As part of the review and revision of the Colorado Academic Standards (CAS), the Colorado Department of Education invited the public to review and give feedback to proposed revisions to the CAS. These public comments, suggestions, and indications of approval were collected through an online feedback system that was open from October 16, 2017 through December 4, 2017. Below is the public feedback submitted for Mathematics. Only those parts of the standards (Prepared Graduate Statements, Grade Level Expectations, Evidence Outcomes, etc.) that received feedback are listed below, and as such, some PGs/GLEs/EOs are missing from this document. For more information on the Colorado Academic Standards and the 2018 review and revision, visit [http://www.cde.state.co.us/standardsandinstruction](http://www.cde.state.co.us/standardsandinstruction).

Mathematics Prepared Graduate Statements

**PG: 1. Make meaning of a problem and plan a solution pathway, while monitoring and evaluating their progress and changing course if necessary.**

- **Agree:** (no comment)
- **Neutral:** How do these fit with the Standards of Mathematics Practice, which are already extremely effective. Is this a duplicate effort? Any streamlining makes more sense than adding new verbage.
- **Disagree:** (no comment)
- **Agree:** Absolutely.
- **Neutral:** (no comment)
- **Disagree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** This seems absolutely appropriate for a prepared graduate competency in mathematics and it leverages the standards for math practice.
- **Agree:** (no comment)
- **Neutral:** (no comment)
- **Agree:** When you rush on a math problem, you are most likely to get the answer wrong. If you read the problem slowly and try to slowly step-by-step, you are probably going to get the correct answer.
- **Comment:** How is this different from common core math practice standards? Do we need something different?
- **Agree:** (no comment)
- **Agree:** (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Neutral: I would suggest to make thinking about the process more modular, identifying what needs to happen in the next step and then identifying what structurally must be done to achieve that change.
Comment: The language of the Prepared Graduate Statements needs revising. It appears to address the Standards for Mathematical Practice - consider a tighter alignment of language.
Comment: I would like to see us abandon these prepared graduate statements completely. There is a lot of overlap with the Practice Standards, and by having both I think it just diffuses the focus.
Agree: This PGS does an adequate job preparing students to be able to problem solve once they leave public education. It has a high cognitive demand asking students to think about their thinking as the approach a math problem and not simply focusing on the algorithm needed to solve the problem. These are definitely skills students will need once they have completed there many years in school.
Agree: (no comment)
Agree: (no comment)
Comment: “Make meaning”? How about “Decide what the question is asking...”
Agree: (no comment)

PG: 2. Communicate precisely to others, using clear definitions to justify their reasoning. They are able to use reasoning skills that rely on estimation, precision and comparison while continually asking themselves, “Does this make sense?”

Agree: (no comment)
Neutral: Communicate reflects the SMP standard “attend to precision” and then is melded here with estimation skills. Again, this feels like layering. Perhaps it will make more sense later, but at first glance it seems redundant.
Agree: (no comment)
Agree: It should be a requisite that prior to the conclusion of each math course that students take notes or annotate notes in a handout that teachers create or gather from accredited sources. Students should be able to articulate math in short excerpts of writing, including explanations of steps to solving problems. For instance, ninth grader writes four or five sentences to explain steps to solving systems using equal values to their extraterrestrial friend who is new to the math concept.
Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Neutral: Perhaps including a specific suggestion to NOT use pronouns when explaining a problem of solution. For example, the use of the word “this” in the wording encourages the same kind of educator fill in that students use to hopefully divert their teachers attention from themselves. Perhaps this isn't absolutely mandatory for all students as a prerequisite for graduation. My suggestion would be to change "this" to something like "Would someone unfamiliar with this problem or solution technique be able to understand my reasoning based on my explanation?"
Agree: I appreciate that this prepared graduate competency transcends the discipline of mathematics and also reinforces the communication skills that are so important when using mathematics to solve problems in the professional world.
Disagree: (no comment)
Agree: (no comment)
Agree: Helping your classmates with math is always helpful. It lets you know that you're not the only one that's confused. When you work together, it is easier and more fun. Repeatedly asking yourself "Does this make sense?" is very important. You have to make sure it makes sense to you.
Comment: How is this different from common core math practice standards? Do we need something different?
Agree: (no comment)
Agree: (no comment)
Neutral: (no comment)
Comment: I did not really understand this one is there a way to make it similar than a whole bunch of words i do not really understand.
Comment: I did not really understand this one is there a way to make it similar than a whole bunch of words i do not really understand.
Agree: (no comment)
Agree: (no comment)
Comment: Consider separating the ideas of communicating and reasoning. Combine the communicating ideas from statement 4 with the communicating ideas of statement 2. Reasoning should be it's own statement.
Agree: This PGS also has a high cognitive demand by asking students to synthesize their learning in order to be able to communicate and justify their reasoning. There is also the underlying life skill of communicating effectively and convincing others you reasoning is correct. I do have one minor question, is it necessary to include "that rely on estimation, precision, and comparison"? Although I degree that those are strategies students should learn in order to communicate and justify, I wonder if there are other ways students might reason through a problem and if there are other strategies students use does that part of the statement mean the alternative ways should not be considered "good enough"?
Agree: (no comment)
Agree: (no comment)
Comment: How does the State intend to support students with dyslexia, dysgraphia, dyscalculia, slow processing speed, etc. in achieving these goals. These students are perfectly able to achieve these goals, but the school districts are unwilling to provide accommodations for many students.
Agree: (no comment)
Comment: I'm glad we are aligning with CCSS so that we have access to many national curriculum choices. However, a weak area across grade levels is practical, day-to-day telling time and dealing with money. I'm not sure where it goes in, but it needs added at multiple levels. And teachers can supplement this missing component with other resources even if it is not in the curriculum they adopt.
Agree: (no comment)
Disagree: This standard tests language rather than mathematical skills. This results in students who excel in math but lacking language communication skills to be potentially "held back" in their progress in math. Weakness in language skills could be a result of culture, foreign language as first language, or simply the manner in which an individual's brain processes information. This standard therefore results in necessarily disadvantaging certain individuals based on these characteristics. It is inherently discriminating against individuals with certain characteristics that has nothing to do with the individual's ability to accurately do math. To eliminate this inequity, this standard should be removed entirely from the math standard in all grade levels.
PG: 3. Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data.

Agree: (no comment)

Disagree: As I read on, I just do not understand the need for these to change the SMPs.
Agree: (no comment)

Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Neutral: While I understand the emphasis on understanding concepts and being able to predict and generalize, at the grade school level, in my professional opinion, there also needs to be emphasis on learning math facts. I have 5th grade students who cannot add or multiply and they are not prepared for the math that they need to be able to do this year, let alone the years to come.
Agree: (no comment)

Agree: This prepared graduate competency leverages the purpose of patterns to make generalizations to support the transfer of mathematics understanding to the real world.
Neutral: (no comment)
Agree: (no comment)

Neutral: I know this is important for many people in 8th grade and above. However, I am only in 7th grade. I realize that this is something you need to know when you are older, but for right now I don't have to worry about this.
Comment: How is this different from common core math practice standards? Do we need something different?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Neutral: I don’t know?
Agree: (no comment)

Agree: (no comment)

Disagree: Teach the student to distinguish between five separate states of nature. (1) We may have random data; i.e. no pattern. (2) We may have data which follows a statistical distribution. (3) When we have chaotic behavior the system may not have a statistical distribution but is deterministic but not predictable. (4) And we may have a situation where the previous statistics are useless because they don’t describe what will become the future probability distribution. (5) Finally, we have a uncertainty where none of the models will work and we can’t apply past probabilities to gauge the future risks. Only simulations may show how a system will evolve. Both the Langton’s Ant and the Game of Life show that math can’t predict how a system of actions will evolve over time. One just has to let the simulation run to see how it turns out. This is most surely how events will occur in the real world. What happened in the past may not recur in the future and the future is unpredictable. Langton’s Ant http://mathworld.wolfram.com/LangtonsAnt.html Game of Life http://mathworld.wolfram.com/GameofLife.html

Comment: Add clarity about patterns.

Disagree: I like the first part of this PGS, however I think you can end the sentence at relationships. "Make sound predictions and generalizations based on patterns and relationships." This makes this PGS more
transferable to a skill we want students to know how to do once they’re done with Math class and makes it more obvious this skill is applied in many content areas.

Agree: (no comment)
Agree: (no comment)

Comment: What will be done to support main streamed students with learning disabilities to achieve these goals. Will teachers be better trained to recognize and remediate issues?

Agree: (no comment)
Agree: (no comment)

Disagree: Revise all knowledge domains to require that the SOL shall provide competency based learning to provide a meaningful and engaging education for both college bound students and non-college bound students. Examples of competency based learning are shown below. http://nursingworld.org/nursingcompetencies https://www.cdc.gov/ncbddd/fasd/curriculum/FASDguide_web.pdf http://www.mpa.unc.edu/competency-based-curriculum Mathematics for the Trades: A Guided Approach, 10th Edition Auth. Saunders and Carman Schools should work with local businesses to better incorporate what they need in the instructional materials. School districts should not have the idea that they can ignore teaching to students who are not college bound. Benefit – Provides examples for the uninterested student on the applicability of the knowledge taught to future work Student may not otherwise see the relevance of the subject to their future Student may find abstract presentation dry and boring Smooth’s the school to workforce transition for students not attending college.

PG: 4. Communicate effective logical arguments using justification and proof. Argumentation involves making and testing conjectures, drawing valid conclusions, and justifying thinking.

Agree: May need to make accommodations such as sentence stems and alternative ways to answer in kinder and first grade.

Disagree: SMP 3????

Agree: (no comment)
Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Neutral: Perhaps this isn’t necessary for as a prerequisite for all students to graduate.

Agree: This prepared graduate competency could be leveraged in language arts and doing so would support student’s ability to demonstrate proficiency in this competency.

Neutral: (no comment)
Neutral: (no comment)

Agree: Have all of your classmates do the exact same math question. When everybody is finished, compare your answers. If all of your answers are the same, congratulate one another. If not everybody has the same answer, explain to them how you got your answer and why it is correct.

Comment: How is this different from common core math practice standards? Do we need something different?

Agree: (no comment)

Comment: Is this about communication in a variety of forms, or just proof writing? I think justifying thinking is very important, but I don't think writing formal proofs is worthy of a top five goal.
Neutral: (no comment)
Neutral: (no comment)
Neutral: (no comment)
Agree: (no comment)

Comment: In this language, discuss how mathematically to test conjectures.

Disagree: I like the concept of the PGS, however the wording of it makes it seem like the "Argumenta-
tion..." part of the PGS is just an after thought and that's where a lot of the cognitive demand lives. One
alternative rewrite might be: "Communicate effective logical arguments by making and testing conjectures,
drawing valid conclusions, and justifying your thinking."

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Disagree: Math standards should not be dependent on language skills or they are unfairly discriminating/
disadvantaging certain population groups.

PG: 5. Use critical thinking to recognize problematic aspects of situations, create
models, and present and defend solutions.

Agree: May also need accommodations for first and kindergarten.

Disagree: I just don't understand. As an educator, I found the SMPs as they are written to work well. Is this
a duplicate or will you do away with SMPs? Why spend this effort? It is frustrating.

Agree: (no comment)

Disagree: Revise the SOL in mathematics to require the instructors use and teach visualization as a means
of teaching math knowledge and in solving problems. Since "critical thinking" is a vague and undefined
term, we should replace it with better definitions. The instructors are to use and teach different heuris-
tics. The research of Scott E. Page suggests that successful people have seven or eight different heuristics
that they can apply to a problem. Steven Covey preached the heuristic of attacking the biggest problem
first. Often the opposite heuristic may apply in a different situation. In To Hell and Back, Audie Murphy
wrote on page 122 wrote of a wrecked Nazi tank. He wrote, "Even the wrecked one worries me. I guess
that when night falls, it will be picked up by a retriever, repaired, and sent against us again. True, it is only
one tank among many, but to the foot soldier that is how war goes. Infinite small threats make up the
whole. Eliminate the little problems, and the big ones take care of themselves."

http://www.jamestanton.com/ Slides on mathematical visualization
https://www.barnesandno-
ble.com/w/difference-scott-e-page/1100625677#productInfoTabs
http://www.ny-
times.com/2012/10/31/books/the-fractalist-benoit-b-mandelbrot-math-memoir.html
Benefits – Benoit
Mandelbrot used his ability to visualize problems as a means of solving problems. James S. Tanton has
methods to use visualization of problems easier for students to understand and solve. Visualization may
help students avoid errors found when solely using algebraic methods.

Disagree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: This is an excellent example of the importance and application of critical thinking and should abso-
lutely be the result of a comprehensive experience in mathematics k-12.
Disagree: How can you “defend” a mathematical solution? The answer is the answer in math.
Agree: That is a great idea
Agree: (no comment)
Agree: Many people don't realize it, but almost everybody hardly use any of their brain power. Some use more than others. Especially in math, it can get difficult and can be hard to figure out. So it's important to use critical thinking.
Comment: How is this different from common core math practice standards? Do we need something different?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Neutral: (no comment)
Agree: (no comment)
Disagree: Critical thinking has to be more well defined here. The scope of what you could mean is quite broad. Even though this has become a buzz word, I would suggest looking at language such as "apply mathematical knowledge effectively to a new application" or "create new mathematical theories based off of previous knowledge and assumptions"
Agree: I like how the word "mathematical" was removed from this PGS, which allows it to be more transferable and makes this a skill that students can rely on once they leave the math classroom. Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: Math standards should not be dependent on language skills or they are unfairly discriminating/disadvantaging certain population groups

Mathematics Preschool

Standard: 1. Number and Quantity

GLE: P.CC.A. Counting and Cardinality: Know number names and the count sequence.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Count verbally or sign to at least 20 by ones. (similar to ELDG 3-5 1.2)

Agree: (no comment)
Supportive Teaching Practices/Adults May:

Agree: (no comment)

Examples of Learning/Children May:

Comment: I wish that this mentioned hide-and-seek games.

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: P.CC.B. Counting and Cardinality: Recognize the number of objects in a small set.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Instantly recognize, without counting, small quantities of up to five objects and says or signs the number. (similar to ELDG 3-5 1.1, 1.4)

Comment: I think that this should specify that we are talking about organized sets (e.g. dice patterns) so that people will not think that we expect preschoolers to be able to instantaneously recognize random sets of 5 objects. I also would encourage us to use the word “subitize” so that people will be able to look that up and find a wealth of information about this topic.

Disagree: If preschool is not mandated, I can't see how or why we would move a Kinder Standard to preschool. You can leave it here, but it also MUST be a Kinder standard as well.

Agree: (no comment)

Supportive Teaching Practices/Adults May:

Agree: (no comment)

Examples of Learning/Children May:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: P.CC.C. Counting and Cardinality: Understand the relationship between numbers and quantities.

Disagree: The use of fingers to represent quantities up to 5 should be a standard, not just a supportive teaching practice. We know from research that students who do not spontaneously use fingers to represent numbers and solve problems tend to progress more slowly, and need explicit teaching and encouragement to do so and preschool is the time to make that happen.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:
Evidence Outcome: Say or sign the number names in order when counting, pairing one number word that corresponds with one object, up to at least 10. (similar to ELDG 3-5 1.3, 1.4)
Disagree: Can we say "one-to-one" correspondence here so that we use the language that all teachers use?
Agree: (no comment)
Evidence Outcome: Count and answer “How many?” questions for approximately 10 objects. (similar to ELDG 3-5 1.4)
Disagree: I don't like the word approximately here. I just think the standard should be clear. Is it to 10 or not?
Agree: (no comment)
Evidence Outcome: Accurately count as many as five objects in a scattered configuration. (similar to ELDG 3-5 1.4)
Agree: (no comment)
Evidence Outcome: Understand that each successive number name refers to a quantity that is one larger. (similar to ELDG 3-5 1.2)
Comment: How does this differ from K.CC.B.4.c? Why have the same expectations for preschool and kindergarten?
Agree: (no comment)
Evidence Outcome: Use the number name of the last object counted to represent the number of objects in a set. (similar to ELDG 3-5 1.5)
Agree: (no comment)
Supportive Teaching Practices/Adults May:
Agree: (no comment)
Examples of Learning/Children May:
Agree: (no comment)
Coherence Connections:
Agree: (no comment)

GLE: P.CC.D. Counting and Cardinality: Compare numbers.
Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:
Evidence Outcome: Compare quantity in two sets of up to five objects and describe the comparison with terms such as more, less, greater than, fewer, or equal to. (similar to ELDG 3-5.2.1)

Comment: I wonder if this should not be about the counting to compare as much as about intuitive comparisons. "Students will compare sets of objects without counting where there are twice as many objects in one set as there are in the other and state which has more and which has less." Perhaps we also add in the comparisons under 5, but since counting to compare is a kindergarten idea, I am not sure how this progresses.

Agree: (no comment)

Evidence Outcome: Identify and use numbers related to order or position from first to tenth. (similar to ELDG 3-5.1.2, 5.4, 5.5)

Disagree: I find the wording here to be unclear. "Use ordinal numbers (e.g. first, second, third) to refer to the placement of objects or people."

Agree: (no comment)

Supportive Teaching Practices/Adults May:

Agree: (no comment)

Examples of Learning/Children May:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: P.C.C.E. Counting and Cardinality: Associate a quantity with written numerals up to 5 and begin to write numbers.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Associate a number of objects with a written numeral 0-5. (similar to ELDG 3-5.1.3)

Comment: Test comment.

Comment: written and spoken?

Agree: (no comment)

Evidence Outcome: Recognize and, with support, write some numerals up to 10. (similar to ELDG 3-5.1.3)

Agree: (no comment)

Supportive Teaching Practices/Adults May:

Agree: (no comment)

Examples of Learning/Children May:

Agree: (no comment)
Standard: 2. Algebra and Functions

GLE: P.OA.A. Operations and Algebraic Thinking: Understand addition as adding to and understand subtraction as taking away from.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Represent addition and subtraction in different ways, such as with fingers, objects, and drawings. (similar to ELDG 3-5 2.2)

Comment: Again this needs to have more detail specific to what this looks like for 5 year old children. Maybe more detail in the "adults may" section.

Evidence Outcome: Solve addition and subtraction word problems. Add and subtract up to five to or from a given number. (similar to ELDG 3-5 2.3)

Comment: This needs to be more specific as to what this looks like for 5 year olds. Some may feel this is a worksheet type of answer.

Evidence Outcome: With adult assistance, begin to use counting on from the larger number for addition. (similar to ELDG 3-5 2.2, 2.3)

Disagree: Counting on as a strategy for addition assumes cardinality. This is not appropriate for many students at this age who simply need to count all over and over. This standard will promote procedural teaching that will be rote and counter productive.


(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Fill in missing elements of simple patterns. (similar to ELDG 3-5 4.1)

Neutral: Numeric, geometric, colored? What are you looking for here? Patterns like this were explicitly not included in the CCSS. What is the rational for including them here? These kinds of activities can be fun and productive and get students to think, I just am not convinced that they should be math standards. I would prefer to see them in art.
Standard: 3. Data, Statistics, and Probability

GLE: P.MD.A. Measurement and Data: Measure objects by their various attributes using standard and non-standard measurement. Use differences in attributes to make comparisons.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use comparative language, such as shortest, heavier, biggest, or later. (similar to ELDG 3-5 5.1, 5.4)

Neutral: Please remove later (which is not coupled with earlier anyway) and include before and after.

Standard: 4. Geometry

GLE: P.G.A. Geometry: Identify, describe, compare, and compose shapes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Name and describe shapes in terms of length of sides, number of sides, and number of angles. (similar to ELDG 3-5 3.1)

Disagree: Describing and comparing shapes by number of angles in preschool seems ambitious. Limit to number of sides.

Evidence Outcome: Correctly name basic shapes regardless of size and orientation. (similar to ELDG 3-5 3.1)

Comment: Please list what is included in "basic shapes." Circles, squares, and triangles? How does this differ from K.G.A.2?

Evidence Outcome: Analyze, compare, and sort two-and three-dimensional shapes and objects in different sizes. Describe their similarities, differences, and other attributes, such as size and shape. (similar to ELDG 3-5 3.3)

Comment: Please fix wording. Should be shapes "of" different sizes.

Supportive Teaching Practices/Adults May:

Comment: Add: provide children with a variety of shapes such as different size and shaped triangles (obtuse, acute, right) and rectangles. Many times children are only presented with the traditional triangle/rectangle shape.
GLE: P.G.B. Geometry: Explore the positions of objects in space.
Evidence Outcome: Correctly follow directions involving their own position in space, such as “Stand up” and “Move forward.” (similar to ELDG 3-5 3.4)
Disagree: “Stand up” is not math.

Mathematics Kindergarten

Standard: 1. Number and Quantity
GLE: 4.NBT.A. Number & Operations in Base Ten: Generalize place value understanding for multi-digit whole numbers.
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:
Comment: I am curious about what the evidence of the CES would look like, and if teachers are expected to teach and assess it.

Inquiry Questions:
Agree: (no comment)

Coherence Connections:
Agree: (no comment)

GLE: 4.NBT.B. Number & Operations in Base Ten: Use place value understanding and properties of operations to perform multi-digit arithmetic.
Agree: (no comment)
Evidence Outcome: Fluently add and subtract multi-digit whole numbers using the standard algorithm. (CCSS: 4.NBT.B.4)
Agree: (no comment)
Evidence Outcome: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (CCSS: 4.NBT.B.5)
Agree: (no comment)
Evidence Outcome: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (CCSS: 4.NBT.B.6)
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:
Comment: (no comment)

Inquiry Questions:
Agree: (no comment)

Coherence Connections:
Agree: (no comment)
GLE: 4.NF.A. Number & Operations - Fractions: Extend understanding of fraction equivalence and ordering.
Inquiry Questions:
Comment: Comment for: "How does comparing fractions by finding common numerators exemplify understanding of denominators of fractions?" The wording is throwing my understanding off - is it "exemplify" or ability to understand both comparisons?

Coherence Connections:
Agree: (no comment)

GLE: 4.NF.B. Number & Operations - Fractions: Build fractions from unit fractions.
Inquiry Questions:
Agree: (no comment)

Coherence Connections:
Agree: (no comment)

Inquiry Questions:
Agree: (no comment)

Coherence Connections:
Agree: (no comment)

GLE: K.CC.A. Counting and Cardinality: Use number names and the count sequence.
Agree: (no comment)
Agree: (no comment)
Disagree: Add one standard: Count back by ones from 20 to 0.
Agree: (no comment)
Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. Another possibility, from NCTM is "Count with understanding and recognize "how many" in sets of objects."

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Count to 100 by ones and by tens. (CCSS: K.CC.A.1)
Agree: (no comment)
Online Feedback  Mathematics Kindergarten

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Count forward beginning from a given number within the known sequence (instead of having to begin at 1). (CCSS: K.CC.A.2)

Agree: (no comment)

Evidence Outcome: Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects). (CCSS: K.CC.A.3)

Disagree: The common core doesn't say read and write, but we should.

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Disagree: The text in the MP 8 description implies that students are counting objects by tens. In CCSS-M and progression documents, the cluster is "Know number names and the count sequence" and the standard appears to be rote counting by tens. If students needed to count objects by tens, it would fall in the next cluster, "count to tell the number of objects." Counting objects by tens is more appropriate at a 1st grade level.

Inquiry Questions:

Agree: (no comment)
Online Feedback  Mathematics Kindergarten

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

Agree: I love the addition of coherence connections. Great idea!

Agree: (no comment)

GLE: K.CC.B. Counting and Cardinality: Count to determine the number of objects.

Agree: (no comment)

Agree: (no comment)

Comment: I recognize that this standard from the CAS was moved to pre-k. "Identify small groups of objects fewer than five without counting." However, not all students will go to pre-k and this is important. It should remain in kindergarten, with added language related to "regularly ordered (e.g. dice patterns."

Disagree: Can be combined with above GLE and combined into one GLE (see above suggestion. As they stand alone they are too specific. and should be EOs.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Apply the relationship between numbers and quantities and connect counting to cardinality. (CCSS: K.CC.B.4)

a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. (CCSS: K.CC.B.4.a)

b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. (CCSS: K.CC.B.4.b)

c. Understand that each successive number name refers to a quantity that is one larger. (CCSS: K.CC.B.4.c)

Agree: (no comment)

Comment: Is this just the formatting here? Why is the standards labeled "a" and the substandard also "a"? This will be very confusing.

Agree: (no comment)

Disagree: I disagree with moving subitizing to preschool standards. While it is a skill that is first encountered in preschool, at the K-12 level, we can't guarantee our students participated in preschool. Leaving it out of the standards in kindergarten creates the potential for kindergarten (and subsequent grade level) teachers to disregard the critical role subitizing plays in numeracy development.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
Evidence Outcome: Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects. (CCSS: K.CC.5)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Disagree: Don’t like question 3
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)


Agree: (no comment)
Agree: (no comment)
Disagree: Why did instantly recognizing groups fewer than five disappear?
Agree: (no comment)
Disagree: Why? Is there a bigger reason as to why students should compare numbers? What’s the transferable skill we want students to remember after school’s over?

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to 10 objects.) (CCSS: K.CC.C.6)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Compare two numbers between 1 and 10 presented as written numerals. (CCSS: K.CC.C.7)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

Comment: In section 2, it would be helpful to be more explicit about first grade's work using place value understanding to compare quantities up to 100.
GLE: K.NBT.A. Number & Operations in Base Ten: Work with numbers 11-19 to gain foundations for place value.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones. (CCSS: K.NBT.A.1)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Disagree: I only like question 3.
Agree: (no comment)
Coherence Connections:

Agree: (no comment)

Agree: (no comment)

Standard: 2. Algebra and Functions

GLE: K.OA.A. Operations & Algebraic Thinking: Model and describe addition as putting together and adding to, and subtraction as taking apart and taking from, using objects or drawings.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Represent addition and subtraction with objects, fingers, mental images, drawings (drawings need not show details, but should show the mathematics in the problem), sounds (e.g. claps), acting out situations, verbal explanations, expressions, or equations. (CCSS: K.OA.A.1)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills” ...

Evidence Outcome: Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem. (CCSS: K.OA.A.2)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills” ...

Evidence Outcome: Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1). (CCSS: K.OA.A.3)

Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation. (CCSS: K.OA.A.4)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Fluently add and subtract within 5. (CCSS: K.OA.A.5)

Disagree: This is a struggling point for teachers because of its lack of clarity. What is fluent? How many problems in a minute, for example? Is it oral or written? Expectations are ALL OVER THE PLACE from classroom to classroom. What does research show to be developmentally appropriate for kindergarten?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Standard: 3. Data, Statistics, and Probability

GLE: K.MD.A. Measurement & Data: Describe and compare measurable attributes.

Agree: (no comment)

Disagree: Please add 3 additional standards here. "Place numbers up to 20 on a marked number line to show numbers as distances from zero. Recognize that the distance between each number is the same." "Given a number on a number line up to 100, generate numbers that would be less than that number as numbers to the left, and numbers to the right as "bigger" or "greater than" or "more." And given two numbers separated by at least one, name numbers that would belong between the two numbers on the number line." "Demonstrate that when numbers are added to, it can be represented with moving to the right on the number line, and when subtracting, it is represented with movement to the left."

Agree: (no comment)
Online Feedback Mathematics Kindergarten

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (CCSS: K.MD.A.1)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter. (CCSS: K.MD.A.2)

Agree: Why did “order several objects by length, height, weight, or price” disappear?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Neutral: We teach kindergarten students not to stand on chairs. Question 2 could be stand on a step, a stool, etc.

GLE: K.MD.B. Measurement & Data: Classify objects and count the number of objects in each category.

Agree: (no comment)

Disagree: There needs to be a standard added, to make a graphic representation of the categories. That is, I have 4 pictures of dogs and 3 pictures of squirrels. Make a representation of that. (using sticky notes, or whatever). Organize it. Sorry I don’t have that word-smithed, but there needs to be something.

Agree: (no comment)

Agree: (no comment)
(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.) (CCSS: K.MD.B.3)

Agree: (no comment)

Comment: Are there other ways that students can categorize besides these to be proficient?? Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Standard: 4. Geometry

GLE: K.G.A. Geometry: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to. (CCSS: K.G.A.1)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Correctly name shapes regardless of their orientations or overall size. (CCSS: K.G.A.2)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”). (CCSS: K.G.A.3)

Disagree: Take out "lying in a plane"

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...


Agree: (no comment)

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/'corners') and other attributes (e.g., having sides of equal length). (CCSS: K.G.B.4)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
Evidence Outcome: Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. (CCSS: K.G.B.5)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?” (CCSS: K.G.B.6)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Mathematics First Grade

Standard: 1. Number and Quantity

GLE: 1.NBT.A. Number & Operations in Base Ten: Extend the counting sequence.

Agree: (no comment)

Disagree: How will this be assessed? What does it mean to “extend the counting sequence.”? Maybe the bigger picture is understanding what counting is and what it tells you?

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. (CCSS: 1.NBT.A.1)

**Agree:** (no comment)

**Comment:** I know in our school district we have kids that can potentially do this in Kinder. Students' in particular from higher income families that were exposed to counting before even entering Kinder. Having this as a 1st grade EO doesn't allow for those students to continue to grow as counter. The statement below continues to be true and including these as they are can have potential harm on our students. Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

**Agree:** (no comment)

**Inquiry Questions:**

**Agree:** (no comment)

**Disagree:** These questions don’t seem to get to the heart of the content in the standard. Perhaps, “how do patterns in the number system help us know what comes next when we count?” or “how do we use the name of the number to help us know how to write it with numerals?” or “how do we use the digits in the number to help us know what the name of the number is? or “what connections are there between the name of the number and how we write it with numerals?”

**Coherence Connections:**

**Agree:** (no comment)

**GLE: 1.NBT.B. Number & Operations in Base Ten: Understand place value.**

**Agree:** (no comment)

**Agree:** (no comment)

**(PG Feedback) Agree:**

**(PG Feedback) Disagree:** I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: (CCSS: 1.NBT.B.2)

a. 10 can be thought of as a bundle of ten ones — called a “ten.” (CCSS: 1.NBT.B.2.a)
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. (CCSS: 1.NBT.B.2.b)
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). (CCSS: 1.NBT.B.2.c)

Comment: A shortcoming of the Common Core standards is that they never make explicit that first grade students should come to understand the structure of tens and ones by counting large sets of objects and structuring them as groups of tens and ones. First graders are transitioning from being counting thinkers to beginning grouping thinkers. They need to develop and apply the grouping thinking, not just recognize it as the standards emphasize. I know that we are trying not to add to Common Core, but clarity would be helpful here...

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. (CCSS: 1.NBT.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: 1.NBT.C. Number & Operations in Base Ten: Use place value understanding and properties of operations to add and subtract.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:
**Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (CCSS: 1.NBT.C.4)

**Agree:** (no comment)

**Disagree:** Does this mean we are now teaching students how to carry/borrow??

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (CCSS: 1.NBT.C.5)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (CCSS: 1.NBT.C.6)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing...
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Comment: add on to question 1: How does thinking about the tens and ones in a number help you add or subtract ten without counting by ones?

Coherence Connections:

Agree: (no comment)

Standard: 2. Algebra and Functions

GLE: 1.OA.A. Operations & Algebraic Thinking: Represent and solve problems involving addition and subtraction.

Disagree: Add 1 standard: Use a number line diagram to represent addition and subtraction as movement to the right or to the left.

Disagree: Not very high rigor... rewrite possibility from NCTM "Model situations that involve addition and subtraction of whole numbers."

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (CCSS: 1.OA.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (CCSS: 1.OA.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
Online Feedback  Mathematics First Grade

Students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:
- Neutral: in questions 2 and 3, suggest a representational option such as number line or bar model as well
- Coherence Connections:
  - Neutral: It would be helpful here to be more explicit that while kindergarten students explore comparing numbers, compare word problems are first introduced in first grade.

GLE: 1.OA.B. Operations & Algebraic Thinking: Understand and apply properties of operations and the relationship between addition and subtraction.
- Agree: (no comment)
- Agree: I like shifting this content to Standard 2.
- (PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Apply properties of operations as strategies to add and subtract. (Students need not use formal terms for these properties.) Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) (CCSS: 1.OA.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Understand subtraction as an unknown-addend problem. For example, subtract 10 - 8 by finding the number that makes 10 when added to 8. (CCSS: 1.OA.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Inquiry Questions:

**Agree:** Good questions here to support the algebraic thinking behind unknowns in word problems. How can we make more direct connections to the language of parts and wholes within the problem types?

**GLE: 1.OA.C. Operations & Algebraic Thinking: Add and subtract within 20.**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).**

**(CCSS: 1.OA.C.5)**

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).**

**(CCSS: 1.OA.C.6)**

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Inquiry Questions:**

**Neutral:** possible rewording of Question 3: How can we use counting on or counting back to solve problems when we run out of fingers?
Online Feedback  Mathematics First Grade


**Disagree:** What does "Work with" mean how will it be assessed? How will we know when students can "work with" correctly?

*(PG Feedback) Disagree:* I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2. (CCSS: 1.OA.D.7)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ - 3, 6 + 6 = _. (CCSS: 1.OA.D.8)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Inquiry Questions:**

Neutral: Possible question: What does the equals sign mean?

**Standard: 3. Data, Statistics, and Probability**

GLE: 1.MD.A. Measurement & Data: Measure lengths indirectly and by iterating length units.

**Disagree:** Add 1 standard: Represent numbers from 1-120 on a marked number line diagram. Use benchmark numbers to estimate positions on a number line diagram. (e.g. “On this line the number 0 is here, 50 is here, and 100 is here. About where should I put the number 99?” Or, “50 is here and 100 is here. What do you think this number is that is in the middle between those numbers.”

**Agree:** (no comment)

32
Online Feedback  Mathematics First Grade

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Order three objects by length; compare the lengths of two objects indirectly by using a third object. (CCSS: 1.MD.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills…”

Evidence Outcome: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (CCSS: 1.MD.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills…”

Inquiry Questions:

Neutral: This feels like a test question. Maybe broaden it, "how can an object have more than one measure?" (this could get into multiple attributes measured or different units used or inaccuracies in the measuring process)

Coherence Connections:

Disagree: 3. I disagree that students should understand the use of standard measures before non-standard measures. Different units can also be explored through non-standard units of measure.

GLE: 1.MD.B. Measurement & Data: Tell and write time.

Disagree: Please add a standard about knowing the value of pennies, nickles, dimes, and quarters. To immediately leap at 2nd grade to solving problems with money without prior experience with the value of coins is too steep a climb.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design.
backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Tell and write time in hours and half-hours using analog and digital clocks. (CCSS: 1.MD.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Disagree: These aren’t really inquiry questions. They seem more like assessment questions. Maybe, "Why do we call it a half-hour? Why do we say half-past? How are the hands on the clock alike and different?"

GLE: 1.MD.C. Measurement & Data: Represent and interpret data.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (CCSS: 1.MD.C.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Comment: There should be more about verbalization of ideas in these. Students should be able to make accurate statements about data representations using accurate vocabulary and syntax. E.g. "There were 6 more students who went to the park last Saturday than students who went shopping."
Standard: 4. Geometry


Comment: See 2nd grade: Also another option from NCTM "Categorize two- and three-dimensional shapes by their attributes." (for 1st it would probably be only 2D) this ups the rigor a bit.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. (CCSS: 1.G.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students to not need to learn formal names, such as “right rectangular prims.”) (CCSS: 1.G.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. (CCSS: 1.G.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

**Neutral:** Identifying congruence and symmetry in the first statement might prompt teachers to believe they are responsible for teaching these concepts, even though the statement says, "intuitive understanding."

**Inquiry Questions:**

**Disagree:** Maybe broaden the second question to prompt more inquiry, "how does the number of pieces you cut a shape into affect the size of the pieces?"

**Coherence Connections:**

**Disagree:** The grade 2 statement is to vague to be helpful.

---

**Mathematics Second Grade**

**Standard: 1. Number and Quantity**

**GLE: 2.NBT.A. Number & Operations in Base Ten: Understand place value.**

**Disagree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

(PG Feedback) **Disagree:** I wish I could put strongly disagree! I’ve never seen such horrible standards for students!!

(PG Feedback) **Agree:**

(PG Feedback) **Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: (CCSS: 2.NBT.A.1)

a. 100 can be thought of as a bundle of ten tens — called a "hundred." (CCSS: 2.NBT.A.1.a)

b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones). (CCSS: 2.NBT.A.1.b)

**Disagree:** (no comment)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: Count within 1000; skip-count by 5s, 10s, and 100s. (CCSS: 2.NBT.A.2)**

- **Disagree:** This isn’t even taught at my daughter’s school
- **Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (CCSS: 2.NBT.A.3)**

- **Disagree:** Not taught!
- **Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons. (CCSS: 2.NBT.A.4)**

- **Disagree:** Another thing not taught
- **Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

- **Disagree:** (no comment)
- **Agree:** (no comment)

**Inquiry Questions:**

- **Agree:** If this was used I’d back it 100 percent but it isn’t!
- **Agree:** (no comment)
Disagree: These questions are too narrow to inquire about for long. Make them more open ended.

Coherence Connections:
Disagree: (no comment)
Agree: (no comment)

GLE: 2.NBT.B. Number & Operations in Base Ten: Use place value understanding and properties of operations to add and subtract.
Neutral: (no comment)
Agree: (no comment)
Disagree: This is pretty good, but could be more rigorous by adding students develop strategies based on their knowledge to add and subtract.

(PG Feedback) Disagree:
(PG Feedback) Agree:
(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. (CCSS: 2.NBT.B.5)

Disagree: (no comment)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of the EOs to “Learning Progression” or “Essential Learning Skills”...

Comment: Could the term fluently be defined? Fluency doesn’t not mean rote memory. It means being able to use number sense to solve a basic fast. Fluently doesn’t mean do timed math tests. Research is showing that speed and drill test is negatively impacting students. Being fast at math fast recall does not necessarily mean a student is a strong math student.

Evidence Outcome: Add up to four two-digit numbers using strategies based on place value and properties of operations. (CCSS: 2.NBT.B.6)
Disagree: (no comment)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
Evidence Outcome: Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (CCSS: 2.NBT.B.7)

Disagree: Just teach the students how to do the work without the extra bs
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900. (CCSS: 2.NBT.B.8)

Disagree: Ccss are useless! The standards hold students back
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.) (CCSS: 2.NBT.B.9)

Disagree: (no comment)
Agree: (no comment)
Agree: Could this be the GLE????

Colorado Essential Skills and Mathematical Practices:

Disagree: (no comment)
Agree: (no comment)

Inquiry Questions:

Disagree: (no comment)
Online Feedback  Mathematics Second Grade

Agree: (no comment)

Neutral: I like the broader question with the example in parentheses. Could the same format be used for the second question? "What is the most efficient way to solve an addition problem with three addends?" (e.g. 38+...) More about other broader questions? "How does thinking about tens and ones help you add and subtract mentally? Which is more efficient: breaking both addends into tens and ones or keeping one number whole and breaking the other addend into tens and ones? How can you use a number line to represent adding and subtracting tens and ones? How about drawings of tens and ones? How about concrete materials?"

Coherence Connections:

Disagree: (no comment)

Agree: (no comment)

Standard: 2. Algebra and Functions

GLE: 2.OA.A. Operations & Algebraic Thinking: Represent and solve problems involving addition and subtraction.

Disagree: This GLE is OK, a rewrite to consider from NCTM (where Common Core stemmed from).... "Model situations that involve the addition and subtraction of whole numbers." OR "Select and use appropriate operations to solve real world problems."

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (see CCSS glossary) (CCSS: 2.OA.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Neutral: Maybe we can challenge the key words a bit more with something like, "why do you sometimes add the two numbers to solve a take apart problem? and why do you sometimes subtract the two numbers to solve an add to problem?"

Coherence Connections:

Neutral: It would be helpful for second grade teachers to know that first grade students were exposed to all three addition and subtraction problem types (add to/take from, put together/take apart, and comparison) and that the work of 2nd grade is to refine their understanding and apply to two step problems.
GLE: 2.OA.B. Operations & Algebraic Thinking: Add and subtract within 20.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read "Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution."

Evidence Outcome: Fluently add and subtract within 20 using mental strategies. (See 1.OA.C.6 for a list of strategies.) By end of Grade 2, know from memory all sums of two one-digit numbers. (CCSS: 2.OA.B.2)

Comment: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Colorado Essential Skills and Mathematical Practices:

Disagree: MP 1: students should not be using tools or diagrams by the end of the year. All combinations within 20 should be solved with reasoning strategies. Please don’t imply that students can be modeling or counting to be proficient with this standard by the end of the year.

GLE: 2.OA.C. Operations & Algebraic Thinking: Work with equal groups of objects to gain foundations for multiplication.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read "Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution."
Evidence Outcome: Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends. (CCSS: 2.OA.C.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. (CCSS: 2.OA.C.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Disagree: I'd like to see more emphasis on the development of multiplication in this section than on even and odd.

Inquiry Questions:

Disagree: I'd like to see more emphasis on the development of multiplication in this section than on even and odd.

Standard: 3. Data, Statistics, and Probability

GLE: 2.MD.A. Measurement & Data: Measure and estimate lengths in standard units.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. (CCSS: 2.MD.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
Evidence Outcome: Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. (CCSS: 2.MD.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Estimate lengths using units of inches, feet, centimeters, and meters. (CCSS: 2.MD.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. (CCSS: 2.MD.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Disagree: Add MP6; Students must be supported in order to be able to use proper syntax to describe differences in length. (e.g. "The red bar is six inches longer than the blue bar." and, "The blue bar is six inches shorter than the red bar.")

Inquiry Questions:

Neutral: Can we broaden question 2? "When is a 25-foot measuring tape a better tool than a 1-foot ruler? When is a 1-foot ruler a better tool than a 25-foot measuring tape?"

GLE: 2.MD.B. Measurement & Data: Relate addition and subtraction to length.

Agree: (no comment)
(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (CCSS: 2.MD.B.5)

Comment: Please amend to include reference to the use of number lines to represent these problems.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram. (CCSS: 2.MD.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Neutral: It would probably be helpful to explicitly state something about using number lines as a tool to compare quantities and to add or subtract quantities.

Inquiry Questions:

Neutral: "How can number lines help us add and subtract mentally?"

GLE: 2.MD.C. Measurement & Data: Work with time and money.

Disagree: How is this assessed? What kind of work?

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Evidence Outcome: Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. (CCSS: 2.MD.C.7)

Comment: Analog clocks are quickly going the route of Roman Numerals. I look forward to the day that reading an analog clock is eliminated from our standards.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have? (CCSS: 2.MD.C.8)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: The CES makes a better GLE.

Inquiry Questions:

Disagree: Question 1 is very simple.

Disagree: Question 1 is too specific. How about something like "why does telling time require counting by different size units? (fives and ones?) What is the same and what is different about digital and analog clocks? which questions about time are easier to answer by looking at an analog clock? (how close to the hour is it? how many more minutes until...) which questions about time are easier to answer by looking at a digital clock? (what time is it?)

GLE: 2.MD.D. Measurement & Data: Represent and interpret data.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units. (CCSS: 2.MD.D.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems (see CCSS glossary) using information presented in a bar graph. (CCSS: 2.MD.D.10)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Disagree: language in #2 will be difficult for general classroom teachers.

Standard: 4. Geometry


Disagree: Not very rigorous...from NCTM: "Analyze shapes from mathematical and real-world perspectives."

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (CCSS: 2.G.A.1)

Disagree: I know that this is the CCSS standard. But drawing solids with a specified number of faces was absurd from the beginning and continues to be. It should be eliminated.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
Evidence Outcome: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them. (CCSS: 2.G.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape. (CCSS: 2.G.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Comment: Add, "How can these counters be organized into rows and columns? Is it possible to make a rectangular shape?"

Coherence Connections:

Disagree: Specify what students need to do in grade 3. Being vague doesn’t help the teacher plan ahead.

Mathematics Third Grade

Standard: 1. Number and Quantity

GLE: 3.NBT.A. Number & Operations in Base Ten: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:
(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use place value understanding to round whole numbers to the nearest 10 or 100. (CCSS: 3.NBT.A.1)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (CCSS: 3.NBT.A.2)

Agree: (no comment)
Agree: (no comment)
Agree: It is great to have the common core standards code included so that teachers can access other resources that are aligned to the CCSSM to support their learning and their teaching of this evidence outcome and standard.

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. (CCSS: 3.NBT.A.3)

Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

GLE: 3.NF.A. Number & Operations - Fractions: Develop understanding of fractions as numbers.

Agree: (no comment)

Agree: Thank you for including all of the standards that fall under a given cluster in the same evidence outcome. This provides a much clearer picture of what the student learning should include and makes it easier to provide coherent instruction to students.

Agree: (no comment)
Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Describe a fraction as the quantity formed by (1) part when a whole is partitioned into (b) equal parts; understand a fraction as the quantity formed by a parts of size ( ). (CCSS: 3.NF.A.1)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Disagree: Could we insert this language about "a whole?" a whole (e.g. a set of objects, a geometric shape, a bar, a measurement (capacity, weight, time)) There is lots of explicit mention of number lines (thus the need for more work with number lines with whole numbers in the lower grades), but no mention of other representations.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Describe a fraction as a number on the number line; represent fractions on a number line diagram. (CCSS: 3.NF.A.2)

a. Represent a fraction as ( ) on a number line diagram by defining the interval from (0) to (1) as the whole and partitioning it into (b) equal parts. Recognize that each part has size ( ) and that the endpoint of the part based at (0) locates the number ( ) on the number line. (CCSS: 3.NF.A.2.a)

b. Represent a fraction as ( ) on a number line diagram by marking off (a) lengths ( ) from (0). Recognize that the resulting interval has size ( ) and that its endpoint locates the number ( ) on the number line. (CCSS: 3.NF.A.2.b)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (CCSS: 3.NF.A.3)

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (CCSS: 3.NF.A.3.a)

b. Recognize and generate simple equivalent fractions, e.g., \( \frac{1}{2} = \frac{2}{4} \). Explain why the fractions are equivalent, e.g., by using a visual fraction model. (CCSS: 3.NF.A.3.b)

c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express \( 3 \) in the form \( 3 = \frac{3}{1} \); recognize that \( 6 = \frac{6}{1} \); locate \( 1 \) at the same point of a number line diagram. (CCSS: 3.NF.A.3.c)

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols \( > \), \( = \), or \( < \), and justify the conclusions, e.g., by using a visual fraction model. (CCSS: 3.NF.A.3.d)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: "If i cut this rope, this watermelon, this peanut into 2 equal parts, how is that the same in all cases? Do I have the same amount? Why is the fraction the same?"

Coherence Connections:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Standard: 2. Algebra and Functions

GLE: 3.OA.A. Operations and Algebraic Thinking: Represent and solve problems involving multiplication and division.

Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. (CCSS: 3.OA.A.1)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: For all grade levels and standards: Use numbers for evidence outcomes instead of letters.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. (CCSS: 3.OA.A.2)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (see glossary table 2) (CCSS: 3.OA.A.3)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = _ \div 3$, $6 \times 6 = ?$. (CCSS: 3.OA.A.4)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Comment: The use of the word decomposed (referring to breaking down an array) is confusing as math terminology. Perhaps a better word is deconstruct.

Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

GLE: 3.OA.B. Operations and Algebraic Thinking: Apply properties of multiplication and the relationship between multiplication and division.

Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find $8 \times 7$ as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.) (CCSS: 3.OA.B.5)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Interpret division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8. (CCSS: 3.OA.B.6)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Comment: Background Knowledge as opposed to personal experience

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Comment: * How can the distributive property be modeled using a closed array? I like the question, but I wonder if using the term 'distributive property' implies that the students must use the term to understand the property. Because the standards state that students are not responsible for using the term, is this question inaccessible to some students?

Coherence Connections:

Agree: I am glad to have the coherence statements that help me understand both coherence within the grade and across grades.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

PG Feedback Agree: I am so glad that the prepared graduate statements are broad and reflect the ways that all people use math in the real world. It is great to have all standards link to all prepared graduate statements.

PG Feedback Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. (CCSS: 3.OA.C.7)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: The inquiry questions here provide reflective questions for a grade level team to consider when preparing to teach and assess this evidence outcome.
Agree: (no comment)

Coherence Connections:

Agree: The statement around fluency supporting the use of reasoning to solve problems provides additional clarity to the spirit of the standards and ways to support students.
Agree: (no comment)

GLE: 3.OA.D. Operations and Algebraic Thinking: Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).) (CCSS: 3.OA.D.8)

Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. (CCSS: 3.OA.D.9)

Agree: (no comment)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Inquiry Questions:

Agree: (no comment)
Agree: (no comment)
Coherence Connections:

Agree: (no comment)
Agree: (no comment)

Standard: 3. Data, Statistics, and Probability
GLE: 3.MD.A. Measurement and Data: Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram. (CCSS: 3.MD.A.1)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm³ and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of “times as much”; see Glossary, Table 2).) (CCSS: 3.MD.A.2)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

GLE: 3.MD.B. Measurement and Data: Represent and interpret data.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were ”backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each
PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. (CCSS: 3.MD.B.3)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Disagree: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters. (CCSS: 3.MD.B.4)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Disagree: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:
Agree: (no comment)
Agree: (no comment)

Inquiry Questions:
Agree: (no comment)
Agree: (no comment)

Coherence Connections:
Agree: (no comment)
Agree: (no comment)
GLE: 3.MD.C. Measurement and Data: Use concepts of area and relate area to multiplication and to addition.

**Agree:** (no comment)

**Agree:** (no comment)

**Disagree:** Area?? hmmm...shouldn’t this belong in geometry? Plus....This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) **Agree:**

(PG Feedback) **Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Recognize area as an attribute of plane figures and understand concepts of area measurement. (CCSS: 3.MD.C.5)

**Neutral:** (no comment)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills” ...

**Evidence Outcome:** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). (CCSS: 3.MD.C.6)

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
Evidence Outcome: Use concepts of area and relate area to the operations of multiplication and addition. (CCSS: 3.MD.C.7.a)

a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. (CCSS: 3.MD.C.7.a)

b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. (CCSS: 3.MD.C.7.b)

c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning. (CCSS: 3.MD.C.7.c)

d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. (CCSS: 3.MD.C.7.d)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

GLE: 3.MD.D. Geometric measurement: Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

Agree: (no comment)
Agree: (no comment)
**Disagree:** This also sounds more like Geometry and would be more meaningful if taught with geometry...plus... This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Agree:**

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. (CCSS: 3.MD.D.8)

*Agree:* (no comment)

*Agree:* (no comment)

*Agree:* (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...Definitely should be in Geometry!

**Colorado Essential Skills and Mathematical Practices:**

*Agree:* (no comment)

*Agree:* (no comment)

**Inquiry Questions:**

*Agree:* (no comment)

*Agree:* (no comment)

**Coherence Connections:**

*Agree:* (no comment)

*Agree:* (no comment)

**Standard: 4. Geometry**

**GLE: 3.G.A. Geometry: Reason with shapes and their attributes.**

*Agree:* (no comment)
Evidence Outcome: Explain that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. (CCSS: 3.G.A.1)

Evidence Outcome: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape. (CCSS: 3.G.A.2)

Colorado Essential Skills and Mathematical Practices:

Inquiry Questions:

Coherence Connections:

I appreciate the connection between geometry and the major content of the grade being explicitly stated here.

I like that these match the standards within the cluster in the CCSSM.

Mathematics Fourth Grade

Standard: 1. Number and Quantity

GLE: 4.NBT.A. Number & Operations in Base Ten: Generalize place value understanding for multi-digit whole numbers.

Evidence Outcome: Explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that (700 / 70 = 10) by applying concepts of place value and division. (CCSS: 4.NBT.A.1)

I like that these match the standards within the cluster in the CCSSM.
Evidence Outcome: Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using (>), (=), and (<) symbols to record the results of comparisons. (CCSS: 4.NBT.A.2)

- Agree: (no comment)
- Agree: (no comment)

Evidence Outcome: Use place value understanding to round multi-digit whole numbers to any place. (CCSS: 4.NBT.A.3)

- Neutral: I think that we should decide what place the students need to get to, to be considered a master of this subject. Hundredths, thousandths.....
- Agree: (no comment)
- Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

- Agree: (no comment)
- Agree: (no comment)

Inquiry Questions:

- Agree: (no comment)
- Agree: (no comment)

Coherence Connections:

- Agree: (no comment)
- Agree: (no comment)
- Agree: (no comment)

GLE: 4.NBT.B. Number & Operations in Base Ten: Use place value understanding and properties of operations to perform multi-digit arithmetic.

- Agree: (no comment)
- Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Fluently add and subtract multi-digit whole numbers using the standard algorithm. (CCSS: 4.NBT.B.4)

- Agree: (no comment)
- Agree: (no comment)

Evidence Outcome: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (CCSS: 4.NBT.B.5)

- Agree: (no comment)
- Agree: (no comment)

Evidence Outcome: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (CCSS: 4.NBT.B.6)

- Agree: (no comment)
- Agree: (no comment)
Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Comment: Inquiry question 1 here sounds more like a question to pose to teachers, not students. Are these inquiry questions for teachers or students? Now I am confused. Looking back at the prior grades these are clearly written so that they could be presented to students. I prefer that myself. I think that the format and intention of these (for students or for teachers) should be consistent across the grades.

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

GLE: 4.NF.A. Number & Operations - Fractions: Extend understanding of fraction equivalence and ordering.

Agree: (no comment)
Agree: (no comment)

Comment: It might be nice to have fractions separate like they are in the CCSSM domains.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Explain why a fraction \( \frac{a}{b} \) is equivalent to a fraction \( \frac{c}{d} \) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (CCSS: 4.NF.A.1)

Agree: (no comment)
Agree: (no comment)

Evidence Outcome: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as \( \frac{1}{2} \). Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols \( > \), \( = \), or \( < \), and justify the conclusions, e.g., by using a visual fraction model. (CCSS: 4.NF.A.2)

Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Comment: What was the reasoning behind choosing common numerators for the inquiry question rather than common denominators, using benchmark fractions, etc.?
Comment: Question 2 here looks like it is targeted at teachers, not students. I don’t like giving the area model hint in that question. I think there are a number of ways to do this and by suggesting an area model it kind of shuts down the inquiry.

Coherence Connections:
- Agree: (no comment)
- Agree: (no comment)
- Agree: I think the coherence connections are powerful information for teachers.

GLE: 4.NF.B. Number & Operations - Fractions: Build fractions from unit fractions.
- Agree: (no comment)
- Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:

Evidence Outcome: Understand a fraction ( ) with (a > 1) as a sum of fractions (. (CCSS: 4.NF.B.3)
- a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. (CCSS: 4.NF.B.3.a)
- b. Decompose a fraction into a sum of fractions with like denominators in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: ( ) ; ( ) ; ( 2 = 1 + 1 + = + + ). (CCSS: 4.NF.B.3.b)
- c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. (CCSS: 4.NF.B.3.c)
- d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. (CCSS: 4.NF.B.3.d)
- Agree: (no comment)
- Agree: (no comment)

Evidence Outcome: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. (CCSS: 4.NF.B.4)
- a. Understand a fraction ( ) as a multiple of (. For example, use a visual fraction model to represent ( ) as the product ( 5 ), recording the conclusion by the equation ( = 5 ). (CCSS: 4.NF.B.4.a)
- b. Understand a multiple of ( ) as a multiple of ( ), and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express ( 3 ) as ( 6 ), recognizing this product as ( ). (In general, ( n = ).) (CCSS: 4.NF.B.4.b)
- c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat ( ) of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie? (CCSS: 4.NF.B.4.c)
- Agree: (no comment)
- Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:
- Agree: (no comment)
- Agree: (no comment)

Inquiry Questions:
- Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

Comment: I think the second thing here is a good example why we need to mention the use of a lot of visual models in 3rd grade. I think that this should be true, however the standards as they are written here only explicitly mention number lines.


Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:

Evidence Outcome: Express a fraction with denominator (10) as an equivalent fraction with denominator (100), and use this technique to add two fractions with respective denominators (10) and (100). (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.) For example, express ( ) as ( ), and add ( + = ). (CCSS: 4.NF.C.5)

Agree: (no comment)
Agree: (no comment)

Evidence Outcome: Use decimal notation for fractions with denominators (10) or (100). For example, rewrite (0.62) as ( ); describe a length as (0.62) meters; locate (0.62) on a number line diagram. (CCSS: 4.NF.C.6)

Agree: (no comment)
Agree: (no comment)

Evidence Outcome: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols (>), (=), or (<), and justify the conclusions, e.g., by using a visual model. (CCSS: 4.NF.C.7)

Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Comment: Is the third statement an inquiry question, or does it belong in Coherence Connections.

Coherence Connections:

Agree: (no comment)
Agree: (no comment)
Standard: 2. Algebra and Functions

GLE: 4.OA.A. Operations and Algebraic Thinking: Use the four operations with whole numbers to solve problems.

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (CCSS: 4.OA.A.1)

Agree: (no comment)

Evidence Outcome: Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (See glossary.) (CCSS: 4.OA.A.2)

Agree: (no comment)

Evidence Outcome: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (CCSS: 4.OA.A.3)

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Agree: Knowing that my students have trouble creating equations from words (multiplicative vs additive comparison), this seems to be a great/essential question and skill.

Coherence Connections:

Agree: (no comment)

Comment: Perhaps unnecessary and is find stand alone - could the third to fifth grade connection be strengthened using linear, to area, to volume connection?

GLE: 4.OA.B. Operations and Algebraic Thinking: Gain familiarity with factors and multiples.

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. (CCSS: 4.OA.B.4)

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Neutral: I like the first inquiry question. Is the second question something that would really be addressed in 4th grade?

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

Agree: (no comment)

GLE: 4.OA.C. Operations and Algebraic Thinking: Generate and analyze patterns.

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. (CCSS: 4.OA.C.5)

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

Agree: (no comment)

Standard: 3. Data, Statistics, and Probability

GLE: 4.MD.A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Agree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Agree:

(PG Feedback) Agree: I like the connections to the Standards for Math Practice that appear in these statements.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Evidence Outcome: Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), … (CCSS: 4.MD.A.1)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (CCSS: 4.MD.A.2)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. (CCSS: 4.MD.A.3)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Inquiry Questions:

Agree: (no comment)

Agree: (no comment)

Coherence Connections:

Agree: I appreciate the connection of time to both the decomposing of shapes and the concept of fractions.

Comment: Could the following: "imagine how operations impact larger numbers" also be stated for small numbers (less than one)?

GLE: 4.MD.B. Represent and interpret data.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. (CCSS: 4.MD.B.4)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Agree: (no comment)

Comment: The following: "How can informal experiences with data provide foundational understanding to support future data analysis?" seems more of a coherence question. An inquiry question might talk more about the current ability to use the data or decision make with the data.

Coherence Connections:

Agree: (no comment)

Agree: (no comment)
GLE: 4.MD.C. Measurement and Data: Geometric measurement: understand concepts of angle and measure angles.

Agree: (no comment)

Disagree: This seems to belong in the geometry standard.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: (CCSS: 4.MD.C.5)

a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles. (CCSS: 4.MD.C.5.a)

b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. (CCSS: 4.MD.C.5.b)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. (CCSS: 4.MD.C.6)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (CCSS: 4.MD.C.7)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Comment: Is there also a connection to composing and decomposing whole numbers?

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

Comment: Agree with statement - wording somewhat disjoint between both sentences.

Standard: 4. Geometry


Agree: (no comment)

Disagree: This has pretty low cognitive demand.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (CCSS: 4.G.A.1)

Agree: (no comment)

Disagree: I would love to see this one deleted. It comes out of nowhere, is rote in the way it is presented, and is not extended in 5th or 6th grade, meaning that it is completely forgotten and needs to be retaught in geometry. So really it is just a waste of time in 4th grade and people just teach it because it might be on the state test.
**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. (CCSS: 4.G.A.2)

- **Agree:** (no comment)

- **Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (CCSS: 4.G.A.3)

- **Agree:** (no comment)

- **Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

- **Agree:** (no comment)

**Inquiry Questions:**

- **Agree:** (no comment)

**Coherence Connections:**

- **Agree:** (no comment)

- **Agree:** (no comment)
Mathematics Fifth Grade

Standard: 1. Number and Quantity

GLE: 5.NBT.A. Number & Operations in Base Ten: Understand the place value system.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Recognize that in a multi-digit number, a digit in one place represents (10) times as much as it represents in the place to its right and ( ) of what it represents in the place to its left. (CCSS: 5.NBT.A.1)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Explain patterns in the number of zeros of the product when multiplying a number by powers of (10), and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of (10). Use whole-number exponents to denote powers of (10). (CCSS: 5.NBT.A.2)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…
Evidence Outcome: Read, write, and compare decimals to thousandths. (CCSS: 5.NBT.A.3)
   a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., (347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 + 9 + 2 ). (CCSS: 5.NBT.A.3.a)
   b. Compare two decimals to thousandths based on meanings of the digits in each place, using (>, =), and (<) symbols to record the results of comparisons. (CCSS: 5.NBT.A.3.b)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use place value understanding to round decimals to any place. (CCSS: 5.NBT.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: 5.NBT.B. Number & Operations in Base Ten: Perform operations with multi-digit whole numbers and with decimals to hundredths.

Agree: (no comment)

Disagree: Too specific with the "to the hundredths" part of this GLE. The rest of it is better, however if we truly want a more transferable/ rigorous skill instead of simply performing operations a more rigorous term might be "fluently" or to understand the meaning.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Fluently multiply multi-digit whole numbers using the standard algorithm.  
(CCSS: 5.NBT.B.5)

Agree: It would be great to have an example of what the state means by "The Standard Algorithm." Believe it or not, this is a source of controversy.

Agree: (no comment)

Comment: Is using the standard algorithm the only way students can show they can do the math??? Does it make it any less correct if they use their own way if its quick and accurate? Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (CCSS: 5.NBT.B.6)

Agree: (no comment)

Disagree: So specific! What if a kids doesn’t understand any of these??? This narrow EO runs a risk of teachers not allowing students to have mathematical freedom.

Evidence Outcome: Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (CCSS: 5.NBT.B.7)

Agree: (no comment)

Disagree: This one needs to specify that when multiplying decimal numbers that they will have products to the hundredths place. 5th grade students should not be required to multiply hundredths by hundredths resulting in products to the ten-thousandths place. It is inconsistent with the other standards and completely unreasonable. I believe what I am saying was the intention of the writers of the Common Core, we just need to fix the wording.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

**GLE: 5.NF.A. Number & Operations - Fractions: Use equivalent fractions as a strategy.**

Agree: (no comment)

**Comment:** Fractions: Use equivalent fractions as a strategy. A strategy for what? finish ...strategy to add and subtract fractions.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) **Agree:**

(PG Feedback) **Disagree:** I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, ( + = + = ). (In general, ( + = ).) (CCSS: 5.NF.A.1)

Agree: (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result ( + = ), by observing that ( < ). (CCSS: 5.NF.A.2)

Agree: (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: 5.NF.B. Number & Operations - Fractions: Apply and extend previous understandings of multiplication and division.

Agree: (no comment)

Comment: Fractions: Apply and extend previous understandings of multiplication and division. finish ...division to multiply and divide fractions.

Disagree: This doesn’t fit with the EOs. It’s broad enough, but what are we asking students to do if they were asked to show proficiency only on GLE. There’s not enough there to know what we’re asking students to do.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Interpret a fraction as division of the numerator by the denominator (( = a b )). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret () as the result of dividing (3) by (4), noting that (1) multiplied by (4) equals (3), and that when (3) wholes are shared equally among (4) people each person has a share of size (). If (9) people want to share a (50)-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie? (CCSS: 5.NF.B.3)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. (CCSS: 5.NF.B.4)

a. Interpret the product \( \left( \frac{a}{b} \right) \) as a parts of a partition of \( (q) \) into \( (b) \) equal parts; equivalently, as the result of a sequence of operations \( (a \div b) \). For example, use a visual fraction model to show \( (4 \div 2) \), and create a story context for this equation. Do the same with \( (2 \div 3) \). (In general, \( (a \div b) \). (CCSS: 5.NF.B.4.a)

b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. (CCSS: 5.NF.B.4.b)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… Do we need the sub-EOs for this one?? Are they too constraining?

Evidence Outcome: Interpret multiplication as scaling (resizing), by: (CCSS: 5.NF.B.5)

a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. (CCSS: 5.NF.B.5.a)

b. Explaining why multiplying a given number by a fraction greater than \( (1) \) results in a product greater than the given number (recognizing multiplication by whole numbers greater than \( (1) \) as a familiar case); explaining why multiplying a given number by a fraction less than \( (1) \) results in a product smaller than the given number; and relating the principle of fraction equivalence \( (\frac{a}{b} = \frac{c}{d}) \) to the effect of multiplying \( (\frac{a}{b}) \) by \( (1) \). (CCSS: 5.NF.B.5.b)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… Do we need the sub-EOs for this one?? Are they too constraining?

Evidence Outcome: Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. (CCSS: 5.NF.B.6)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing
Evidence Outcome: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) (CCSS: 5.NF.B.7)

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for \( \frac{1}{4} \), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that \( \frac{1}{4} = \) because \( \frac{1}{4} \times 4 = 1 \). (CCSS: 5.NF.B.7.a)

b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for \( 4 \), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that \( 4 \div \frac{1}{4} = 20 \) because \( \frac{1}{4} 	imes 20 = 4 \). (CCSS: 5.NF.B.7.b)

c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share \( \frac{1}{2} \) lb of chocolate equally? How many \( \frac{1}{4} \)-cup servings are in 2 cups of raisins?

d. (CCSS: 5.NF.B.7.c)

Disagree: The majority of 5th grade students are not ready to conceptually understand dividing with fractions. I would appreciate it if someone involved in the decision-making process would actually try teaching this subject to 5th graders before mandating that they learn it.

Agree: (no comment)

Comment: Students are not ready to divide fractions in 5th grade. They cannot conceptually understand what is happening when you divide a whole number by a fraction or a fraction into a whole number.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Standard: 2. Algebra and Functions

GLE: 5.OA.A. Operations and Algebraic Thinking: Write and interpret numerical expressions.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use grouping symbols (parentheses, brackets, or braces) in numerical expressions, and evaluate expressions with these symbols. (CCSS: 5.OA.A.1)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as 18932 + 921, without having to calculate the indicated sum or product. (CCSS: 5.OA.A.2)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: 5.OA.B. Operations and Algebraic Thinking: Analyze patterns and relationships.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have
Evidence Outcome: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. (CCSS: 5.OA.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE: 5.MD.B. Measurement and Data: Represent and interpret data.**

*Agree: (no comment)*

*(PG Feedback) Disagree:* I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. *(CCSS: 5.MD.B.2)*

*Agree:* The example in this one is way too confusing in my opinion.

*Comment:* Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE: 5.MD.C. Measurement and Data: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**

*Disagree:* Shouldn’t this be in Geometry?

*Disagree:* This doesn’t seem like it fits in this Standard...sounds more like a a Geometry standard.

*(PG Feedback) Disagree:* I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Recognize volume as an attribute of solid figures and understand concepts of
volume measurement. (CCSS: 5.MD.C.3)
   a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of vol-
      ume, and can be used to measure volume. (CCSS: 5.MD.C.3.a)
   b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to
      have a volume of n cubic units. (CCSS: 5.MD.C.3.b)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and
improvised units. (CCSS: 5.MD.C.4)
Agree: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Relate volume to the operations of multiplication and addition and solve real
world and mathematical problems involving volume. (CCSS: 5.MD.C.5)
   a. Model the volume of a right rectangular prism with whole-number side lengths by packing it
      with unit cubes, and show that the volume is the same as would be found by multiplying
      the edge lengths, equivalently by multiplying the height by the area of the base. Represent
      threefold whole-number products as volumes, e.g., to represent the associative property of
      multiplication. (CCSS: 5.MD.C.5.a)
   b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of
      right rectangular prisms with whole number edge lengths in the context of solving real
      world and mathematical problems. (CCSS: 5.MD.C.5.b)
   c. Use the additive nature of volume to find volumes of solid figures composed of two non-
      overlapping right rectangular prisms by adding the volumes of the non-overlapping parts,
      applying this technique to solve real world problems. (CCSS: 5.MD.C.5.c)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

85
Standard: 4. Geometry

GLE: 5.G.A. Geometry: Graph points on the coordinate plane to solve real-world and mathematical problems.

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate). (CCSS: 5.G.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (CCSS: 5.G.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: 5.G.B. Geometry: Classify two-dimensional figures into categories based on their properties.

Disagree: Can the rigor of this be bumped with changing “classify” to analyze?

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each
PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles. (CCSS: 5.G.B.3)

Agree: We need specificity around the nature of a trapezoid. Is it a category or a shape? Are all rectangles trapezoids?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Classify two-dimensional figures in a hierarchy based on properties. (CCSS: 5.G.B.4)

Agree: Are trapezoids to be treated as a category? Are all rectangles trapezoids? I think all teachers need to be on the same page with this one.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Mathematics Sixth Grade

Standard: 1. Number and Quantity

GLE: 6.NS.A. The Number System: Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Disagree: (no comment)

Agree: (no comment)

(PG Feedback) Disagree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for ( ) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that ( = ) because ( ) of ( ) is (). (In general, ( = ).) How much chocolate will each person get if 3 people share ( ) lb of chocolate equally? How many ( )-cup servings are in ( ) of a cup of yogurt? How wide is a rectangular strip of land with length ( ) mi and area ( ) square mi? (CCSS: 6.NS.A.1)

Comment: I think the example is wordy. I teach this in multiple ways you could show the KCF. The keep, change, flip or maybe no example at all.

Disagree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Disagree: why would we do that

Inquiry Questions:

Disagree: (no comment)

Coherence Connections:

Disagree: (no comment)

GLE: 6.NS.B. The Number System: Compute fluently with multi-digit numbers and find common factors and multiples.

Disagree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree:

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Fluently divide multi-digit numbers using the standard algorithm. (CCSS: 6.NS.B.2)

**Disagree:** This should be completed in 5th grade (or at least started). Not just conceptually, but using the standard algorithm.

**Disagree:** Why is this not in 5th grade? It is not a middle school concept, they should already know how to divide whole numbers with the standard algorithm so that 6th grade then takes that concept and applies it to decimal division.

**Disagree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. (CCSS: 6.NS.B.3)

**Agree:** What does fluently mean? That is not a measurable word to me.

**Disagree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2). (CCSS: 6.NS.B.4)

**Disagree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

**Disagree:** (no comment)
Disagree: (no comment)

Inquiry Questions:

Agree: (no comment)

Disagree: (no comment)

Coherence Connections:

Agree: (no comment)

Disagree: Development of the algorithm should go with the models in 5th grade, not in 6th grade. We focus on the division of decimals with the standard algorithm.

Disagree: (no comment)

Disagree: (no comment)

GLE: 6.NS.C. The Number System: Apply and extend previous understandings of numbers to the system of rational numbers.

Disagree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain why positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (CCSS: 6.NS.C.5)

Disagree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Describe a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. (CCSS: 6.NS.C.6)

a. Use opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; identify that the opposite of the opposite of a number is the number itself, e.g., -(3) = 3, and that 0 is its own opposite. (CCSS: 6.NS.C.6.a)

b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; explain that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. (CCSS: 6.NS.C.6.b)

c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. (CCSS: 6.NS.C.6.c)

Neutral: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Order and find absolute value of rational numbers. (CCSS: 6.NS.C.7)

a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right. (CCSS: 6.NS.C.7.a)

b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write -3 °C > -7 °C to express the fact that -3 °C is warmer than -7 °C. (CCSS: 6.NS.C.7.b)

c. Define the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars. (CCSS: 6.NS.C.7.c)

d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars. (CCSS: 6.NS.C.7.d)

Neutral: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (CCSS: 6.NS.C.8)

Neutral: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:
- **Neutral**: (no comment)

Inquiry Questions:
- **Neutral**: (no comment)

Coherence Connections:
- **Neutral**: (no comment)

- **Agree**: (no comment)
- **Agree**: (no comment)
- **Disagree**: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) **Agree**:

(PG Feedback) **Disagree**: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) **Disagree**: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Apply the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.” (CCSS: 6.RP.A.1)

Agree: (no comment)
Neutral: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Apply the concept of a unit rate ( ) associated with a ratio ( a:b ) with ( b 0 ), and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of (3) cups of flour to (4) cups of sugar, so there is ( ) cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.” (Expectations for unit rates in this grade are limited to non-complex fractions.) (CCSS: 6.RP.A.2)

Agree: (no comment)
Disagree: no way

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (CCSS: 6.RP.A.3)

a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. (CCSS: 6.RP.A.3.a)

b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? (CCSS: 6.RP.A.3.b)

c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. (CCSS: 6.RP.A.3.c)

d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (CCSS: 6.RP.A.3.d)

Agree: (no comment)

Comment: I noticed that the PFL is missing. In the summary it said that it was suggested to move it to Social Studies. Has this been communicated and will it be on Social Studies standards. I fear that we will be tested on it and no one will be responsible for teaching it.
Neutral: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Disagree: (no comment)

Inquiry Questions:

Agree: I appreciate these. Very helpful.

Disagree: (no comment)

Coherence Connections:

Agree: Extremely valuable.

Disagree: nope

Agree: This progression is so critical to 6-8 grade success that other areas of focus should be reduced so RP standards can have more time spent on them in 6th grade.

Standard: 2. Algebra and Functions

GLE: 6.EE.A. Expressions & Equations: Apply and extend previous understandings of arithmetic to algebraic expressions.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Write and evaluate numerical expressions involving whole-number exponents.

(CCSS: 6.EE.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Write, read, and evaluate expressions in which letters stand for numbers.

(CC:SS 6.EE.A.2)

a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation “Subtract (y) from (5)” as (5 - y). (CC:SS: 6.EE.A.2.a)

b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression (2 ( 8 + 7 ) ) as a product of two factors; view ( ( 8 + 7 ) ) as both a single entity and a sum of two terms. (CC:SS: 6.EE.A.2.b)

c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas ( V = s^3 ) and ( A = 6s^2 ) to find the volume and surface area of a cube with sides of length ( s = ). (CC:SS: 6.EE.A.2.c)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression ( 3 ( 2 + x ) ) to produce the equivalent expression ( 6 + 3x ); apply the distributive property to the expression ( 24x + 18y ) to produce the equivalent expression ( 6 ( 4x + 3y ) ); apply properties of operations to (y + y + y) to produce the equivalent expression (3y). (CC:SS: 6.EE.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions (y + y + y) and (3y) are equivalent because they name the same number regardless of which number (y) stands for. (CC:SS: 6.EE.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Describe solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. (CCSS: 6.EE.B.5)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; recognize that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (CCSS: 6.EE.B.6)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Solve real-world and mathematical problems by writing and solving equations of the form (x = p=q) and (px=q) for cases in which (p), (q) and (x) are all nonnegative rational numbers. (CCSS: 6.EE.B.7)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
Evidence Outcome: Write an inequality of the form \((x < c)\) or \((x > c)\) to represent a constraint or condition in a real-world or mathematical problem. Show that inequalities of the form \((x > c)\), \((x < c)\), \((x = c)\), or \((x \leq c)\) have infinitely many solutions; represent solutions of such inequalities on number line diagrams. (CCSS: 6.EE.B.8)

Comment: There should be an evaluation of whether or not 6th graders are ready to make the leap from equivalent expressions to inequalities. Since this is repeated in 7th, is that the better place for introduction of this topic allowing for greater depth of equivalent expressions in 6th?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…”

GLE: 6.EE.C. Expressions & Equations: Represent and analyze quantitative relationships between dependent and independent variables.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation \((d = 65t)\) to represent the relationship between distance and time. (CCSS: 6.EE.C.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Comment: How are students to investigate independent and dependent relationships here? What is the limit of understanding expected, especially algebraically? Understanding the difference between this standard, and the 7th grade \( y = cx \), and the 8th grade functions \( y = mx + b \), it seems that students have to understand most of this, if not all, before entering 7th, then repeat to more focused extent in 7th, then return to idea in 8th. But coherence comments suggest that it is a stair-stepped building block.

Standard: 3. Data, Statistics, and Probability


Comment: This doesn’t seem like it is a transferable life skill. Sure it’s something to teach, however is there a bigger picture concept we want students to know? I think combining the statistic ones into one GLE gets to the bigger picture.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Identify a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students’ ages. (CCSS: 6.SP.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Demonstrate that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (CCSS: 6.SP.A.2)

Disagree: The 6.SP standards need to be minimized and this would be a good place to trim the GLEs in this area. While this cluster supports 7.SP clusters, those should be trimmed down, as well. Essentially, students will need to be re-taught many SP standards in high school anyway. Trimming the standards in middle will allow greater focus and rigor on the 6 and 7 grade standards that focus on rational number numeracy and proportional reasoning, which is where most students struggle and why Algebra has such a high failure rate.
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Explain that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. (CCSS: 6.SP.A.3)

Disagree: 6.SP.A.3 provides another opportunity to trim down the quantity of 6th grade standards. Statistical variability is important to learn. Is 6th grade the right place? Will students use these concepts any time soon or will they just need to be retaught by a high school teacher anyway?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Agree: Maybe spread some of these concepts into 8th grade, that way the bulk of it is not done in 6th and 7th.


Disagree: This doesn’t seem like it is a transferable life skill. Sure it’s something to teach, however is there a bigger picture concept we want students to know? I think combining the statistic ones into one GLE gets to the bigger picture.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.B.4)

Disagree: I think dot plots and histograms are completely reasonable for 6th graders to use, create and read. However, box and whisker plots with variability (inter-quartile range and/or mean absolute deviation is absurd. They are just learning measures of center in 6th grade and to apply at that level is too much. This type of statistical data display and understanding would better fit with 8th grade.

Disagree: How important is it that students can create such a wide range of data displays? Understanding statistics is important. Is this the right time to focus on this topic when there is so much about numeracy students need to learn to apply?
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Summarize numerical data sets in relation to their context, such as by: (CCSS: 6.SP.B.5)

a. Reporting the number of observations. (CCSS: 6.SP.B.5.a)
b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. (CCSS: 6.SP.B.5.b)
c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (CCSS: 6.SP.B.5.c)
d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (CCSS: 6.SP.B.5.d)

Disagree: I think dot plots and histograms are completely reasonable for 6th graders to use, create and read. However, box and whisker plots with variability (inter-quartile range and/or mean absolute deviation is absurd. They are just learning measures of center in 6th grade and to apply at that level is too much. This type of statistical data display and understanding would better fit with 8th grade.

Disagree: While these ideas are important to learn, is 6th grade the right time? For example, MAD seems like such a highly focused skill and that will need to be retaught in high school in Stats.

Disagree: Finding IQR and MAD are developmentally inappropriate measures for 6th graders. Finding these measures is purely skill-based. Finding range provides 6th graders with the necessary information to be able to describe the spread of the data.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Standard: 4. Geometry


Comment: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Agree:
(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. (CCSS: 6.G.A.1)

Agree: This concept should be the main focus of this cluster. It would be good to reduce the number of GLEs in this standard in other areas.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas (V = l w h) and (V = b h) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. (CCSS: 6.G.A.2)

Comment: This standard reads more like a lesson plan rather than an evidence outcome.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. (CCSS: 6.G.A.3)

Agree: This is an important concept to focus on as it prepares students to use the coordinate plane for a variety of purposes.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
Evidence Outcome: Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. (CCSS: 6.G.A.4)

Neutral: Does this include pyramids? Specific shapes that are netted need to be listed.

Neutral: It would be good to revisit the reason why this moved from 7th grade down to 6th. Are 6th graders ready for this concept? Do 7th grade teachers reteach it anyway when they teach 7.G.B.6?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EO's are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EO's are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EO's and changing the name of EO's to “Learning Progression” or “Essential Learning Skills”...

Mathematics Seventh Grade

Standard: 1. Number and Quantity

GLE: 7.NS.A. The Number System: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Agree: (no comment)

PG Feedback: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

PG Feedback: Agree:
Evidence Outcome: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (CCSS: 7.NS.A.1)

a. Describe situations in which opposite quantities combine to make (0). For example, a hydrogen atom has (0) charge because its two constituents are oppositely charged. (CCSS: 7.NS.A.1.a)

b. Demonstrate (p+q) as the number located a distance (\(|q|\)) from (p), in the positive or negative direction depending on whether (q) is positive or negative. Show that a number and its opposite have a sum of (0) (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. (CCSS: 7.NS.A.1.b)

c. Demonstrate subtraction of rational numbers as adding the additive inverse, (p-q=p+(-q)). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (CCSS: 7.NS.A.1.c)

d. Apply properties of operations as strategies to add and subtract rational numbers. (CCSS: 7.NS.A.1.d)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Evidence Outcome: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (CCSS: 7.NS.A.2)

a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as ((-1)(-1) = 1) and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. (CCSS: 7.NS.A.2.a)

b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If (p) and (q) are integers, then (\((-\frac{p}{q}) = \frac{p}{-q}\)). Interpret quotients of rational numbers by describing real-world contexts. (CCSS: 7.NS.A.2.b)

c. Apply properties of operations as strategies to multiply and divide rational numbers. (CCSS: 7.NS.A.2.c)

d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. (CCSS: 7.NS.A.2.d)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)
Evidence Outcome: Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) (CCSS: 7.NS.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Inquiry Questions:

Coherence Connections:

GLE: 7.RP.A. Ratios & Proportional Relationships: Analyze proportional relationships and use them to solve real-world and mathematical problems.
Evidence Outcome: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks (1) mile in each (2) hour, compute the unit rate as the complex fraction (1 \text{ mile}) \div (2 \text{ hours}) = \frac{1}{2} \text{ miles per hour}, equivalently (2) miles per hour. (CCSS: 7.RP.A.1)

Disagree: I disagree about teaching complex fractions with unit rates. I talk about complex fractions, but students see that dividing by 2/3 is the same as multiplying by the reciprocal. I am using this in the unit for solving equations and will then move to unit rates and teach the same way!

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Identify and represent proportional relationships between quantities. (CCSS: 7.RP.A.2)

a. Determine whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (CCSS: 7.RP.A.2.a)

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (CCSS: 7.RP.A.2.b)

c. Represent proportional relationships by equations. For example, if total cost (t) is proportional to the number (n) of items purchased at a constant price (p), the relationship between the total cost and the number of items can be expressed as \( t = pn \). (CCSS: 7.RP.A.2.c)

d. Explain what a point \((x, y)\) on the graph of a proportional relationship means in terms of the situation, with special attention to the points \((0, 0)\) and \((1, r)\) where \(r\) is the unit rate. (CCSS: 7.RP.A.2.d)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Agree: (no comment)
Evidence Outcome: Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (CCSS: 7.RP.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Disagree: Not sure that we need to include the entrepreneurial skills in the standards - maybe allow this as an extra option.

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Comment: This section is SO helpful to me as a teacher and a parent. It helps me to know where they are coming from, where they are going to and why it is needed.

Agree: (no comment)
Neutral: (no comment)

Standard: 2. Algebra and Functions

GLE: 7.EE.A. Expressions & Equations: Use properties of operations to generate equivalent expressions.

Agree: (no comment)
Agree: Really like the coding at the front of the GLE and the math domain language!!

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (CCSS: 7.EE.A.1)

Neutral: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Agree: (no comment)

Evidence Outcome: Demonstrate that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, \((a + 0.05a = 1.05a)\) means that “increase by (5)%” is the same as “multiply by (1.05).” (CCSS: 7.EE.A.2)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Disagree: This CES does not make sense with this. What position are students supposed to take???

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: I like statement 3 that this GLE requires greater emphasis... why not just say "MAJOR WORK OF THE GRADE?"

Agree: (no comment)

GLE: 7.EE.B. Expressions & Equations: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Disagree: This GLE is transferable, however is there a more rigorous more important life skill that encompasses this skill?

Agree: (no comment)
Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

PG Feedback) Agree:

Evidence Outcome: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional () of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar (9 ) inches long in the center of a door that is (27 ) inches wide, you will need to place the bar about (9) inches from each edge; this estimate can be used as a check on the exact computation. (CCSS: 7.EE.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Evidence Outcome: Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (CCSS: 7.EE.B.4)

a. Solve word problems leading to equations of the form \( px + q = r \) and \( (p)(x + q) = r \) where \( p \), \( q \), and \( r \) are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? (CCSS: 7.EE.B.4.a)

b. Solve word problems leading to inequalities of the form \( px + q > r \), \( (p)(x + q) < r \), or \( (p + q) > r \) where \( p \), \( q \), and \( r \) are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. (CCSS: 7.EE.B.4.b)

Comment: It is confusing when the evidence outcome is labeled with a lower case letter, and the sub-statement is also labeled with a lower case letter. Why not use numbers for the evidence outcomes? This will also make the CCSS coding the same as the Colorado coding.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:
Agree: (no comment)

Inquiry Questions:
Comment: The language when I click the (i) for Inquiry questions is a little awkward??

Agree: (no comment)

Coherence Connections:
Agree: (no comment)

Standard: 3. Data, Statistics, and Probability
GLE: 7.SP.A. Statistics & Probability: Use random sampling to draw inferences about a population.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Understand that statistics can be used to gain information about a population by examining a sample of the population; explain that generalizations about a population from a sample are valid only if the sample is representative of that population. Explain that random sampling tends to produce representative samples and support valid inferences. (CCSS: 7.SP.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)
Evidence Outcome: Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be. (CCSS: 7.SP.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)


Disagree: With the main focus of 7.SP.A being the application of proportional reasoning to statistical analysis, does this standard support coherence with this concept? The standards need to be reduced at the middle levels and this might be a good place to look for opportunities to do this.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:
Evidence Outcome: Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. (CCSS: 7.SP.B.3)

**Disagree**: Eliminate MAD at the middle level.

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree**: (no comment)

Evidence Outcome: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. (CCSS: 7.SP.B.4)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree**: (no comment)

Colorado Essential Skills and Mathematical Practices:

**Agree**: (no comment)

Inquiry Questions:

**Agree**: (no comment)

Coherence Connections:

**Agree**: (no comment)


**Comment**: Probability is not taught until 7th grade, then not touched on at all in 8th grade. In order for students to build a deeper understanding and for greater retention of the concepts of probability, I feel it should be introduced earlier, perhaps 5th grade, and built upon over the middle school years.

**Comment**: Much of these ideas do not get revisited until high school. Are they necessary to include in 7th grade, which is already packed with standards, when they will likely need to be retaught at a higher grade?

**Disagree**: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able
to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Explain that the probability of a chance event is a number between (0) and (1) that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near (0) indicates an unlikely event, a probability around () indicates an event that is neither unlikely nor likely, and a probability near (1) indicates a likely event. (CCSS: 7.SP.C.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Evidence Outcome: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. (CCSS: 7.SP.C.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)
Evidence Outcome: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (CCSS: 7.SP.C.7)

a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. (CCSS: 7.SP.C.7.a)

b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (CCSS: 7.SP.C.7.b)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Evidence Outcome: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (CCSS: 7.SP.C.8)

a. Explain that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (CCSS: 7.SP.C.8.a)

b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. (CCSS: 7.SP.C.8.b)

c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood? (CCSS: 7.SP.C.8.c)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Coherence Connections:

Agree: (no comment)

Standard: 4. Geometry

GLE: 7.G.A. Geometry: Draw construct, and describe geometrical figures and describe the relationships between them.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Agree:

Evidence Outcome: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (CCSS: 7.G.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Evidence Outcome: Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. (CCSS: 7.G.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)
Evidence Outcome: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in cross sections of right rectangular prisms and right rectangular pyramids. (CCSS: 7.G.A.3)

**Disagree:** While it seems as if this standard might lead to some interesting activities for 7th graders, this seems more like a lesson plan than a standard for what we want students to learn. I am unsure if students will use these concepts in 8th grade or Algebra. (The coherence connections seem to back this up) Likely students will engage in similar activities in Geometry which means that they are being retaught something they learned 3 years prior.

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree:** (no comment)

**Colorado Essential Skills and Mathematical Practices:**

**Agree:** (no comment)

**Inquiry Questions:**

**Agree:** (no comment)

**Coherence Connections:**

**Agree:** (no comment)

**GLE: 7.G.B. Geometry: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**Agree:** (no comment)

**PG Feedback Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**PG Feedback Agree:**
Evidence Outcome: State the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. (CCSS: 7.G.B.4)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree**: (no comment)

Evidence Outcome: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (CCSS: 7.G.B.5)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree**: (no comment)

Evidence Outcome: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (CCSS: 7.G.B.6)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree**: (no comment)

Colorado Essential Skills and Mathematical Practices:

**Agree**: (no comment)

Inquiry Questions:

**Agree**: (no comment)

Coherence Connections:

**Agree**: (no comment)
Mathematics Eighth Grade

Standard: 1. Number and Quantity

GLE: 8.NS.A. The Number System: Know that there are numbers that are not rational, and approximate them by rational numbers.

Agree: I really like this change. This feels like what an 8th grade student can realistically grasp when trying to understand irrational vs rational numbers.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Demonstrate informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. Define irrational numbers as numbers that are not rational. (CCSS: 8.NS.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., \(\sqrt{2}\)). For example, by truncating the decimal expansion of \(\sqrt{2}\), show that \(\sqrt{2}\) is between (1) and (2), then between (1.4) and (1.5), and explain how to continue on to get better approximations. (CCSS: 8.NS.A.2)

Agree: Good to have example included rather than at bottom of Standard.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Comment: (CES) Colorado Essential Skills Entrepreneurial Skills... "skills" noted twice?
Agree: Would like a link to complete list of CES Entrepreneurial Skills

Coherence Connections:

Comment: What about including future learning? This would strengthen the coherence.
Agree: What about future learnings?

Standard: 2. Algebra and Functions


Comment: Understanding exponents and radicals is an important precursor to Algebra. Within this cluster, please look for opportunities to reduce the scope of this standard. The reality is that Algebra teachers often reteach exponent rules in their entirety, and 8th grade teachers have reduced or eliminated the teaching of many exponent rules because of this fact. If the scope of study were reduced, perhaps teachers would be more inclined to teach exponents in a way that led to better retention and understanding of them so that Algebra teachers did not need to teach an entire unit on them.

Comment: Can major content be identified in all grades and standards so teachers know what content may need more emphasis?

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, \(3 \cdot 2 \times 3^{5} \cdot 3 = 3^4 \cdot 3 = 3^5\). (CCSS: 8.EE.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Online Feedback

Mathematics Eighth Grade

Evidence Outcome: Use square root and cube root symbols to represent solutions to equations of the form \((x^2 = p)\) and \((x^3 = p)\), where \((p)\) is a positive rational number. Evaluate square roots of small perfect squares (up to 100) and cube roots of small perfect cubes (up to 64). Know that \((\sqrt{ })\) is irrational. (CCSS: 8.EE.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use numbers expressed in the form of a single digit times an integer power of \((10)\) to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as \((3)\) times \((10^8)\) and the population of the world as \((7)\) times \((10^9)\), and determine that the world population is more than \((20)\) times larger. (CCSS: 8.EE.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. (CCSS: 8.EE.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Comment: Saying all GLE’s "require greater emphasis" means none of them get greater emphasis. We have to determine importance. Some of them must be lesser emphasis

GLE: 8.EE.B. Expressions & Equations: Understand the connections between proportional relationships, lines, and linear equations.

Comment: This GLE is a critical learning in middle school math that brings together major areas of study from 5 through 7 grade. As you consider the scope and sequence of standards, look for ways to reduce the number of standards 5-8 grade teachers must address so that they can focus on ones that lead directly to students being able to access this GLE and therefore be better prepared for Algebra.
Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. (CCSS: 8.EE.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use similar triangles to explain why the slope (m) is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation (y = mx) for a line through the origin and the equation (y = mx + b) for a line intercepting the vertical axis at (b). (CCSS: 8.EE.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...


Comment: Consider clarifying the specific objectives of this cluster so that there is clear articulation from 8th grade teachers to Algebra teachers when it comes to solving simultaneous linear equations.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able
Online Feedback  Mathematics Eighth Grade

Evidence Outcome: Solve linear equations in one variable. (CCSS: 8.EE.C.7)

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form \((x = a), (a = a), \text{ or } (a = b)\) results (where \((a)\) and \((b)\) are different numbers). (CCSS: 8.EE.C.7.a)

b. Solve linear equations with rational number coefficients, including equations with variables on both sides and whose solutions require expanding expressions using the distributive property and collecting like terms. (CCSS: 8.EE.C.7.b)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Analyze and solve pairs of simultaneous linear equations. (CCSS: 8.EE.C.8)

a. Explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. (CCSS: 8.EE.C.8.a)

b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, \((3x + 2y = 5)\) and \((3x + 2y = 6)\) have no solution because \((3x + 2y)\) cannot simultaneously be \((5)\) and \((6)\). (CCSS: 8.EE.C.8.b)

c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. (CCSS: 8.EE.C.8.c)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…


Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect
is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Define a function as a rule that assigns to each input exactly one output. Show that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required for Grade 8.) (CCSS: 8.F.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. (CCSS: 8.F.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Interpret the equation (y = mx + b) as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function (A = s^2) giving the area of a square as a function of its side length is not linear because its graph contains the points ((1,1)), ((2,4)) and ((3,9)), which are not on a straight line. (CCSS: 8.F.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Agree: LOVE the previous, current, and future learning in this section. Might each coherence piece be modeled after this one?
Comment: How does work in 6th grade relate to this? In 6th, standard to graph equations of lines seems to be same as now graphing $y = mx + b$

**GLE: 8.F.B. Functions: Use functions to model relationships between quantities.**

*Agree: (no comment)*

*(PG Feedback) Agree:* I appreciate that the Prepared Graduate is at the top of each standard. How might we imbedd them even more in the standard information? i.e the Mathematical Practices.

*(PG Feedback) Disagree:* I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome: Construct a function to model a linear relationship between two quantities.**

Determine the rate of change and initial value of the function from a description of a relationship or from two ((x, y)) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (CCSS: 8.F.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. (CCSS: 8.F.B.5)**

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Coherence Connections:**

*Agree:* "This requires greater emphasis based on..." is helpful in elevating the importance of college and career readiness.
Standard: 3. Data, Statistics, and Probability


**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (CCSS: 8.SP.A.1)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. (CCSS: 8.SP.A.2)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. (CCSS: 8.SP.A.3)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
Online Feedback Mathematics Eighth Grade

ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Explain that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores? (CCSS: 8.SP.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Standard: 4. Geometry

GLE: 8.G.A. Geometry: Understand congruence and similarity using physical models, transparencies, or geometry software.

Disagree: The rigor of this GLE is not there. What’s the bigger reasoning for studying this? Why is this a transferable something kids will need to know? This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Verify experimentally the properties of rotations, reflections, and translations: (CCSS: 8.G.A.1)

a. Lines are taken to lines, and line segments to line segments of the same length. (CCSS: 8.G.A.1.a)

b. Angles are taken to angles of the same measure. (CCSS: 8.G.A.1.b)

c. Parallel lines are taken to parallel lines. (CCSS: 8.G.A.1.c)

Comment: I think the wording of a, b, and c are really awkward and unclear. Are you referring to corresponding parts? Rigid transformations and congruency? What is this getting at?!

Comment: The verbiage "are taken to" in these standards is confusing and unclear. I have had to search this online and I haven't found anything that makes it clear other than just guessing and stumbling through it. Lines are taken to lines, and line segments to line segments of the same length. (CCSS: 8.G.A.1.a) Angles are taken to angles of the same measure. (CCSS: 8.G.A.1.b) Parallel lines are taken to parallel lines. (CCSS: 8.G.A.1.c)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Demonstrate that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. (CCSS: 8.G.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (CCSS: 8.G.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Demonstrate that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. (CCSS: 8.G.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so. (CCSS: 8.G.A.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Comment: Might the "i" give us the list of skills and a short description of each?

Comment: Entrepreneurial skill comment seems to be a stretch, at best

Coherence Connections:

Comment: Not sure what "this GLE requires greater emphasis" means - greater than what? This does not seem to be a GLE that is actually that big of a deal in the overall scheme of mathematics progression. Overall, is the emphasis of this GLE on transformations within the coordinate system and coordinate rules? With respect to similarity and dilations, where does the concept of indirect measurement fit - 7th grade, 8th grade, or HS? Standards are not clear.


Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain a proof of the Pythagorean Theorem and its converse. (CCSS: 8.G.B.6)

Neutral: Is this standard that students can explain any proof of Pythagoras? There are so many of them!

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (CCSS: 8.G.B.7)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (CCSS: 8.G.B.8)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Comment: GLE requires greater emphasis in comparison to what?


Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their
integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: State the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (CCSS: 8.G.C.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Mathematics High School

Standard: 1. Number and Quantity

GLE: HS.N-CN.A. The Complex Number System: Perform arithmetic operations with complex numbers.

Agree: (no comment)

Disagree: Not a necessary competency for a high school graduate

Disagree: I agree with everything up to mastery of the complex number system in algebra one level. It takes through the algebra 2 level before students really master all operations on complex numbers.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. Potentially, combining this one with the GLE about real numbers might make this one more applicable.

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Define complex number (i) such that (i^2 = -1), and show that every complex number has the form (a + bi) where (a) and (b) are real numbers. (CCSS: HS.N-CN.A.1)

Agree: (no comment)
Disagree: should not be expected

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use the relation (i^2 = -1) and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. (CCSS: HS.N-CN.A.2)

Agree: (no comment)

Disagree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. (CCSS: HS.N-CN.A.3)

Agree: (no comment)

Disagree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Neutral: These are tough to agree with because although I see the importance of teaching High School students complex numbers I also see how they are not relevant for all students beyond school. I wonder what the bigger picture is for learning complex numbers...again, should this be linked with the rational numbers and more of a general knowledge? (I'm not saying they shouldn't be taught because I think they should be taught and students should be exposed the operations with complex numbers, however I'm not sure if it should be its own GLE.
Coherence Connections:

**Agree:** (no comment)

**Comment:** I would argue that complex conjugate is needed in algebra 2 and not necessarily only what is defined as advanced classes here (calculus etc). I think rephrasing #2 with the (+) might be necessary

**Agree:** (no comment)

**GLE:** HS.N-CN.B. The Complex Number System: Represent complex numbers and their operations on the complex plane.

**Agree:** I appreciate the inclusion of the (+) standards so that I have guidance on the content that honors level students should engage in at the high school level.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. Potentially, combining this one with the GLE about real numbers might make this one more applicable.

**Disagree:** How much do students need to know about the complex number system to enter college? For some majors it would be good for some background information to be known, but not necessary for all who enter college.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard“ a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. (CCSS: HS.N-CN.B.4)

**Comment:** So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

**Evidence Outcome:** (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, ( ( -1 + )^3 = 8 ) because ( ( -1 + ) ) has modulus (2) and argument (120). (CCSS: HS.N-CN.B.5)

**Comment:** So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

**Evidence Outcome:** (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. (CCSS: HS.N-CN.B.6)

**Comment:** So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.
Coherence Connections:

**Comment**: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

**GLE: HS.N-CN.C. The Complex Number System: Use complex numbers in polynomial identities and equations.**

**Agree**: (no comment)

**Disagree**: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Disagree**: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome**: Solve quadratic equations with real coefficients that have complex solutions. (CCSS: HS.N-CN.C.7)

**Agree**: (no comment)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome**: (+) Extend polynomial identities to the complex numbers. For example rewrite as ( x^2+4 ) as ( (x + 2i)(x - 2i) ). (CCSS: HS.N-CN.C.8)

**Agree**: (no comment)

**Comment**: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

**Evidence Outcome**: (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. (CCSS: HS.N-CN.C.9)

**Agree**: (no comment)

**Comment**: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.
Colorado Essential Skills and Mathematical Practices:

**Agree**: (no comment)

**Agree**: (no comment)

Inquiry Questions:

**Agree**: (no comment)

**Neutral**: (no comment)

Coherence Connections:

**Agree**: (no comment)

**Neutral**: (no comment)

**GLE: HS.N-Q.A. Quantities: Reason quantitatively and use units to solve problems.**

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: Most excellent! I've been teaching this way for years...thank you for the validation.

**Agree**: (no comment)

**(PG Feedback) Agree:**

**(PG Feedback) Comment**: #1 is phrased strangely. Putting this into two separate sentences like in #4 would make it sounds much stronger and be much clearer

**(PG Feedback) Disagree**: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(CCSS: HS.N-Q.A.1)*

**Agree**: (no comment)

**Agree**: (no comment)

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Define appropriate quantities for the purpose of descriptive modeling. *(CCSS: HS.N-Q.A.2)*

**Agree**: (no comment)

**Agree**: (no comment)
Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CCSS: HS.N-Q.A.3)

Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

Comment: "middle grades" : is this middle school? Or what is meant by this?
Agree: (no comment)

GLE: HS.N-RN.A. The Real Number System: Extend the properties of exponents to rational exponents.

Agree: (no comment)
Agree: (no comment)

Agree: I appreciate the inclusion of the code from the CCSSM

Neutral: How much do the students really need to master the concept of rational exponents in order to be prepared for after secondary opportunities?

Comment: We’re finding they just are not fully ready for mastery of rational exponents in algebra one level. We absolutely introduce it but they are still reeling over general exponent rules...they are not yet coming in
from 8th grade with the mastery of general exponent rules that you contend. Most will master the general exponent rules this year and the rational exponent rules by algebra two.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Agree:

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Agree:

Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents For example, we define (5^{1/3}) to be the cube root of (5) because we want ( ( 5^ )^{3} = 5^{ ( ) 3} ) to hold, so ( ( 5^ )^{3} ) must equal (5). (CCSS: HS.N-RN.A.1)

Disagree: How does this apply to real life required math skills?

Agree: (no comment)

Agree: (no comment)

Neutral: I will stick to just square and cubic roots for regular classes

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the Eos are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the Eos and changing the name of Eos to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Rewrite expressions involving radicals and rational exponents using the properties of exponents. (CCSS: HS.N-RN.A.2)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Disagree: Only if restricted to square and cubic roots

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the Eos are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the Eos and changing the name of Eos to “Learning Progression” or “Essential Learning Skills”...

**Colorado Essential Skills and Mathematical Practices:**

- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** Thank you for including the SMPs that are most forward for each grade level expectation.
- **Neutral:** Only small fractions that students can gasp and visualize for regular classes - the rest should be left for advanced classes
- **Comment:** Is there a list of Colorado Essential Skills that these come from?

**Inquiry Questions:**

- **Disagree:** How does this apply to real life math needed as an everyday citizen?
- **Agree:** (no comment)
- **Agree:** I love the way it starts with "how do we know"
- **Agree:** This is a good application and probably the one place where these radical exponents may be useful
- **Agree:** (no comment)

**Coherence Connections:**

- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** I am glad to see both the previous attention to this concept and the future work with this concept
- **Disagree:** Both 1 and 2 should be in advanced classes only.
- **Agree:** This is a very helpful part to include! I like!

**GLE: HS.N-RN.B. The Real Number System: Use properties of rational and irrational numbers.**

- **Agree:** (no comment)
- **Agree:** (no comment)
- **Agree:** (no comment)

(PG Feedback) **Comment:** Can you link to the prepared graduate statements?

(PG Feedback) **Agree:**

(PG Feedback) **Agree:** Again?

(PG Feedback) **Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plucked at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. (CCSS: HS.N-RN.A.3)

Agree: (no comment)
Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)

Comment: Spelling error. It should read "Students verbally express" rather than "Students verbal express"
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Neutral: This is an advanced level type of thinking -- why make it an expectation for regular classes
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: (no comment)

Comment: This is a run-on sentence and is incredibly difficult to actually read: Although in applications of mathematics the distinction between rational and irrational numbers is irrelevant, since we always deal with finite decimal approximations (and therefore with rational numbers), thinking about the properties of rational and irrational numbers is good practice for mathematical reasoning habits such as constructing viable arguments (MP3) and attending to precision (MP6). I would strongly suggest segmenting this into several shorter sentences to make the point clearer because currently it is near impossible to understand what you’re trying to say.
Agree: (no comment)


Agree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?", and this does not have an answer of yes. (These all appear to have pluses, so does this mean they are not for "all" kids to learn.)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true.
backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., ( ), ( || ), ( ||, ) ). (CCSS: HS.N-VM.A.1)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Evidence Outcome: (+) find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. (CCSS: HS.N-VM.A.2)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Solve problems involving velocity and other quantities that can be represented by vectors. (CCSS: HS.N-VM.A.3)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Coherence Connections:

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

GLE: HS.N-VM.B. Vector and Matrix Quantities: Perform operations on vectors.

Agree: (no comment)

Disagree: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this. Also, this GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: (+) Add and subtract vectors. (CCSS: HS.N-VM.B.4)

a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. (CCSS: HS.N-VM.B.4.a)

b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. (CCSS: HS.N-VM.B.4.b)

c. Understand vector subtraction ( - ) as ( + (-) ), where (-) is the additive inverse of ( ), with the same magnitude as ( ) and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. (CCSS: HS.N-VM.B.4.c)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Multiply a vector by a scalar. (CCSS: HS.N-VM.B.5)

a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g. as ( ( _x, _y ) = ( _x, _y ) ). (CCSS: HS.N-VM.B.5.a)

b. Compute the magnitude of a scalar multiple ( ) using ( | | = || ). Compute the direction of ( ) knowing that when ( || 0 ), the direction of ( ) is either along ( ) (for (c>0)) or against ( ) (for (c<0)). (CCSS: HS.N-VM.B.5.b)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Coherence Connections:

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

GLE: HS.N-VM.C. Vector and Matrix Quantities: Perform operations on matrices and use matrices in applications.

Agree: (no comment)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: (+) Use matrices to represent and manipulate data, e.g., as when all of the payoffs or incidence relationships in a network. (CCSS: HS.N-VM.C.6)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.
Evidence Outcome: (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of
the payoffs in a game are doubled. (CCSS: HS.N-VM.C.7)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Add, subtract, and multiply matrices of appropriate dimensions. (CCSS:
HS.N-VM.C.8)

Comment: (no comment)

Evidence Outcome: (+) Understand that, unlike the multiplication of numbers, matrix multiplica-
tion for square matrices is not a commutative operation, but still satisfies the associative and dis-
tributive properties. (CCSS: HS.N-VM.C.9)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Understand that the zero and identity matrices play a role in matrix addi-
tion and multiplication similar to the role of (0) and (1) in the real numbers. The determinant of a
square matrix is nonzero if and only if the matrix has a multiplicative inverse. (CCSS: HS.N-
VM.C.10)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Multiply a vector (regarded as a matrix with one column) by a matrix of
suitable dimension to produce another vector. Work with matrices as transformations of vectors.
(CCSS: HS.N-VM.C.11)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Work with (2 2) matrices as transformations of the plane and interpret the
absolute value of the determinant in terms of area. (CCSS: HS.N-VM.C.12)

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Coherence Connections:

Agree: This is nice clarification and justification for the inclusion of the (+) standards

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college
bound? If so, is there another way we can structure them, so they are not viewed as being taught to all
students in order to graduate?? That's how I read this.

Standard: 2. Algebra and Functions

GLE: HS.A-APR.A. Arithmetic with Polynomials and Rational Expressions: Perform
arithmetic operations on polynomials.

Agree: (no comment)

Agree: i feel that this is a good goal for students

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger
concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that stu-
dents will need to remember when the leave the world of Math education. I think the GLE should have an
answer of yes to the following question: "What do we want students to remember, understand and be able
to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**Agree:** (no comment)

*(PG Feedback)* **Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

*(PG Feedback)* **Comment:** Same “decide”

Evidence Outcome: Explain that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. *(CCSS: HS.A-APR.A.1)*

**Agree:** (no comment)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree:** (no comment)

**Colorado Essential Skills and Mathematical Practices:**

**Agree:** (no comment)

**Agree:** Making hypothesis and drawing conclusions is important, but not practical to do for every theorem, so I would rate this idea lower than the others in this section.

**Comment:** How is the CES demonstrated here.

**Agree:** (no comment)

**Inquiry Questions:**

**Agree:** (no comment)

**Agree:** (no comment)

**Disagree:** This is a close ended question. Students can guess and have a third of a chance getting it right.

**Agree:** (no comment)

**Coherence Connections:**

**Disagree:** (no comment)

**Comment:** A little long


**Agree:** (no comment)
**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**Agree:** (no comment)

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**(PG Feedback) Comment:** Decide what the problem is asking.

**Evidence Outcome:** State and apply the Remainder Theorem. For a polynomial (p(x)) and a number (a), the remainder on division by (x - a) is (p(a)), so (p(a) = 0) if and only if ((x - a)) is a factor of (p(x)). (CCSS: HS.A-APR.B.2)

**Agree:** (no comment)

**Agree:** (no comment)

**Disagree:** Why is it necessary for all graduates to understand this?

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree:** (no comment)

**Evidence Outcome:** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. (CCSS: HS.A-APR.B.3)

**Agree:** (no comment)

**Agree:** (no comment)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Agree:** (no comment)
Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Inquiry Questions:

Agree: (no comment)
Agree: Essential question
Agree: (no comment)
Agree: (no comment)

Coherence Connections:

Agree: (no comment)
Agree: This is great to read and think about for me as an educator. I don’t think students need to or will even stay with this long enough to process the idea.
Agree: (no comment)

GLE: HS.A-APR.C. Arithmetic with Polynomials and Rational Expressions: Use polynomial identities to solve problems.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Prove polynomial identities. For example, the polynomial identity \((x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2\) can be used to generate Pythagorean triples and use them to describe numerical relationships. (CCSS: HS.A-APR.C.4)

Disagree: While polynomial identities can form a rich ground for... why is it necessary for all graduates to understand this? This is not critical information for most students' future, so should not be part of the standards.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progressions” or “Essential Learning Skills”...

Evidence Outcome: (+) Know and apply the Binomial Theorem for the expansion of in powers of (x) and (y) for a positive integer (n), where (x) and (y) are any numbers, with coefficients determined for example by Pascal’s Triangle. (CCSS: HS.A-APR.C.5)

Comment: So can these be viewed as “bonus” and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.
Colorado Essential Skills and Mathematical Practices:

**Agree**: (no comment)

**Inquiry Questions**:

**Disagree**: I don’t like this question...to answer it kids can just guess and check or answer yes or no...is there a way to rephrase it so that is not implied.

**Coherence Connections**:

**Agree**: (no comment)

**GLE: HS.A-APR.D. Arithmetic with Polynomials and Rational Expressions: Rewrite rational expressions.**

**Disagree**: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. Whats the bigger picture? What’s the why for students learning this?

**PG Feedback Disagree**: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome: Rewrite simple rational expressions in different forms. write ( ) in the form ( ), where ( ), ( ), ( ), and ( ) are polynomials with the degree of (l) less than the degree of (b(x)), using inspection, long division, or, for the more complicated examples, a computer algebra system. (CCSS: HS.A-APR.D.6)**

**Disagree**: This standard is obsolete in light of technology advances. Computer programming, graphing, and modeling are applied to solve problems of this type in real world, even when division or factoring are possible (people just don’t take time to check; technology is faster). Why then would we teach this?

**Comment**: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome: (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expressions; add, subtract, multiply, and divide rational expressions. (CCSS: HS.A-APR.D.7)**

**Comment**: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this. Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose...
behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Disagree: Standard is not essential for all graduates. Even for those who work with polynomial functions, computer programming and estimation is much more useful and applied than these techniques. We should be teaching what is relevant, not archaic mathematical procedures that technology has made obsolete.

GLE: HS.A-CED.A. Creating Equations: Create equations that describe numbers or relationships. ★

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Create equations and inequalities. Include equations arising from linear and quadratic functions, and simple rational and exponential functions in one variable and use them to solve problems. (CCSS: HS.A-CE.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Create equations in two or more variables to represent relationships between quantities and graph equations on coordinate axes with labels and scales. (CCSS: HS.A-CED.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”.

Evidence Outcome: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. (CCSS: HS.A-CED.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”.

Evidence Outcome: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law (V = IR) to highlight resistance (R). (CCSS: HS.A-CED.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”.

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: There are many possible questions to ask about this....are these the best two?

Coherence Connections:

Agree: (no comment)

GLE: HS.A-REI.A. Reasoning with Equations and Inequalities: Understand solving equations as a process of reasoning and explain the reasoning.

Agree: This is a great GLE because it meets cognitive demand, transfer and can be assessed.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were ”backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, ”old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. (CCSS: HS.A-REI.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. (CCSS: HS.A-REI.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Disagree: This doesn’t match the GLE necessarily.

Coherence Connections:

Agree: (no comment)

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. I think this definitely can be applied to the real-world and is an applicable skill, however as it stands alone it is not a skill the is transferable. It can be EO (or essential skill) within solving equations.

*(PG Feedback) Disagree:* I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. (CCSS: HS.A-REI.C.5)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. (CCSS: HS.A-REI.C.6)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line \((y = -3x)\) and the circle \((x^2 + y^2 = 3)\). (CCSS: HS.A-REI.C.7)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
Evidence Outcome: (+) Represent a system of linear equations as a single matrix equation in a vector variable. (CCSS: HS.A-REI.C.8)

**Disagree:** So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate? That's how I read this. Could this be put with the vector GLE?

Evidence Outcome: (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension (3 3) or greater). (CCSS: HS.A-REI.C.9)

**Comment:** So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate? That's how I read this.

**Inquiry Questions:**

**Disagree:** This seems like too simple of a question. I think this can be answered by 8th graders.

**Coherence Connections:**

**Agree:** (no comment)

**GLE: HS.A-REI.D. Reasoning with Equations and Inequalities: Represent and solve equations and inequalities graphically.**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGs and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGs's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGs were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGs there would be GLEs for each PG that provided skills students would need at each grade level in order to get students to the skill of the PG. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). (CCSS: HS.A-REI.D.10)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGs) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Explain why the (x)-coordinates of the points where the graphs of the equations (y = f(x)) and (y = g(x)) intersect are the solutions of the equation (f(x) = g(x)); (Include cases where (f(x)) and/or (g(x)) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.) find the solutions approximately e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where (f(x)) and/or (g(x)) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. (CCSS: HS.A-REI.D.11)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. (CCSS: HS.A-REI.D.12)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...


Agree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

Neutral: (no comment)

(PG Feedback) Agree:

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plotted at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
(PG Feedback) Comment: Maybe change “make meaning of a problem” to “decide what the problem is asking”

Evidence Outcome: Interpret expressions that represent a quantity in terms of its context. ★ (CCSS: HS.A-SSE.A.1)

a. Interpret parts of an expression, such as terms, factors, and coefficients. (CCSS: HS.A-SSE.A.1.a)

b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret \((P(1+r)^n)\) as the product of \(P\) and a factor not depending on \(P\). (CCSS: HS.A-SSE.A.1.b)

Agree: (no comment)

Agree: (no comment)

Neutral: I would add an understanding of how mathematical functions are altered by different components, such as coefficients, logarithmic scales, positive and negative shifts, so on and so forth.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed at the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Comment: I like “in context of the problem” better

Evidence Outcome: Use the structure of an expression to identify ways to rewrite it. For example, see \((x^4 - y^4)\) as \(((x^2)^2 - (y^2)^2)\), thus recognizing it as a difference of squares that can be factored as \(((x^2 - y^2)(x^2 + y^2))\). (CCSS: HS.A-SSE.A.2)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed at the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Agree: (no comment)

Neutral: I would suggest to look at application of mathematics to understand the physical applications of what is happening, more than graphically or algebraically
Comment: There are notable inconsistencies across the different grade bands in the level of specificity on the right side. In particular, the text that accompanies each MP is dramatically different, from nothing beyond the MP itself, to very specific examples of the MP’s connection to the content. Consistency is important and personally, I find more specificity helpful.

Disagree: The CES doesn’t seem to be a generic communication skill, but rather another GLE or EO.

Neutral: (no comment)

Inquiry Questions:

Agree: (no comment)

Agree: (no comment)

Agree: This is a great question - "show in more than one way".

Agree: (no comment)

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

GLE: HS.A-SSE.B. Seeing Structure in Expressions: Write expressions in equivalent forms to solve problems.

Agree: (no comment)

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. Although I think this is important for students to learn I also know that even if a student cannot do this does not mean they’ll be unsuccessful at solving problems it’ll just make their life easier. For this reason, it shouldn’t be a GLE.

Agree: (no comment)

(PG Feedback) Comment: I want you guys to realize what we are asking of our students. What typical Freshman in Algebra 1 are being asked to do is what I was doing in honors algebra 2 as a junior in the early 2000's. They are completely lost, and it's so difficult for them to figure out what we are doing. Many of them look at me on a daily basis and I feel bad for them because we are shoving this down their throat. Before common core standards were inititated, they still struggled with the abstract thought process and now we are going above and beyond. Please change these standards so that they are more manageable for our algebra 1 students. We're doing them a huge disservice trying to get them through the current algebra 1 course.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

(PG Feedback) Comment: Same comment as before about “decide what the problem is asking”

Evidence Outcome: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ (CCSS: HS.A-SSE.B.3)

a. Factor a quadratic expression to reveal the zeros of the function it defines. (CCSS: HS.A-SSE.B.3.a)

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. (CCSS: HS.A-SSE.B.3.b)

c. Use the properties of exponents to transform expressions for exponential functions. For example, the expression \((1.15^t)\) can be rewritten as \(( (1.15^{1/12})^{12t} 1.012^{12t})\) to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. (CCSS: HS.A-SSE.B.3.c)

Agree: (no comment)

Agree: (no comment)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… Is there a bigger concept this is aimed at? Why learn this?

Comment: Typo in c? 1.15^t?

Evidence Outcome: Derive the formula for the sum of a finite geometric series (when the common ratio is not (1)), and use the formula to solve problems. For example, calculate mortgage payments. ★ (CCSS: HS.A-SSE.B.4)

Agree: (no comment)

Agree: (no comment)

Disagree: The approach to this is backwards - we want students to derive the geometric series formula, and then as an example determine a mortgage payment?!?! How about have the standard be the relevant part - determine a mortgage payment, and the extension (that is only relevant to a few) be deriving the formula in general? Mathematics in high school needs to be more relevant to what people actually do and experience.

Comment: This was something that I studied in College and it took me a few years to grasp. Yet we are having our average 15 year old go through this process?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…
Agree: (no comment)

Colorado Essential Skills and Mathematical Practices:
Agree: (no comment)
Agree: (no comment)
Comment: There's a typo in the CES ("...a expressions.." should be "expressions")
Comment: Typo in 1? Just expressions, Not a expressions

Inquiry Questions:
Agree: (no comment)
Agree: (no comment)
Comment: This is something that I did as a 17 year old, and we're having them do this as 15 year olds?
Please rethink what we are doing here.
Disagree: This a a good inquiry question for a lesson or two, however if the intent is to be an inquiry ques-
tions asking students to inquire and apply this doesn't quite hit the mark.
Agree: (no comment)

Coherence Connections:
Agree: I appreciate the description of "doing and undoing" as a math activity.
Agree: (no comment)
Comment: (no comment)
Agree: (no comment)

GLE: HS.F-BF.A. Building Functions: Build a function that models a relationship be-
tween two quantities.
Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included
on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" de-
signed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true
backwards design. If you were to backwards design the standards for PGS there would be GLEs for each
PGS that provided skills students would need at each grade level in order to get students to the skill of the
PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the cate-
gory of math. For example, for this “Standard” a High School GLE might read “Given a problem involving
the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Write a function that describes a relationship between two quantities.★ (CCSS: HS.F-BF.A.1)

a. Determine an explicit expression, a recursive process, or steps for calculation from a con-
text. (CCSS: HS.F-BF.A.1.a)

b. Combine standard function types using arithmetic operations. For example, build a func-
tion that models the temperature of a cooling body by adding a constant function to a de-
caying exponential, and relate these functions to the model. (CCSS: HS.F-BF.A.1.b)

c. (+) Compose functions. For example, if (T(y)) is the temperature in the atmosphere as a
function of height, and (h(t)) is the height of a weather balloon as a function of time, then
(T(h(t))) is the temperature at the location of the weather balloon as a function of time.
(CCSS: HS.F-BF.A.1.c)

Comment: It might be helpful to have a hotlink that explains the start and + symbols. I see the + symbol
explained in the Coherence Connections, but it's not obvious when reading the evidence outcomes. Any
explanation of the star symbol is difficult to find. It should be easier and more obvious to determine what the symbols mean.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★ (CCSS: HS.F-BF.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.F-BF.B. Building Functions: Build new functions from existing functions.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Identify the effect on the graph of replacing \((f(x))\) by \((f(x) + k)\), \((k f(x))\), \((f(kx))\), and \((f(x + k))\) for specific values of \(k\) both positive and negative; find the value of \(k\) given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. (CCSS: HS.F-BF.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing...
Evidence Outcome: Find inverse functions. (CCSS: HS.F-BF.B.4)

a. Solve an equation of the form \( f(x) = c \) for a simple function \( f \) that has an inverse and write an expression for the inverse. For example, \( f(x) = 2x^3 \) or \( f(x) = x^2 \) for \( x > 1 \). (CCSS: HS.F-BF.B.4.a)

b. (+) Verify by composition that one function is the inverse of another. (CCSS: HS.F-BF.B.4.b)

c. (+) Read values of an inverse function from a graph or table, given that the function has an inverse. (CCSS: HS.F-BF.B.4.c)

d. (+) Produce an invertible function from a non-invertible function by restricting the domain. (CCSS: HS.F-BF.B.4.d)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed at the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. (CCSS: HS.F-BF.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed at the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”.... So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

GLE: HS.F-IF.A. Interpreting Functions: Understand the concept of a function and use function notation.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. Can this go with the one below?

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Evidence Outcome: Explain that a function is a correspondence from one set (called the domain) to another set (called the range) that assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \). (CCSS: HS.F-IF.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (CCSS: HS.F-IF.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Demonstrate that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by \( f(0) = f(1) = 1 \), \( f(n+1) = f(n) + f(n-1) \) for \( n \geq 1 \). (CCSS: HS.F-IF.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Agree: (no comment)

GLE: HS.F-IF.B. Interpreting Functions: Interpret functions that arise in applications in terms of the context.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each
PGS that provided skills students would need at each grade level in order to get students to the skill of the
PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the cate-
gory of math. For example, for this “Standard” a High School GLE might read “Given a problem involving
the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: For a function that models a relationship between two quantities, interpret key
features of graphs and tables in terms of the quantities, and sketch graphs showing key features. Key
features include: intercepts; intervals where the function is increasing, decreasing, positive, or
negative; relative maximums and minimums; symmetries; end behavior; and periodicity. (CCSS:
HS.F-IF.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers
(and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Relate the domain of a function to its graph and, where applicable, to the
quantitative relationship it describes. For example, if the function (h(n)) gives the number of person-
hours it takes to assemble (n) engines in a factory, then the positive integers would be an ap-
propriate domain for the function.★ (CCSS: HS.F-IF.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers
(and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Calculate and interpret the average rate of change presented symbolically or as
a table, of a function over a specified interval. Estimate the rate of change from a graph.★ (CCSS:
HS.F-IF.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the
standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers
(and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and stu-
dents don’t know how to transfer their skills or the purpose behind learning them. These are learning tar-
gets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will
need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connec-
tions” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the
EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.F-IF.C. Interpreting Functions: Analyze functions using different representa-
tions.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included
on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” de-
dsigned, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true
backwards design. If you were to backwards design the standards for PGS there would be GLEs for each
PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ (CCSS: HS.F-IF.C.7)

a. Graph linear and quadratic functions and show intercepts, maxima, and minima. (CCSS: HS.F-IF.C.7.a)

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. (CCSS: HS.F-IF.C.7.b)

c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. (CCSS: HS.F-IF.C.7.c)

d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. (CCSS: HS.F-IF.C.7.d)

e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. (CCSS: HS.F-IF.C.7.e)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EO’s are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EO’s are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EO’s and changing the name of EO’s to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. (CCSS: HS.F-IF.C.8)

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. (CCSS: HS.F-IF.C.8.a)

b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as \( y = (1.02)^t \), \( y = (0.97)^t \), \( y = (1.01)^{12t} \), \( y = (1.2)^t \), and classify them as representing exponential growth or decay. (CCSS: HS.F-IF.C.8.b)

Disagree: This standard is and the comments are disconnected from science, biology, economics, and other disciplines. The standard should show how to apply fractional exponents to reveal the hidden regularities in different areas. This is not interdisciplinary learning. Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organisms, Cities, Economies, and Companies by Geoffrey West “In the book, West chronicles the journey he and his collaborators embarked on in the early 90’s when they began to extend—to dozens of other biological quantities—Max Kleiber’s observations from the 1930s that for the majority of animals, metabolic rates scale to the ¾ power of the animals’ masses.” https://www.santafe.edu/news-center/news/geoffrey-west-and-anticipate-the-book-scale-emerges https://www.nytimes.com/2017/05/26/business/dealbook/geoffrey-west-scale-the-universal-laws-of-growth-innovation-sustainability.html Page 28 A typical complex system is composed of myriad individual constituents or agents that once aggregated take on collective characteristics that are usually not manifested in, nor could be easily predicted from the properties of the individual components themselves. For example, you are much more than the totality of your cells and, similarly, your cells are much more than the totality of all the molecules from which they are composed. ... In a similar fashion, a city is much more than the sum of its buildings, roads, and people, a company much more than the sum of its employees and products, and an
ecosystem much more than the plants and animals that inhabit it. ... In general, then, a universal characteristic of a complex system is that the whole is greater than, and often significantly different from, the simple linear sum of its parts. ... Furthermore, even if we understood how the individual constituents, whether cells, ants, or people, interact with another, predicting the systemic behavior of the resulting whole is not usually possible. The collective outcome, in which a system manifests significantly different characteristics from those resulting from simply adding up all the contributions of its individual constituent parts, is called an emergent behavior. It is readily recognizable characteristic of economies, financial markets, urban communities, companies, and organisms. Page 37 Perhaps even more remarkably there are also scaled socioeconomic versions of one another. Socioeconomic quantities such as wages, wealth, patents, AIDS cases, crime, and educational institutions, which have no analog in biology and did not exist on the planet before humans invented cities ten thousand years ago, also scale with population size but with the superlinear (meaning bigger than one) exponent of approximately 1.15”

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. (CCSS: HS.F-IF.C.9)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE: HS.F-LE.A. Linear, Quadratic and Exponential Models:** Construct and compare linear, quadratic, and exponential models and solve problems.★

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. This GLE could exist under some of the other broader GLEs.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Distinguish between situations that can be modeled with linear functions and with exponential functions. (CCSS: HS.F-LE.A.1)

a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (CCSS: HS.F-LE.A.1.a)

b. Identify situations in which one quantity changes at a constant rate per unit interval relative to another. (CCSS: HS.F-LE.A.1.b)

c. Identify situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. (CCSS: HS.F-LE.A.1.c)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (CCSS: HS.F-LE.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use graphs and tables to describe that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. (CCSS: HS.F-LE.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: For exponential models, express as a logarithm the solution to \((ab^{ct} = d)\) where \((a), (c), and (d)\) are numbers and the base \((b)\) is \((2), (10), or (e)\); evaluate the logarithm using technology. (CCSS: HS.F-LE.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

**GLE: HS.F-LE.B. Linear, Quadratic, and Exponential Models: Interpret expressions for functions in terms of the situation they model.★**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Interpret the parameters in a linear or exponential function in terms of a context. (CCSS: HS.F-LE.B.5)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

**GLE: HS.F-TF.A. Trigonometric Functions: Extend the domain of trigonometric functions using the unit circle.**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

**(PG Feedback) Disagree:** PGS I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Evidence Outcome: Use radian measure of an angle as the length of the arc on the unit circle subtended by the angle. (CCSS: HS.F-TF.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. (CCSS: HS.F-TF.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Use special triangles to determine geometrically the values to sine, cosine, tangent for ( ), ( ), and ( ) and use the unit circle to express the values sine, cosine, and tangent for (x), ( + x ), and ( 2 - x ) and in terms of their values for (x) where (x) is any real number. (CCSS: HS.F-TF.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. (CCSS: HS.F-TF.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... So can these
be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Coherence Connections:

Disagree: How is this skill relevant to all graduates? It is a useful building block towards calculus and college trigonometry, but not essential for all graduates.

GLE: HS.F-TF.B. Trigonometric Functions: Model periodic phenomena with trigonometric functions.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CAS's then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Model periodic phenomena with trigonometric functions with specified amplitude, frequency, and midline. ★ (CCSS: HS.F-TF.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. (CCSS: HS.F-TF.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.
Evidence Outcome: (+) Use inverse function to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context. ★ (CCSS: HS.F-TF.B.7)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

GLE: HS.F-TF.C. Trigonometric Functions: Prove and apply trigonometric identities.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Prove the Pythagorean identity \( \sin^2(\theta) + \cos^2(\theta) = 1 \) and use it to find \( \sin(\theta) \), \( \cos(\theta) \), or \( \tan(\theta) \) given \( \sin(\theta) \), \( \cos(\theta) \), or \( \tan(\theta) \) and the quadrant of the angle. (CCSS: HS.F-TF.C.8)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems. (CCSS: HS.F-TF.C.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

**Standard: 3. Data, Statistics, and Probability**

**GLE: HS.S-CP.A. Conditional Probability and the Rules of Probability: Understand independence and conditional probability and use them to interpret data.**

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. I think probability is an important transferable skill, but could there be just one GLE that encompasses all of probability.

**Evidence Outcome:** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). (CCSS: HS.S-CP.A.1)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Explain that two events (A) and (B) are independent if the probability of (A) and (B) occurring together is the product of their probabilities, and use this characterization to determine if they are independent. (CCSS: HS.S-CP.A.2)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Using the conditional probability of \( (A) \) given \( (B) \) as \( \frac{P(A \mid B)}{P(B)} \), interpret the independence of \( (A) \) and \( (B) \) as saying that the conditional probability of \( (A) \) given \( (B) \) is the same as the probability of \( (A) \), and the conditional probability of \( (B) \) given \( (A) \) is the same as the probability of \( (B) \). (CCSS: HS.S-CP.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…”

Evidence Outcome: Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results. (CCSS: HS.S-CP.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…”

Evidence Outcome: Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer. (CCSS: HS.S-CP.A.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…”

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)


Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an
answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. I think probability is an important transferable skill, but could there be just one GLE that encompasses all of probability.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for GLE there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Find the conditional probability of (A) given (B) as the fraction of (B)’s outcomes that also belong to (A), and interpret the answer in terms of the model. (CCSS: HS.S-CP.B.6)

Comment: EO Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Apply the Addition Rule, ( P( A B ) = P (A ) + P ( B ) - P ( A B ) ), and interpret the answer in terms of the model. (CCSS: HS.S-CP.B.7)

Comment: EO Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: (+) Apply the general Multiplication Rule in a uniform probability model, ( P ( A B ) = P (A ) P ( B A ) = P ( B ) P ( A B ) ), and interpret the answer in terms of the model. (CCSS: HS.S-CP.B.8)

Comment: EO Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…
Evidence Outcome: (+) Use permutations and combinations to compute probabilities of compound events and solve problems. (CCSS: HS.S-CP.B.9)

Comment: EO Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… So can these be viewed as “bonus” and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Colorado Essential Skills and Mathematical Practices:

Agree: I think the CES is a better GLE!


Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, ”old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Describe statistics as a process for making inferences about population parameters based on a random sample from that population. (CCSS: HS.S-IC.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability (0.5). Would a result of (5) tails in a row cause you to question the model? (CCSS: HS.S-IC.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: HS.S-IC.B. Making Inferences and Justifying Conclusions: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for GLEs there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Identify the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. (CCSS: HS.S-IC.B.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. (CCSS: HS.S-IC.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…
Evidence Outcome: Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. (CCSS: HS.S.-IC.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Evaluate reports based on data. Define and explain the meaning of significance, both statistical (using p-values) and practical (using effect size). (CCSS: HS.S-IC.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Inquiry Questions:

Agree: (no comment)

Coherence Connections:

Agree: (no comment)

GLE: HS.S-ID.A. Interpreting Categorical and Quantitative Data: Summarize, represent, and interpret data on a single count or measurement variable.

Disagree: Why is this separate from the next one? This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Comment: I feel like #2 and #4 say essentially the same thing in different words currently

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Model data in context with plots on the real number line (dot plots, histograms, and box plots). (CCSS: HS.S-ID.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. (CCSS: HS.S-ID.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). (CCSS: HS.S-ID.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages and identify data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. (CCSS: HS.S-ID.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Agree: (no comment)
GLE: HS.S-ID.B. Interpreting Categorical and Quantitative Data: Summarize, represent, and interpret data on two categorical and quantitative variables.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes. If this was combined with the one above, students would be aiming for the bigger picture of "Summarize, represent, and interpret data."

(PG Feedback) **Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

**Evidence Outcome:** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. (CCSS: HS.S-ID.B.5)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. (CCSS: HS.S-ID.B.6)

a. **Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.** (CCSS: HS.S-ID.B.6.a)

b. **Informally assess the fit of a function by plotting and analyzing residuals.** (CCSS: HS.S-ID.B.6.b)

c. **Fit a linear function for a scatter plot that suggests a linear association.** (CCSS: HS.S-ID.B.6.c)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Distinguish between correlation and causation. (CCSS: HS.S-ID.B.9)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE:** HS.S-ID.C. Interpreting Categorical and Quantitative Data: Interpret linear models.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferrable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand, and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. If the GLE becomes what was suggested above then these EOs would be the stepping stones to that bigger picture of summarizing, representing, and analyzing data.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (CCSS: HS.S-ID.C.7)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seems to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Using technology, compute and interpret the correlation coefficient of a linear fit. (CCSS: HS.S-ID.C.8)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
GLE: HS.S-MD.A. Using Probability to Make Decisions: Calculate expected values and use them to solve problems.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

**PG Feedback Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions. (CCSS: HS.S-MD.A.1)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Evidence Outcome: (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. (CCSS: HS.S-MD.A.2)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.
Evidence Outcome: (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of multiple-choice test where each question has four choices, and find the expected grade under various grading schemes. (CCSS: HS.S-MD.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Evidence Outcome: (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households? (CCSS: HS.S-MD.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Coherence Connections:

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.


Agree: However, the EO’s are a bit more advanced then this. I think this could be a GLE for all HS probability and then the EOs can live as the stepping stones towards this.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were ”backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date,
Evidence Outcome: (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. (CCSS: HS.S-MD.B.5)

a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or game at a fast-food restaurant. (CCSS: HS.S-MD.B.5.a)

b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or major accident. (CCSS: HS.S-MD.B.5.b)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Evidence Outcome: (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). (CCSS: HS.S-MD.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Evidence Outcome: (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). (CCSS: HS.S-MD.B.7)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.
Coherence Connections:

Comment: So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Standard: 4. Geometry

GLE: HS.G-C.A. Circles: Understand and apply theorems about circles.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Prove that all circles are similar. (CCSS: HS.G-C.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. (CCSS: HS.G-C.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. (CCSS: HS.G-C.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
ers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Construct a tangent line from a point outside a given circle to the circle. (CCSS: HS.G.C.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.G.C.B. Circles: Find arc lengths and areas of sectors of circles.

Comment: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS's a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this "Standard" a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. (CCSS: HS.G.C.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
GLE: HS.G-CO.A. Congruence: Experiment with transformations in the plane.

Disagree: The GLE does not have enough rigor. If the rigor was increased then the GLE would encompass many of the other GLEs revolving around transformations.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: State precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. (CCSS: HS.G-CO.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Represent transformations in the plane using e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not. (e.g., translation versus horizontal stretch). (CCSS: HS.G-CO.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. (CCSS: HS.G-CO.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. (CCSS: HS.G-CO.A.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using appropriate tools. e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. (CCSS: HS.G-CO.A.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Colorado Essential Skills and Mathematical Practices:

Comment: Is there an Essential Skill that goes with this? Entrepreneurial?

Agree: (no comment)

GLE: HS.G-CO.B. Congruence: Understand congruence in terms of rigid motions.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. (CCSS: HS.G-CO.B.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teach-
Er (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. *(CCSS: HS.G-CO.B.7)*

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**Evidence Outcome:** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. *(CCSS: HS.G-CO.B.8)*

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE:** HS.G-CO.C. Congruence: Prove geometric theorems.

**Disagree:** This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. If there was a GLE about making and proving conjectures that involves students understanding the process of how theorems come about, this would be a more rigorous and transferable skill then simply proving and then later making conjectures.

**(PG Feedback) Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment’s endpoints. (CCSS: HS.G-CO.C.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. (CCSS: HS.G-CO.C.10)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. (CCSS: HS.G-CO.C.11)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.G-CO.D. Congruence: Make geometric constructions.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the
Evidence Outcome: Make formal geometric constructions with a variety of tools and methods. (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.) Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. (CCSS: HS.G-CO.D.12)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. (CCSS: HS.G-CO.D.13)

Disagree: This substandard for constructing regular polygons seems unnecessary

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Coherence Connections:

Disagree: While students can use construction to locate a line of reflection precisely, why should they? How is this skill relevant and useful?

GLE: HS.G-GMD.A. Geometric Measurement and Dimension: Explain volume formulas and use them to solve problems.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, ”old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri’s principle, and informal limit arguments. (CCSS: HS.G-GMD.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: (+) Give an informal argument using Cavalieri’s principle for the formulas for the volume of a sphere and other solid figures. (CCSS: HS.G-GMD.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this.

Evidence Outcome: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★ (CCSS: HS.G-GMD.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... 


Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, “old” CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. (CCSS: HS.G-GMD.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...


Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. (CCSS: HS.G-GPE.A.1)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Derive the equation of a parabola given a focus and directrix. (CCSS: HS.G-GPE.A.2)

Disagree: How is deriving the equation of a parabola by focus and directrix an essential skill for all graduates? Most adults have no idea about these terms.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will...
Evidence Outcome: (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. (CCSS: HS.G-GPE.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Coherence Connections:

Agree: It is nice to make geometric and algebraic connections, and powerful. However, requiring parts of this for all graduates is not understanding how mathematics fits into most peoples’ lives.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes. Why do we ask students to prove? What is the bigger picture for students to understand?

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point \((1, 0)\) lies on the circle centered at the origin containing the point \((0, 2)\). (CCSS: HS.G-GPE.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…
Evidence Outcome: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems. (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). (CCSS: HS.G-GPE.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Find the point on a directed line segment between two given points that partitions the segment in a given ratio. (CCSS: HS.G-GPE.B.6)

Disagree: Why do all graduates need to know this?

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use coordinates and the distance formula to compute perimeters of polygons and areas of triangles and rectangles.★ (CCSS: HS.G-GPE.B.7)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.G-MG.A. Modeling with Geometry: Apply geometric concepts in modeling situations.

Agree: (no comment)

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn't true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”
Evidence Outcome: Use geometric shapes, their measures, and their properties to describe objects. (e.g., modeling a tree trunk or a human torso as a cylinder). ★ (CCSS: HS.G-MG.A.1)

Comment: Getting a better definition of modeling in geometry is necessary. Many things are being called "modeling in geometry" that are very basic, and are just word problems that no one really would ever do or care about.

Agree: (no comment)

Evidence Outcome: Apply concepts of density based on area and volume in modeling situations. e.g., persons per square mile, BTUs per cubic foot. ★ (CCSS: HS.G-MG.A.2)

Agree: (no comment)

Evidence Outcome: Apply geometric methods to solve design problems. (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ★ (CCSS: HS.G-MG.A.3)

Agree: (no comment)

Coherence Connections:

Comment: If trig may have greatest application in college and career, it should have greater emphasis in standards than it does. It should be mentioned specifically in several modeling with geometry standards.

GLE: HS.G-SRT.A. Similarity, Right Triangles, and Trigonometry: Understand similarity in terms of similarity transformations.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when the leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Verify experimentally the properties of dilations given by a center and a scale factor. (CCSS: HS.G-SRT.A.1)

a. Show that a dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. (CCSS: HS.G-SRT.A.1.a)

b. Show that the dilation of a line segment is longer or shorter in the ratio given by the scale factor. (CCSS: HS.G-SRT.A.1.b)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...
Evidence Outcome: Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. (CCSS: HS.G-SRT.A.2)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. (CCSS: HS.G-SRT.A.3)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

GLE: HS.G-SRT.B. Similarity, Right Triangles, and Trigonometry: Prove theorems involving similarity.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: “What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?” and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Data, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. (CCSS: HS.G-SRT.B.4)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing
Evidence Outcome: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS: HS.G-SRT.B.5)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

**GLE: HS.G-SRT.C. Similarity, Right Triangles, and Trigonometry: Define trigonometric ratios and solve problems involving right triangles.**

**Neutral:** This is a better GLE, but to make it a skill where kids might actually see the purpose (for construction, for instance) the GLE could be more around applying these to find missing side lengths in right triangles.

**PG Feedback Disagree:** I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were “backwards” designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. (CCSS: HS.G-SRT.C.6)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”...

Evidence Outcome: Explain and use the relationship between the sine and cosine of complementary angles. (CCSS: HS.G-SRT.C.7)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered, Maybe reorganizing
the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

Evidence Outcome: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★ (CCSS: HS.G-SRT.C.8)

Comment: Why does this one have the modeling * and others do not.

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”…

GLE: HS.G-SRT.D. Similarity, Right Triangles, and Trigonometry: Apply trigonometry to general triangles.

Disagree: This GLE is too specific (seems more like an EO), it is a specific skill that will lead up to a bigger concept between the PGS and EO, which is what the GLE should be. This is not a transferable skill that students will need to remember when they leave the world of Math education. I think the GLE should have an answer of yes to the following question: "What do we want students to remember, understand and be able to do several years from now, perhaps long after they have forgotten the details?" and this does not have an answer of yes.

(PG Feedback) Disagree: I like these PGS’s a lot, however I was disappointed to see that all 5 were included on all GLEs for every grade level. On the previous page, it was stated that the CAS were "backwards" designed, however if all 5 PGS were plopped at the top of the, reorganized, "old" CASs then this isn’t true backwards design. If you were to backwards design the standards for PGS there would be GLEs for each PGS that provided skills students would need at each grade level in order to get students to the skill of the PGS. I think you can still categorize the learning into Number and Quantity, Algebra and Functions, Date, Statistics and Probability, and Geometry, but within each category create GLE that are based on the category of math. For example, for this “Standard” a High School GLE might read “Given a problem involving the Real and Complex Number Systems determine the meaning of the problem and how to find a solution.”

Evidence Outcome: (+) Derive the formula \( A = \frac{1}{2}ab\sin(C) \) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side. (CCSS: HS.G-SRT.D.9)

Comment: Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don’t know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”… (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That’s how I read this
Evidence Outcome: (+) Prove the Laws of Sines and Cosines and use them to solve problems. (CCSS: HS.G-SRT.D.10)

**Disagree:** How is it essential for all graduates to be able to prove the law of sines and the law of cosines? Most adults cannot even state these, never mind prove them.

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

Evidence Outcome: (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces). (CCSS: HS.G-SRT.D.11)

**Comment:** Math has become so desegregated and although having evidence outcomes spelled out on the standards are helpful when determining what to teach, I have found the opposite effect is also true. Teachers (and I am guilty of this, too) are only focused on ensuring the EOs are taught to their integrity and students don't know how to transfer their skills or the purpose behind learning them. These are learning targets, but they should be aimed to the bigger picture (potentially the PGS) that develops a skill students will need or reference for the rest of their lives. Consequently, test scores have suffered. Maybe reorganizing the structure of the document such that the EOs are at the bottom. The “Academic Context and Connections” column seem to be aimed at that bigger picture, so it might be worthwhile putting those before the EOs and changing the name of EOs to “Learning Progression” or “Essential Learning Skills”... (+) So can these be viewed as "bonus" and not necessary to teach to all students, but only college bound? If so, is there another way we can structure them, so they are not viewed as being taught to all students in order to graduate?? That's how I read this.

**Coherence Connections:**

**Disagree:** Stating these as standards is misleading, even with the + qualifier. These are not necessary for all graduates to learn.