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 Science. 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.

Science Prepared Graduate Statements

PG: 1. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Agree: This is a foundational idea in all of science. All student should graduate with an understanding of it!
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: Fully agree.
Agree: Please reference NGSS to make better sense of the alignment
Agree: please add the coding for the NGSS
Agree: (no comment)
Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Comment: The preface (students can use the full range....) to every PGS is redundant and detracts from getting to main idea. Also, the phrase “make sense of” is too nebulous; consider “students should be able to explain phenomena and solve problems related to...” A general comment overall: the setup of the GLE is a familiar structure that will facilitate an easy transition for teachers. The alignment with the NGSS is apparent to users of NGSS; would prefer that CO use the NGSS as the state document overall.
Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: “They are more focused than the previous standards. They focus on a few core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge.”
Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”
**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 education are listed 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.

**Agree:** (no comment)

**Agree:** As a general note, the phrase "use the full range of science and engineering practices" is very vague and unclear, but I assume that the grade level standards will be much more specific.

**Disagree:** (no comment)

**Agree:** “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”

Comment: I sort of like the introduction of engineering into the standards. However, I hope you are planning on telling us exactly what "engineering practices" you’re talking about and not just leaving us with a vague statement like that. Engineering is not generally part of a teacher prep program.

**Neutral:** (no comment)

**Agree:** (no comment)

**Agree:** I would recommend changing the language to, "that require and understanding of..."

**Agree:** The addition of science and engineering practices to all PGS's is a great addition though teachers will need support to incorporate engineering practices throughout the standards. All of the PGS’s seem awkward. The language would be better understood if changed to "...and solve problems that require an understanding of how..."

**Agree:** (no comment)

**Agree:** (no comment)

**Neutral:** (no comment)

**Agree:** This sounds like a good overall assessment.

**Agree:** These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

Comment: full range science? and engineering practices? = both too vague and up to too much interpretation. Would help to have the three dimension framework coding included.

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to.

**Disagree:** (no comment)

**Neutral:** I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

**Agree:** (no comment)

**Agree:** (no comment)

**Neutral:** (no comment)

**Disagree:** "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts
and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

**Disagree:** (no comment)

**Neutral:** (no comment)

**Comment:** It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

**Agree:** (no comment)

**Comment:** It is important that all PSG statements talk about using the full range of science and engineering practices to make sense of natural phenomena and solve problems. Using practices to make sense of phenomena and solve problems is the essence of science and should be the goal of K-12 science education. There might be a better way of articulating the relationship between disciplinary understanding and applying practices to sense-making and problem-solving. For example, for PSG #3... Students can apply an understanding of how energy is transferred and conserved together with the full range of science and engineering practices to make sense of natural phenomena and solve problems involving energy transfer and conservation.

**Comment:** What is meant by the phrase "full range?"

**Agree:** I approve of the new wording of this and all of the PGS being more consistent with the NGSS. I really wonder why Colorado doesn’t just adopt the NGSS and take advantage of all the supporting curricula being developed to meet the NGSS. Seems to me like a lost opportunity. I think Colorado’s new standards are moving in the direction of NGSS yet it is still NGSS-lite.

**Agree:** (no comment)

**Comment:** "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

**Comment:** "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

**Neutral:** (no comment)

**Agree:** (no comment)

PG: 2. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** Fully agree.

**Agree:** Please reference NGSS to make better sense of the alignment

**Agree:** (no comment)

**Agree:** Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

**Agree:** (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: “They are more focused than the previous standards. They focus on a few core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge.”

Agree: (no comment)

Agree: (no comment)

Agree: why use "Objects" instead of "Matter"

Disagree: (no comment)

Disagree: Revise the SOL to instruct students that Newton Dynamics mislead the general public as to the determinism of motion. Revise the SOL to say that we may obtain an understanding of the interactions between some objects and within systems of objects. In other cases only a simulation may expose the interactions for as long as the simulation is run. No knowledge is available for future states when the simulation was not run for the appropriate period of time. Chaos theory has so revolutionized science that in 1986, in “Proceedings Before the Royal Society of London,” entitled The recently recognized failure of predictability in Newtonian dynamics, the then president of the International Union of Applied and Theoretical Mechanics, Sir James Lighthill, issued an apology “for having misled the general educated public by spreading ideas about the determinism of systems satisfying Newton’s laws of motion that, after 1960, were to be proved incorrect.” https://privateequity.weil.com/insights/excluded-losses-provisions-and-the-butterfly-effect/

Also this youtube video shows that one can't predict the motion of a simple double pendulum. https://www.youtube.com/watch?v=QXf95_EKS6E

Agree: (no comment)

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: "...and solve problems that require an understanding of how..."

Agree: (no comment)

Agree: (no comment)

Agree: Interactions between systems is a valid area of understanding.

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGS seems to suggest that I will need to.

Agree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Agree: We need better training in logic and analysis starting from an early age. Too many of my entering freshman cannot recognize a scientifically valid approach, determine the quality of a source of information or spot even the most trivial logical fallacy.

Neutral: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Disagree: This makes NO sense!
Comment: It would be better to say "...explain natural phenomena..." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Comment: This is a general comment, not specific to this PGS. I am writing on behalf of BSCS, a non-profit research and development organization in Colorado Springs whose mission is to transform science education. Over our 60-year history, BSCS has been integrally involved in the efforts to bring research-based teaching to science. As an organization, we endorse the directions that the National Research Council called for in their 2012 "Framework for Science Education" and their translation into standards recommendations by Achieve in the Next Generation Science Standards. Recognizing that the draft CAS for science are based on these two research-based documents, we agree with the recommended standards as a whole. Members of the BSCS staff (including myself) have opted to comment individually on the underlying direction of the standards. Daniel Edelson, Executive Director, BSCS

Comment: Full range is too ambiguous of a phrase.

Agree: The emphasis in each of the PGS statements for students using scientific and engineering practices is definitely an improvement. This comment applies to all of the PGSs

Agree: (no comment)

Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)

Agree: (no comment)

PG: 3. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Agree: Energy is both a core idea in science, and a crosscutting concepts. If students understand energy conservation and transformations, they can make sense of a wide range of phenomena.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Fully agree.

Agree: Please reference NGSS to make better sense of the alignment

Agree: (no comment)

Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Agree: (no comment)

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)
Agree: “They are more focused than the previous standards. They focus on a few core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge.”
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: (no comment)
Agree: (no comment)
Agree: I would recommend changing the language to, "that require an understanding of...
Agree: "...and solve problems that require an understanding of how...
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to.
Agree: (no comment)
Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.
Agree: (no comment)
Neutral: (no comment)
Neutral: (no comment)
Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.
Disagree: (no comment)
Comment: Could the NGSS coding be added for more clarity and cross-referencing purposes?
Neutral: (no comment)
Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.
Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.
Agree: (no comment)
Comment: Could be combined with PGS 4
Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Disagree: I agree that we need to include more Physics but identifying waves in a PGS is too specific in #3&4. Make the statement in #4 more general?

Agree: (no comment)

PG: 4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Fully agree.

Agree: Please reference NGSS to make better sense of the alignment

Agree: (no comment)

Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Agree: (no comment)

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: "They are more focused than the previous standards. They focus on a few core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge."

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Disagree: (no comment)

Agree: (no comment)

Disagree: I understand that NGSS calls out waves separately. However, because this is so closely connected to energy it seems like they should be together. The more we can integrate for teachers, the more they will integrate for students.

Disagree: I know that NGSS separates energy transfers and transformations from waves, however this is quite confusing to teachers and students. The conceptual flow is better if waves are included in energy and called out as a means of energy transfer. When the standard is integrated, teachers integrate. Sadly, when it is separate, many do not.

Agree: (no comment)

Agree: (no comment)

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to.

Agree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.
Agree: (no comment)
Neutral: (no comment)
Neutral: (no comment)
Neutral: (no comment)
Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)
Neutral: (no comment)
Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)
Comment: This could be combined into PGS 3. Energy and information is transferred and conserved. Could also be omitted entirely and added as a GLE.
Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.
Disagree: I agree that we need to include more Physics but identifying waves in a PGS is too specific in #3&4. Make the statement in #4 more general?
Agree: (no comment)

PG: 5. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: Fully agree.
Agree: Please reference NGSS to make better sense of the alignment
Agree: (no comment)
Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.
Comment: Would like to see something on energy flow in organisms....
Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)

Agree: “These standards give really good detail as to what’s expected of students, because what students are expected to know is blended with science and engineering practices.”

Agree: (no comment)

Agree: The phrase: "how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction" seems to imply that the structures are the organisms themselves. I think it would be clear to say "how underlying structures..." or "how component structures...".

Disagree: (no comment)

Agree: (no comment)

Agree: "...and solve problems that require an understanding of how..."

Agree: I would recommend changing the language to, "that require and understanding of..." AND remove "these" as it is confusing.

Agree: (no comment)

Agree: (no comment)

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to. Engineering practices in life science??

Disagree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Agree: We must be clear in the standards and in classroom practice that adaptations via evolution are the mechanism by which living systems fundamentally interact with the abiotic and biotic parts of the environment. This subject must move beyond the culture wars if we are to successfully train scientists, physicians and functioning adults.

Agree: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Comment: Could the NGSS coding be added for more clarity and cross-referencing purposes?

Agree: (no comment)

Comment: It would be better to say ".....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-micrometer scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Disagree: This is not interdisciplinary learning. This standard does not require math and an understanding of how scaling laws and emergent behavior explain what is observed. 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.”


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”

**Agree:** (no comment)

**Comment:** "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

**Disagree:** The word configured is very uncommonly used in this context please replace it with an understandable term. ".....the structures of individual organisms and how these structures function to support life, growth, behavior, and reproduction."

**Agree:** (no comment)

**PG: 6. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.**

**Agree:** These standards are focused. The components, interactions, and mechanisms of an ecosystem are an example of the core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge.

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** Fully agree.

**Agree:** Please reference NGSS to make better sense of the alignment

**Agree:** (no comment)

**Agree:** Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

**Agree:** Excellent revision. It is key for all people to understand living systems interactions both direct and indirect.

**Agree:** (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross-referencing purposes?

Agree: (no comment)

Agree: “These standards give really good detail as to what’s expected of students, because what students are expected to know is blended with science and engineering practices.”

Agree: (no comment)

Agree: (no comment)

Agree: consider "their abiotic..." instead of "the abiotic..."

Disagree: (no comment)

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: (no comment)

Agree: Living vs. nonliving could be added to help with ESL students.

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to. Engineering practices in life science??

Disagree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Agree: We must be clear in the standards and in classroom practice that adaptations via evolution are the mechanism by which living systems fundamentally interact with the abiotic and biotic parts of the environment. This subject must move beyond the culture wars if we are to successfully train scientists, physicians and, more generally, functioning adults.

Agree: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Comment: Could the NGSS coding be added for more clarity and cross-referencing purposes?

Agree: (no comment)

Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Agree: (no comment)
Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Disagree: Living systems include and are part of the abiotic environment so wording here is unclear. Biotic and Abiotic interact as parts of the environment... this makes it sound like there is an abiotic and biotic environment separately. Reword to something like "how living systems interact with the biotic and abiotic COMPONENTS OF environmentS.

Agree: (no comment)

PG: 7. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Fully agree.

Agree: Please reference NGSS to make better sense of the alignment

Agree: (no comment)

Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Agree: The combination of genetic and environmental factors is important for understanding personal health and the new genetic engineering technologies.

Agree: (no comment)

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: "These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone."

Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone."

Agree: (no comment)

Agree: (no comment)

Neutral: (no comment)

Agree: This standard focuses on a core ideas in science that is really important for students to know. It is a building block for more advanced knowledge.

Agree: (no comment)

Agree: Love this one! Much more meaningful. "...and solve problems that require an understanding of how..."

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: (no comment)

Agree: Nature vs. nurture could be added to help with lower level students.
Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? Explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGS seems to suggest that I will need to. Engineering practices in life science??

Agree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Agree: (no comment)

Agree: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Comment: Could the NGSS coding be added for more clarity and cross-referencing purposes?

Agree: (no comment)

Comment: It would be better to say "...explain natural phenomena..." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn't matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Agree: (no comment)

Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)

Agree: (no comment)

**PG: 8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.**

Agree: Evolution is a scientific fact, and by fact, I mean something that is tentatively held and falsifiable, but that has a large body of evidence to support it. Therefore, it must be taught in science classrooms.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Fully agree.

Agree: Please code for NGSS to make better sense of the document

Agree: Absolutely agree with this - it is so important to understand the role of natural selection and evolution.
Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Agree: Evolution is a basic tenet of science. It must be taught in public schools.

Agree: The understandings students will gain in this revision are important to their ability to interact in the world and engage in science throughout their lives regardless of whether they choose a career in a STEM field.

Agree: With the increase in antibiotic resistant strains, it’s more important than ever that we make sure students understand the influence of natural selection upon evolution!

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”

Neutral: "...and other natural forces such as genetic drift ..."

Agree: I strongly support this standard. The new standards are more focused than the previous standards. They focus on a few core ideas in science that are really important for students to know and that are the building blocks for more advanced knowledge. We must strongly encourage teachers to teach this standard because it is so central to understanding biology.

Agree: Thank you for including evolution as an essential field of scientific study. Likewise, please do not even consider including non-scientific "theories" such as creationism or intelligent design" Science standards need to reflect genuine scientific inquiry and leave room for the real debates and uncertainties based on peer-reviewed research.

Disagree: (no comment)

Agree: This standard focuses on a core ideas in science that is really important for students to know. It is a building block for more advanced knowledge.

Agree: Please make sure we continue to strengthen Colorado’s commitment to upholding scientific consensus around evolution

Agree: Evolution is not just a theory - it’s a very well established science. Students need to understand evolution to understand the biological world.

Agree: (no comment)

Agree: "...and solve problems that require an understanding of how..."

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: (no comment)

Agree: (no comment)

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don’t teach any engineering, but the PGS seems to suggest that I will need to. Engineering practices in life science??

Agree: (no comment)

Neutral: (no comment)

Agree: This is one of the most important standards in the list. But the comment made earlier about critical thinking, logic and the scientific method are absolutely necessary for students to navigate this material.
Agree: (no comment)
Neutral: (no comment)
Disagree: This PGC encompasses methodological naturalism, an assumption whose use and effect needs to be adequately explained. Biological evolution, a materialistic theory, may or may not account for the "unity and diversity of organisms." Teleology should also be considered as a cause for the origin and diversity of life.

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Agree: It is critically important that Colorado continue to prepare students for life in the modern world by making sure that they understand how natural selection and evolution shape the characteristics of populations. This will be increasingly important as we face changing conditions on earth and challenges like treatment resistant microbes.

Comment: Could the NGSS coding be added for more clarity and cross-referencing purposes?

Agree: (no comment)

Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

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

Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)
Neutral: The concept of evolution is difficult for students to grasp unless they have a solid understanding of biology. This is not a standard I would see every graduate being able to meet.

PG: 9. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: Fully agree.
Agree: Please reference NGSS to make better sense of the alignment
Agree: (no comment)
Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.
Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”

Agree: (no comment)

Agree: Thank you for properly capitalizing "Earth"

Neutral: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (...and solve problems that require an understanding of how...)

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: (no comment)

Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGS seems to suggest that I will need to.

Disagree: (no comment)

Disagree: An over emphasis in engineering could lead in less curriculum covered. This applies to all the statements in this category.

Agree: (no comment)

Agree: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Disagree: (no comment)

Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn't matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Agree: This is an important area of knowledge expressed with appropriate focus on both Earth and the larger universe of which Earth is a part, and their relationships. The PGS as written here supports expansion of the idea into grade-specific standards that are developmentally appropriate and thus coherent as a set.

Agree: (no comment)
Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)

Agree: (no comment)

PG: 10. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Fully agree.

Agree: Please reference NGSS to make better sense of the alignment

Agree: This is also incredibly important.

Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

Agree: Human influence on climate change has been accepted by the world’s leading scientists. It must be taught in public schools.

Agree: Excellent. Earth science is an important understanding for our youth.

Agree: (no comment)

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”

Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”

Agree: (no comment)

Agree: (no comment)

Disagree: (no comment)

Disagree: Revise the SOL on weather and climate to show that with chaos the weather is not predictable because one can’t understand all the initial conditions and unlike the tides do not have periods. Lorenz ‘63: Characteristics of Trajectories • All trajectories in the Lorenz System are central Proven both by linear theory and numerical integration • All trajectories in the Lorenz System are unstable • Some trajectories in the Lorenz System are periodic; some are nonperiodic • No trajectory in the Lorenz System is quasi-periodic

http://schumacher.atmos.colostate.edu/gherman/ATS780FA2015_Lorenz_V2.pdf

Agree: Please make sure we continue to strengthen Colorado’s commitment to upholding the scientific consensus around human induced climate change

Agree: (no comment)

Agree: "...and solve problems that require an understanding of how..."

Agree: I would recommend changing the language to, "that require and understanding of..."

Agree: (no comment)
Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGS seems to suggest that I will need to.

Agree: (no comment)

Neutral: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Agree: (no comment)

Agree: (no comment)

Neutral: (no comment)

Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

Disagree: (no comment)

Agree: (no comment)

Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Comment: Where does the composition of the Earth fit in? Earth is composed of minerals and rocks which make up all landforms.

Agree: This PGS offers both depth and breadth on a central idea of the Earth sciences, the processes of change, which occur at a wide range of time scales. The broad idea in this statement gives coherence to the varied phenomena that are explored in depth at different grade levels.

Agree: (no comment)

Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)

Agree: (no comment)

PG: 11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth’s surface processes interact.

Agree: This is perhaps the most important expectation included in the statements. Students must understand the science behind how the planet’s climate is changing, how it is affecting humans, and how humans are shaping climate. To exclude these standards would make a statement that politics are more important than science in science standards.

Agree: Having been an active alpine mountaineer in the past, I’ve witnessed how the glaciers have receded on mountains around the world, including the French and Swiss Alps, Canada and throughout the US. I agree that it is critical that students learn to use tools and technology to understand how human activity changes the climate. I support this policy; burying our heads under the sand and ignoring science is not what I support.
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: Fully agree.
Agree: Please reference NGSS to make better sense of the alignment
Agree: This one is absolutely critical - climate science is real and students need to understand how human activities impact our Earth.
Agree: This statement makes sense and is appropriately broad. My contention is that the impact of human activities extends far beyond just the surface processes of the Earth. Removing the word "surface" would imply that this includes all of Earth’s processes, including internal forces and processes as well as atmospheric processes and even those that extend beyond the bounds of our planet and its atmosphere to include the solar system and the universe.
Agree: Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.
Agree: Beautifully written. In most jobs and life decisions in the future, students will need this understanding to inform the ways that they choose to interact in the world.
Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”
Agree: “The standards are clear with respect to what should be assessed, and they assess important knowledge and skill.”
Agree: I strongly support this revision. These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.
Agree: (no comment)
Neutral: (no comment)
Disagree: Revise SOL so that critical thinking requires students to always frame their analysis so that a proposition can be confirmed or falsified. Require the Standards of Learning to teach only a valid methodology for establishing the truth or falsity of a proposition; i.e. a valid epistemology. Revise guidelines for critical thinking to provide a requirement that any idea tested should be framed so that it can be falsified. We should have a "competency based learning" model. For instance, we can apply this requirement to the guidelines for nutrition. The Mediterranean diet is now suggested as the best diet model to follow. One should test whether the data gathered considered whether the researchers took into account the Greek Orthodox Church dietary restrictions into a test of nutrition guidelines. https://plato.stanford.edu/entries/popper/ https://plato.stanford.edu/entries/epistemology/ http://www.complete-review.com/reviews/sokalabeyond.htm Beyond the Hoax discusses some of the issues in what constitutes a valid framework of epistemology. It refutes a number of the claims of various "so-called scientists" who attempt to specify a sociology of knowledge. https://www.ncbi.nlm.nih.gov/pubmed/15333159 http://www.abbamoses.com/fasting.html According to the fasting rules 2 x 46 weeks, Greek Orthodox have 96 days with restricted intake of certain foods on Wednesday and Friday. During the six weeks of Lent, they have even more dietary restrictions. Thus Greek Orthodox have 96 days plus 42 = 138 days with significant dietary restrictions. A naive regression only on the food eaten is an incorrect analysis because it ignores other important variables. "Notable & Quotable: Science for Feminists: ‘I offer critical science literacy as a practice
that can directly challenge the epistemic authority of Science.” From the abstract of a paper in the scholarly journal Catalyst: I argue that those of us who have left the Sciences proper and moved to feminist studies spaces have continued to do science through our teaching. In a moment when the impulse to do real science is palpitating in our feminist hearts, I suggest that we critically examine the political stakes of our affective attachments and detachments from s/Science(s). I consider what it means to be attached to a Science that earned its epistemic authority through its co-constitution with colonization and slavery. . . . I offer critical science literacy as a practice that can directly challenge the epistemic authority of Science and be read as “doing science” or more broadly as “rewriting knowledge.” Appeared in the October 27, 2017, print edition as ’Notable & Quotable.’ The Wall Street Journal https://www.wsj.com/articles/notable-quotable-science-for-feminists-1509059119

**Agree:** This standard is incredibly important. One of the biggest challenges facing humans is conservation and protection of the planet, to make sure it can continue to provide as our home. Students need to have an understanding of human impact on the planet so they can work to lessen and find solutions for that impact. Universities and industries are working on those problems, so for Colorado students to succeed in college and in working for top research and engineering organizations, they need to know this science.

**Agree:** Anthropogenic climate change is not a theory - it's a well established science. Students need to understand the interactions between human activities and the earth's atmosphere and the climate.

**Agree:** (no comment)

**Disagree:** This is confusing to me - there may be more clarification in the grade level standards, but as written I disagree.

**Neutral:** The Earth's surface processes could be confusing to teachers. However, if this is clarified within the grade level standards this could work.

**Neutral:** This must be addressed with the social sciences as well, incorporating law, economics, and land/property rights.

**Agree:** A wide range of topics could be discussed here. "Global Warming" should be addressed by name.

**Comment:** The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGS seems to suggest that I will need to.

**Agree:** (no comment)

**Neutral:** I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

**Agree:** (no comment)

**Agree:** (no comment)

**Neutral:** (no comment)

**Agree:** I like how each PGC is focused on the student and references the practices, making sense, natural phenomena and solving problems. This is the kind of thinking we need students to demonstrate as high school graduates in Colorado

**Disagree:** "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

**Disagree:** (no comment)

**Agree:** I think it's very important that the standards call for prepared graduates to understand human-environment interactions, as called for in the NRC Framework for K-12 Science Education.

**Agree:** (no comment)
Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-milimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn’t matter. What is important is that you can explain it, and use that understanding to solve problems.

Agree: (no comment)

Comment: Earth provides humans with resources and this is lost in this statement. Surface processes only refers to volcanism, mountain-building, and weathering and erosion. Where does weather/climate fit in? Where do changes in life fit in?

Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state’s economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.

Comment: This expectation is a solid combination of the natural world and humans' impact and effect on our planet. The same should be added to our exploration of the universe (see expectation 9). As the expectations are now, there is very little that allows for teaching about technologies that allow us to explore the universe, or the potential impact of our exploration, mining, etc. of other planets or celestial bodies, for example. These will become more important as students go into the workplace.

Agree: I support this new PGS since it supports what the consensus of scientists understand as the impact of human activity on global systems. 

Agree: (no comment)

Comment: "Full range of science and engineering practices" needs to be explicitly outlined/defined so that teachers know what they need to incorporate.

Neutral: (no comment)

Agree: (no comment)

Science Preschool

Standard: 1. Physical Science

GLE: 1. Recognize that physical properties of objects and/or materials help us understand the world.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Use senses to explore the properties of objects and materials (e.g., solids, liquids).

Agree: (no comment)

Agree: (no comment)
Evidence Outcome: Make simple observations, predictions, explanations, and generalizations based on real-life experiences.
  Agree: (no comment)
  Agree: (no comment)

Evidence Outcome: Collect, describe, predict and record information using words, drawings, maps, graphs and charts.
  Agree: Is using "words, drawings, maps, graphs and charts" age appropriate for PK?
  Agree: (no comment)

Evidence Outcome: Observe, describe, and discuss living things and natural processes.
  Agree: (no comment)
  Agree: (no comment)

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

Examples of Learning/Children May:
  Agree: (no comment)
  Agree: (no comment)

GLE: 2. Recognize there are cause-and-effect relationships related to matter and energy.
  Agree: (no comment)
  Agree: (no comment)
(PG Feedback) Agree:
Evidence Outcome: Recognize and investigate cause-and-effect relationships in everyday experiences - pushing, pulling, kicking, rolling, or blowing objects.
  Agree: (no comment)
  Agree: (no comment)

Evidence Outcome: Notice change in matter.
  Agree: (no comment)
  Agree: (no comment)

Evidence Outcome: Observe, describe, and discuss properties of materials and transformation of substances.
  Agree: "Observe, describe, and discuss" is unnecessarily wordy- focus on the topic, not a list of verbs.
  Agree: (no comment)

Evidence Outcome: Seek answers to questions and test predictions using simple experiments.
  Agree: (no comment)
  Agree: (no comment)

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

Examples of Learning/Children May:
  Agree: (no comment)
  Agree: (no comment)
Standard: 2. Life Science

GLE: 1. Recognize that living things have unique characteristics and basic needs that can be observed and studied.

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

(PG Feedback) Agree:

Evidence Outcome: Observe, describe and discuss living things.

Agree: "Observe, describe, and discuss" is unnecessarily wordy- focus on the topic, not a list of verbs.
Agree: (no comment)

Evidence Outcome: Observe similarities and differences in the needs of living things.

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

Evidence Outcome: Observe and describe how natural habitats provide for the basic needs of plants and animals with respect to shelter, food, water, air, and light.

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

Evidence Outcome: Ask and pursue questions through simple investigations and observations of living things.

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

Evidence Outcome: Collect, describe, and record information about living things through discussion, drawings, graphs, technology and charts.

Agree: "collect, describe and record" is unnecessarily wordy- focus on the topic, not a list of verbs.
Agree: (no comment)

Evidence Outcome: Identify differences between living and nonliving things.

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

Supportive Teaching Practices/Adults May:

Agree: For #1, "plans" should be "plants" for #4, "Breath" should be "breathe"
Agree: (no comment)

Examples of Learning/Children May:

Agree: in #4, "thing" should be "things" (or say "a living thing") in # 5, include an "and". In the standards part (on the left side), light is included as a need, but it is excluded here.

Comment: The life cycle of a butterfly includes an egg; however, it is difficult for preschool child to understand this part of the life cycle.

GLE: 2. Recognize that living things develop in predictable patterns.

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

(PG Feedback) Agree:

Evidence Outcome: Identify the common needs such as food, air, and water of familiar living things.

Agree: (no comment)
Evidence Outcome: Predict, explain, and infer patterns based on observations and representations of living things, their needs, and life cycles.

Agree: "Predict, explain, and infer patterns" is overly wordy and redundant- focus on the standard, not an excess of verbs.

Agree: (no comment)

Evidence Outcome: Observe and document changes in living things overtime using different modalities such as drawing, dramatization, describing or using technology over time.

Neutral: I realize that this is meant for teachers, but "using different modalities" seems overly technical - wouldn't "methods" or some other process word work? Also, what does "over time" do for the standard?

Agree: (no comment)

Evidence Outcome: Recognize that plants and animals grow and change.

Agree: (no comment)

Supportive Teaching Practices/Adults May:

Agree: #1 "overtime" should be "over time" #3 add "different" before "living things"

Agree: (no comment)

Examples of Learning/Children May:

Agree: #1: I realize that this is meant for teachers, but "modalities" seems overly technical - wouldn't "methods" or some other process word work? Also, "overtime" should be "over time"- I hope we are not working preschoolers more than 8 hours a day. #3: Last "adult" should be "adults"

Agree: (no comment)

Standard: 3. Earth and Space Science

GLE: 1. The acquisition of concepts and facts related to the Earth materials and their uses.

Agree: Thank you for capitalizing "Earth", but I would say "Eatrth's minerals" instead of "the Earth minerals"

Disagree: The language is too confusing "The acquisition of concepts and facts related to..." Does the committee mean how Earth materials are derived, how they change, and use of Earth materials?

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Use senses and tools, including technology, to investigate materials, and observe processes and relationships to gather information and explore the environment.

Agree: (no comment)

Agree: (no comment)

Disagree: Technology is not necessary at Pre-K unless you mean hand lenses, pencils, etc.

Agree: Thank you for including language that provides openings for learners to explore and investigate outdoors. Consider providing similar opportunities in later grades, as well.

Evidence Outcome: Inquire about the natural and physical environment.

Agree: (no comment)

Agree: (no comment)

Agree: Thank you for including language that provides openings for learners to explore and investigate outdoors. Consider providing similar opportunities in later grades, as well.
Evidence Outcome: Observe and discuss common properties, differences, and comparisons among objects.

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

Evidence Outcome: Participate in simple investigations to form hypothesis, gather observations, draw conclusions.

Agree: needs an "and" before "draw conclusions"
Disagree: Children at this age are forming "predictions" not hypotheses.
Comment: Prediction rather than hypothesis should be used at this grade level.
Comment: At Pre-K (and all the way through 8th grade) use the word "prediction" rather than hypothesis.

Evidence Outcome: Record observations using words, drawings, maps, graphs and charts.

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

Supportive Teaching Practices/Adults May:

Agree: #5: "Earth materials" is capitalized at the top of this standard (but see my comment as to how it is presented)- I'd suggest either "Earth's materials", "rocky materials" or "earthen materials".
Agree: (no comment)

Examples of Learning/Children May:

Agree: #3: "Earth materials" is capitalized at the top of this standard (but see my comment as to how it is presented)- I'd suggest either "Earth's materials", "rocky materials" or "earthen materials".
Agree: (no comment)

GLE: 2. The acquisition of concepts and facts related to the natural and physical world and the understanding of naturally-occurring relationships.

Agree: (no comment)

Evidence Outcome: Predict, explain, and infer patterns based on observations and evidence.

Agree: (no comment)
Agree: (no comment)
Agree: Here you use the word, "predict."
Agree: Thank you for including language that provides openings for learners to explore and investigate outdoors. Consider providing similar opportunities in later grades, as well.

Evidence Outcome: Articulate findings through a variety of modalities (e.g., drawings, words, dramatizations).

Agree: Consider different wording for "modalities"
Agree: (no comment)

Evidence Outcome: Recognizes familiar elements of the natural world and demonstrates an understanding that these may change over time (e.g., sun and moon, weather).

Agree: Verbs should be singular to match others n this series.
Agree: (no comment)
Agree: Thank you for including language that provides openings for learners to explore and investigate outdoors. Consider providing similar opportunities in later grades, as well.
Evidence Outcome: Observe and describe patterns observed over the course of a number of days and nights (e.g., differences in the activities or appearance of plants and animals).

Agree: need a space after "nights"
Agree: (no comment)
Agree: Thank you for including language that provides openings for learners to explore and investigate outdoors. Consider providing similar opportunities in later grades, as well.

Supportive Teaching Practices/Adults May:
Agree: Technically, #2 should be "to which they correspond" rather than "they correspond to"
Agree: (no comment)
Disagree: Teachers need to not only "talk" about weather conditions but have students begin to record weather data such as "it is cloudy" or "it is clear skies."

Examples of Learning/Children May:
Agree: (no comment)
Agree: (no comment)
Comment: #4—Would like to see this as an example "when children are outside, weather patterns are talked about." Making this a more concrete concept for young children.

Science Kindergarten

Standard: 1. Physical Science

PG: 1. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Neutral: (no comment)

PG: 10. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Agree: (no comment)

PG: 11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Neutral: (no comment)

PG: 2. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.

Neutral: (no comment)

PG: 3. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Disagree: What are some ways to change the wording in PGS 3 and 4 to avoid repeating the energy transfer component. Is the focus on waves too specific in #4? I agree with the need to include waves and more physics than in the past.
PG: 4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

   Disagree: What are some ways to change the wording in PGS 3 and 4 to avoid repeating the energy transfer component. Is the focus on waves too specific in #4? I agree with the need to include waves and more physics than in the past.

PG: 5. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction.

   Disagree: get rid of the word "configured" and go with what is commonly used such as structure...... "configured" is awkward and does not fit

PG: 6. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

   Disagree: The environment includes both biotic and abiotic.... the way this is worded seems to separate them. Perhaps it should say something about the biotic and abiotic components of the environment. Maybe.... understanding of the interactions between biotic and abiotic components of the environment.

PG: 7. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

   Agree: (no comment)

PG: 8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

   Agree: (no comment)

PG: 9. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth’s place in it.

   Neutral: (no comment)

GLE: 1. Students can answer the question: How can one predict an object’s continued motion, changes in motion, or stability?

   Disagree: I love that the GLE is written as a question! However, this does not sound like kindergarten level language.

   Disagree: I love that the GLE is written as a question however, this is complex language for a kindergartner. Needs to be simplified.

   Agree: (no comment)

(PG Feedback) Agree:
Evidence Outcome: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. (Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.) (Boundary: Limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets)

Agree: (no comment)

Evidence Outcome: Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. (Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.) (Boundary: Does not include friction as a mechanism for change in speed.)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Well done

Agree: I like the elaboration of the GLE as it provides more specificity for teachers.

Agree: (no comment)

GLE: 2. Students can answer the questions: What is meant by conservation of energy? How is energy transferred between objects or systems?

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Make observations to determine the effect of sunlight on Earth’s surface. (Clarification Statement: Examples of Earth’s surface could include sand, soil, rocks, and water) (Boundary: Temperature is limited to relative measures such as warmer/cooler.)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. (Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.)

Agree: (no comment)

Agree: (no comment)
Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do the structures of organisms enable life's functions?

Comment: It appears we are going to use NGSS renamed Colorado Academic Standards...what is the transitional plan for training of teachers and for the substantial increase in rigor required by NGSS? How will we ensure our elementary teachers in particular feel competent in teaching to these standards

Disagree: If students are going to be answering this question then it needs to be written in student friendly language.

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Use observations to describe patterns of what plants and animals (including humans) need to survive. (Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.)

Neutral: (no comment)

Disagree: Plants need "food" as well as animals. Plant food is mostly carbon dioxide and water, but plants also need various minerals and organic matter from the soil.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Neutral: Nice for teachers to have the "answer". I am concerned that the questions in the GLE's aren't student language. If the prompt is, "Students can answer the question:" then the question should be in student friendly, age appropriate language.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: What regulates weather and climate?

Disagree: If students are to answer this question it needs to be written in student friendly language.
Agree: (no comment)

Disagree: Climate is not age-appropriate until high school. Focus on weather conditions (temperature, rainfall, wind, etc.) at K-5.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Use and share observations of local weather conditions to describe patterns over time. (Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.) (Boundary: Quantitative observations limited to whole numbers and relative measures such as warmer/cooler.)

Disagree: "Collect and share" or "Collect and communicate"
Agree: (no comment)

Comment: All investigations have been deleted from Kindergarten. "Use and share" implies they no longer collect any weather information.

Agree: (no comment)

Evidence Outcome: Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. (Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.)

Agree: (no comment)

Disagree: Plants and animals do not generally "change their environment" to meet their needs.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

Comment: Drop the word "climate" out of here--sunlight, wind, snow, rain, etc. are weather conditions (not weather "combinations"!). Climate is not appropriate until high school after students understand not only the weather conditions (temperature, humidity, precipitation, wind conditions, air pressure--these are for grades 5-8), how to read weather maps, and understanding how air molecules move. Biogeology is not a word! "Bio" is living organisms and geology refers to minerals and rocks that have never been alive.

Agree: (no comment)
GLE: 2. Students can answer the question: How do Earth’s surface processes and human activities affect each other?

Agree: (no comment)

Disagree: Surface processes on Earth refer to water running across the surface (erosion), wind blowing on rocks, rocks heating up in the sun, etc. No weathering and erosion is spelled out here. Weather is not a "surface process."

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

Disagree: Shouldn’t young students be using real plants and animals (goldfish) rather than models of plants and animals???

Agree: (no comment)

Evidence Outcome: Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. (Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.)

Agree: (no comment)

Disagree: Weather forecasting is not age appropriate for K or lower elementary unless you mean "if it is sunny without clouds today, it might be sunny tomorrow." Weather forecasting implies an understanding of using lots of weather data from weather maps to forecast the next upcoming storms, etc.

Agree: (no comment)

Evidence Outcome: Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. (Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.)

Neutral: This standard emphasizes the reduction of NEGATIVE impacts of humans on the environment. While this is fine, humans also can be proactive in conserving and enriching the environment. This aspect deserves attention as well.

Agree: (no comment)

Disagree: Young students are finding out how things in the world work—they do not have enough background to understand how humans "impact" the natural world. They need to know how the natural world works first!

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

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

Elaboration on the GLE:
Agree: (no comment)

Disagree: K students should not be studying natural hazards such as storms. This is not age-appropriate. They should be learning how to collect weather data (temperature data, wind [windy or calm], sunny or cloudy, etc.) and looking for patterns in the data. Severe weather that includes winter storms, thunderstorms, and tornadoes (and hurricanes) are more appropriate once students are in middle school.

Agree: (no comment)

Science First Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the question: What are the characteristic properties and behaviors of waves?

Agree: This is not too big a shift (from second to first grade) and therefore current curriculum resources can be used and not put a strain on teachers or districts

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Plan and conduct investigations to provide evidence that vibrating materials can make a sound and that sound can make materials vibrate. (Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.)

Agree: (no comment)

Agree: I love the clarification statements as they support teachers in what this could look like in their classroom.

Agree: (no comment)

Comment: I am very excited that we are using the Next Generation Science Standards; it would be fantastic if we kept the original numbering in order to help teachers find resources.

Evidence Outcome: Make observations to construct an evidence-based account that objects can be seen only when illuminated. (Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Plan and conduct an investigation to determine the effect of a placing objects made with different materials in the path of a beam of light. (Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror)).

Agree: (no comment)

Agree: (no comment)
Evidence Outcome: Use tools and materials to design and build a device that used light or sound to solve the problem of communicating over a distance. (Clarification Statement: This performance expectation integrates transitional science content with engineering through a practice or disciplinary core idea.)

Neutral: I believe you meant to say 'traditional' not 'transitional'.

Agree: (no comment)

Neutral: Having examples for teachers here will be extremely important to determine what this would look like at the kinder level.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Disagree: This will be overwhelming for our elementary teachers. Our district was one of the first to move to NGSS. There was very little support for teachers and after 3 years we switched back to CAS for K-3 as the standards were much more user friendly. Elementary teachers are not content specialists and do not have the time to devote to make sense of this. If the Elaboration on the GLE is to provide teachers with additional information to support students in their learning, then the information provided needs to be relevant to teachers and students and user friendly.

Disagree: This is too overwhelming for our first grade teachers. Our district was one of the first in Colorado to switch from CAS to NGSS. There was little to no support for teachers making this transition. After 3 years of struggling, we changed back to the CAS for grades K - 3 as the standards were more user friendly. Most elementary teachers are not content specialists and do not have the time to make sense of this. If the purpose of 'Elaboration on the GLE' is to provide teachers with the information they need in order to direct students in their learning, the information needs to be relevant and user friendly. Copying the NGSS DCI's along with their clarifications may not be the best way to go.

Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do the structures of organisms enable life's functions?

Disagree: The questions need to be written in student friendly language.

Disagree: Again, if students are being asked to answer this question, the question needs to be in language a first grader can understand.

Disagree: Shifting this topic from fourth/fifth grade to first will put an undo strain on teachers, schools, and districts as they will need to develop and/or purchase new curriculum in a short time frame

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:
Evidence Outcome: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. (Clarification Statement: Examples of human problems that can be solved could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and detecting intruders by mimicking eyes and ears.)

Agree: (no comment)

Comment: Can we please keep the same numbering system as the Next Generation Science Standards?
Agree: (no comment)

Evidence Outcome: Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. (Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring)).

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

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the questions: How are the characteristics of one generation related to the previous generation? Why do individuals of the same species vary in how they look, function, and behave?

Disagree: Need first grader language, please
Agree: (no comment)
Agree: (no comment)

(PG Feedback) Agree:

Evidence Outcome: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. (Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same. This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea).

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

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the questions: What is the universe, and what goes on in stars? What are the predictable patterns caused by Earth's movement in the solar system?

Disagree: The wording of the first question is confusing and can not be answered given the evidence outcomes.

Disagree: I am wondering what we would like a 6 year old to know about what goes on in stars? This needs to be re written to reflect the expectation.

Disagree: Moving this topic from third grade to first will put somewhat of a strain on teachers, schools, and districts to modify/adapt curricular resources.

Agree: (no comment)

Disagree: What goes into stars? What does this mean? Are you talking about the "composition" of gases that make up stars? Are you talking about natural activity (such as solar flares, etc.) that happen on stars? Sentence does not explain what you are talking about. In addition, 1st graders (not sure if this is the same written grade-level expectation for all grade levels) should not be doing anything except observing stars in the sky.

Disagree: Why should 1st graders be able to answer the question "what goes on in stars" if this content is not included in the standards for 1st grade?

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Use observations of the sun, moon, and stars to describe patterns that can be predicted. (Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.)

Agree: In connection to the GLE the question should be, 'Why can we see stars at night but not during the day?'

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Make observations at different times of year to relate the amount of daylight to the time of year. (Make observations at different times of year to relate the amount of daylight to the time of year.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Comment: Comment in () is the same as the statement.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Comment: The cross-cutting concepts were explained for Kindergarten but not here.

Elaboration on the GLE:
Agree: (no comment)
Agree: (no comment)
Comment: Use language of EO in GLE regarding sunrise and sunset....the sun appears to rise and set to avoid later misconceptions.
Comment: Universe is misspelled.

Science Second Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the question: How do particles combine to form the variety of matter one observes?

Neutral: very wordy
Agree: The classification via observable properties was in first grade and makes sense for combining here, as long as it is clear that this is about observable properties and teachers do not think they have to go into physical/chemical chemical changes and atomic structure with seven year olds.
Disagree: I think this GLE needs revisited. It does not seem connected to the evidence outcomes, nor is it written in kid friendly language.
Disagree: I don't think this question captures the essence of the evidence outcomes in this unit. The question also needs to be in 7 year old language. "What properties can we see that help us to sort items?"
Agree: (no comment)
Disagree: It still seems like "interact" is a better word than "combine."
Disagree: 2nd graders are not expected to know the term particles.
Neutral: In reading the details of this area, it seems like these new 2nd grade standards are what was previously taught in 1st grade in Jefferson County - the old "Properties" unit. This seems like a big change to the current standards.
(PG Feedback) Disagree: This statement can be read as being too complex, requiring understanding of atomic structure and chemical changes, etc. Clarification will reduce this anticipated stress and confusion for teachers.
(PG Feedback) Agree:

Evidence Outcome: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. (Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share)

Agree: good
Agree: (no comment)
Agree: (no comment)
Evidence Outcome: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. (Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.)
(Boundary Statement: Quantitative measurements is limited to length.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. (Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. (Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

**Standard: 2. Life Science**

GLE: 1. Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Disagree: add the word COMPONENTS to the statement to refer to the components of environments... or connect the living and nonliving together in the wording.

Agree: (no comment)

(PG Feedback) Agree: Keeping plant and animal structures and functions in second grade will not cause any conflicts with existing curricula (beyond adding an NGSS instructional approach)
Evidence Outcome: Plan and conduct an investigation to determine if plants need sunlight and water to grow.

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

Comment: I recommend using the original NGSS instead of this Colorado version.

Agree: (no comment)

Evidence Outcome: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Neutral: wording difficult "The role of an animal"
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the question: What evidence shows that different species are related?

Disagree: I believe this GLE needs reworked. The evidence outcome emphasis is on the diversity of organisms within a habitat and not the similarities between related species.

Disagree: The essence of this evidence outcome seems to be connected to the diversity of organisms within a habitat not the similarity between organisms. Consider instead "How can we predict what living things might be in a certain habitat based on the nonliving parts of the habitat?"

Agree: (no comment)
Evidence Outcome: Make Observations of plants and animals to compare the diversity of life in different habitats. (Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.)

Neutral: This standard is a prelude to coverage of biological evolution (specifically, the origin of the diversity of life) in later grades. The standard as written is satisfactory, but discussion of biological evolution should be delayed until High School Life Science.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: GLE needs to refer to relatedness of species.

Agree: (no comment)

Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: How do people reconstruct and date events in the Earth's planetary history?

Neutral: Are you asking for a timeline??

Disagree: (no comment)

Disagree: The evidence outcome is related to Earth changes that occur quickly or slowly. Students at this level are not being asked to look at how people reconstruct and date events; rather, they are learning about earth’s process that change the landscape. This GLE needs to be changed to reflect what students are doing at this level.

Disagree: The essence of the evidence outcome is around Earth events that happen fast or slow. This is to help build a base for students looking at Earth evidence and reconstructing some of its history based on evidence in future grades. The purpose of this unit is to establish an understanding that there are events that occur quickly (1 - 100 years) vs those that occur over huge amounts of time...thousands of years. Consider, "What events might cause changes to Earth’s surface that we will see and what events would cause changes we will not see in our lifetime?"

Agree: (no comment)

Comment: Take the word, "planetary," out of the sentence. It's Earth's geologic history. Students should be studying how Earth fits into the solar system in the lower elementary grades.

Disagree: This question is not aligned with the standard. It would be better to stick with the original NGSS questions that are included in the Topic Arrangement under Storylines.

(PG Feedback) Disagree: Moving this topic from fourth to second grade will cause significant strain on teachers, schools, and districts to adjust/purchase curricular resources appropriate to grade level.

(PG Feedback) Agree:
Evidence Outcome: Use information from several sources to provide evidence that Earth events can occur quickly or slowly. (Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.)

Agree: (no comment)
Agree: (no comment)
Comment: Include weathering with erosion of rocks.
Disagree: Erosion (or moving of rock from point A to point B) can also occur very rapidly—for example in a flood situation or a landslide.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Neutral: Do you mean integrate??
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Disagree: This does not reflect an accurate reflection on the GLE. The reasoning portion of the student performance states, "Earth events and the resulting changes can be directly observed; therefore the events occurred rapidly. In other cases, the resulting changes of Earth events can be observed only after long periods of time; therefore these Earth events occur slowly, and change happens over a time period that is much longer than one can observe." This reflects the essence.
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the question: How does wind and water shape and affect the Earth?
Agree: good
Agree: Great, student friendly language!
Agree: (no comment)
Comment: None of the Evidence Outcomes address the statement "how water and wind shape and affect the Earth?" NOT ALIGNED!
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
Evidence Outcome: Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. (Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.)

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

Evidence Outcome: Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Agree: love this!
Agree: (no comment)

Disagree: Students should look for water in the neighborhood of their school—puddles, a stream nearby, perhaps a lake. They shouldn't be developing a "model."
Agree: (no comment)

Evidence Outcome: Obtain information to identify where water is found on Earth and that it can be solid or liquid.

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

Disagree: Plate tectonics does not belong here. Not age-appropriate in the first place.
Comment: Models which focus on local/nearby environments can spiral to global understanding. Focusing investigations on environments at and/or near schools would be most appropriate.
Agree: (no comment)

Science Third Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the questions: How can one predict an object’s continued motion, changes in motion, or stability? What underlying forces explain the variety of interactions observed?

Neutral: (no comment)
Disagree: The second question seems confusing and slightly disconnected from evidence outcome b. Consider: How can we use the patterns in the motion of an object to predict future motion?

Disagree: Student language please! Consider, "How can I use the patterns in the motion of an object to predict future motion?"

Agree: (no comment)

(PG Feedback) Neutral: Although moving this topic from kindergarten to third grade may place some strain on teachers, schools, and districts to adapt or develop new curricular resources, it makes more sense developmentally and in a "story line" of physical science to have it here.

(PG Feedback) Agree:

Evidence Outcome: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.) (Boundary Statements: Limited to one variable at a time: number, size, or direction of forces and to gravity being addressed as a force that pulls objects down. Does not include quantitative force size, only qualitative and relative.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw] (Boundary Statement: Does not include technical terms such as period and frequency.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

GLE: 2. Students can answer the question: Why are some physical systems more stable than others?

Disagree: (no comment)
**Disagree:** This question needs to be more closely aligned to the evidence outcomes and written in student-friendly language. Consider: What is the relationship between size and distance of magnetic and/or electric forces?

**Disagree:** These E.O.'s focus on cause and effect relationships so it seems that our student question should focus on the same. Consider, "What is the relationship between size and distance of magnetic and/or electric forces?"

**Agree:** (no comment)

Evidence Outcome: Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. (Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.) (Boundary Statement: Limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.)

**Agree:** (no comment)

Evidence Outcome: Define a simple design problem that can be solved by applying scientific ideas about magnets. (Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.)

**Agree:** (no comment)

**Colorado Essential Skills and Science and Engineering Practices:**

**Agree:** (no comment)

**Cross Cutting Concepts:**

**Agree:** (no comment)

**Elaboration on the GLE:**

**Agree:** (no comment)
Standard: 2. Life Science

GLE: 1. Students can answer the question: How do the structures of organisms enable life’s functions?

Neutral: (no comment)

Disagree: "What parts of the Life Cycle do all organisms have in common?" would more closely align to the essence of the evidence outcome.

Disagree: The GLE does not seem to reference structures. I would recommend What parts of the life cycle to all organisms have in common? OR What patterns do we see in the life cycles of Earth’s organisms?

Agree: I like that this is in 3rd grade. It is appropriate. In order to fully understand how organisms interact with the living and nonliving environment, they need to first have an understanding how internal and external structures support the survival, growth, behavior and reproduction of an animal. Before going wide and looking at an ecosystem, a student needs to have a firm grasp of how an organism grows, behaves and reproduces.

Agree: (no comment)

Agree: It makes sense to have this GLE is in third grade. Before students study about how organisms interact with their living and nonliving environment, they need to be able to comprehend how the physical characteristics of a living thing allow for its survival, reproduction and life cycle.

(PG Feedback) Neutral: Moving this topic from fourth grade to third makes sense with the sequence of understanding life sciences and will not cause undo strain on curricular resources.

(PG Feedback) Comment: Why does 3rd grade have 5 grade level expectations, but 4th grade only has one? They also cover 5 different “prepared graduate” statements, this is too much for 3rd grade to cover in a year and limits what will be built upon and remembered in 4th and 5th grade. This does not benefit the student.

(PG Feedback) Agree:

(PG Feedback) Disagree: It doesn’t make sense for 3rd grade to study ecosystems before learning about basic cell structure and how living organisms are made. This subject of ecosystems should be maintained at a 4th grade level.

(PG Feedback) Agree:

Evidence Outcome: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (Clarification Statement: Changes organisms go through during their life form a pattern) (Boundary Statement: Limited to those of flowering plants and does not include details of human reproduction.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
Elaboration on the GLE:

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

GLE: 2. Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?

Disagree: This question does not match the GLE and is also identical to the one used in second grade, was this intentional?
Disagree: This question does not track with E.O. This question is also identical to the one used in 2nd grade, is that what was intended?
Disagree: Due to the level of impact on teachers, district curriculum specialist and informal educations, it should stay under 4th grade and not be moved as it is proposed here. For these individuals, switching the time at which these life science concepts are taught would cause a need to entirely rewrite programs, extra training and additional time and resources that are already tight. This big of a change seems to not necessarily be in the best interest of the student, but rather aligning to a framework.

Agree: (no comment)
Disagree: I believe this should stay under 4th grade and not be moved to 3rd grade. This is a very large and complex topic to move to a younger grade that would impact educators (both formal and non-formal) and their time, resources, and budget. It makes more sense to keep this is 4th grade, after in 3rd grade they have had a chance to study organisms and their functions and life cycles.

Disagree: add ".... living and nonliving COMPONENTS of the environment."

(PG Feedback) Agree:

Evidence Outcome: Construct an argument that some animals form groups that help members survive.

Agree: (no comment)
Comment: If this were to stay in 3rd grade, this would be the appropriate focus.

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
GLE: 3. Students can answer the questions: How are the characteristics of one generation related to the previous generation? Why do individuals of the same species vary in how they look, function, and behave?

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

Evidence Outcome: Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. (Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.) (Boundary Statement: Does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.)

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

Evidence Outcome: Use evidence to support the explanation that traits can be influenced by the environment. (Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.)

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 4. Students can answer the questions: What evidence shows that different species are related? How does genetic variation among organisms affect survival and reproduction?

Disagree: The second question needs to be rewritten in student friendly language. Consider: How do the changes in a population of organisms affect their survival and reproduction?
Disagree: In the second question consider, "How do differences among organisms affect survival and reproduction?"

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. (Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.) (Boundary Statement: Does not include identification of specific fossils or present plants and animals and is limited to major fossil types and relative ages.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Disagree: Discussion of common ancestry and the origin of life's diversity are not appropriate at this grade level. The Evidence Outcomes as written are satisfactory, but discussion of biological evolution should be delayed until High School Life Science.

Agree: (no comment)

Agree: (no comment)

GLE: 5. Students can answer the questions: How does the environment influence populations of organisms over multiple generations? What is biodiversity, how do humans affect it, and how does it affect humans?

Disagree: Consider, "How do changes in an environment impact the plants and animals that live there?"
**Disagree:** The second question does not seem to address evidence outcome b. Please consider: How do changes to an environment affect the plants and animals that live there?

**Disagree:** I believe this would be better suited for 4th grade. In addition, there are too many prepared graduate statements for 3rd grade. This would also be able to be taught in conjunction with Colorado History in 4th grade.

**Agree:** (no comment)

**PG Feedback Agree:** It is imperative that our students learn about natural selection.

**PG Feedback Agree:** It is so important to have evolution in the standards and I appreciate seeing how students will be able to start learning and understanding what drives change in organisms in 3rd grade.

Evidence Outcome: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.)

**Agree:** (no comment)

**Neutral:** This standard is a prelude to coverage of biological evolution (in this case microevolution or adaptation) in later grades. The standard as written is satisfactory, but discussion of biological evolution should be delayed until High School Life Science.

**Agree:** (no comment)

Evidence Outcome: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. (Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.) (Boundary Statement: Limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.)

**Agree:** (no comment)

Colorado Essential Skills and Science and Engineering Practices:

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Cross Cutting Concepts:**

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

Elaboration on the GLE:

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: What regulates weather and climate?

Neutral: (no comment)

Disagree: Regulates is confusing. Perhaps: What determines weather and climate?

Disagree: I don't think we are looking at what regulates (controls or maintains) weather and climate but instead, what determines weather and climate.

Agree: (no comment)

Disagree: Climate is not appropriate until 8th or 9th grade!

Agree: Thank you for including language to help students build understanding of Climate and Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

(PG Feedback) Neutral: Moving this topic from fourth grade to third grade will not require too much adaptation of curricular materials for teachers, schools, and districts

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] Obtain and combine information to describe climates in different regions of the world) (Boundary Statement: Graphical displays are limited to pictographs and bar graphs. Does not include climate change.)

Agree: (no comment)

Agree: (no comment)

Disagree: "Represent" is not the same as collecting weather data. Climate not age appropriate until 8-9th grades.

Agree: Yes, get them starting to use data and making graphs to build the base for understanding the difference between and the complexity of weather and climate.

Agree: (no comment)

Evidence Outcome: Obtain and combine information to describe climates in different regions of the world.

Agree: (no comment)

Agree: (no comment)

Comment: I think you mean by climate—deserts, tropical rainforests, arctic climates. These designations are based on different latitudes which is something studied in social studies. Different climates have different plants and animals, etc. When discussing "climate" in science we generally are referring to weather conditions of temperature and precipitation over many years. Changing climate in today's world is what I think about when I see the word, climate. How are kids suppose to learn about climates in other countries when they don't even know the weather patterns and climate in Colorado first!

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: The more they start using data, both graphing and interpreting graphs, the better.

Agree: (no comment)
Cross Cutting Concepts:

Agree: (no comment)
Agree: (no comment)
Agree: See previous comment
Agree: (no comment)

Elaboration on the GLE:

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

Disagree: Definition of climate provided here is not correct!
Agree: Important to build understanding that scientists use patterns to make predictions. Sometimes those predictions don't pan out. Scientists use these instances to further their understanding of the phenomenon they are studying. This is how science works.
Agree: (no comment)

GLE: 2. Students can answer the question: How do natural hazards affect individuals and societies?

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

Disagree: Natural hazards are not age-appropriate here. They can "read" about tornadoes, winter storms, hurricanes, landslides, earthquakes, and volcanic eruptions, but basically, at this age they are still learning how the world works by collecting data to look for patterns. Winter storms, hurricanes, and tornadoes are only studied after weather has been collected for years. Earthquakes and volcanic eruptions are only studied after kids know that the Earth is made of rocks and minerals.
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:

Evidence Outcome: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. (Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.)

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

Disagree: First of all, students need to understand what lightning is before they look at lightning rods. This is not age-appropriate at 2nd grade. They should be collecting weather data (temperature, sunny/cloudy, precipitation, etc.) to look for patterns from day to day and from season to season.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Science Fourth Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the questions: What is energy? What is meant by conservation of energy? How is energy transferred between objects or systems?

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

(PG Feedback) Disagree: This seems like an awful lot of key content rolled into one standard and addressed in one place. Previously, the idea of "what is energy" (particularly electricity was addressed in second grade and conservation much later. This change will cause significant strain on teachers, schools, and districts to provide new curricular resources and the time allotment for one standard may be disproportionate to other standards.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Use evidence to construct an explanation relating the speed of an object to the energy of that object. (Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.) (Boundary Statement: Does not include quantitative measures of changes in speed of an object or on any precise or quantitative definition of energy.)

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

Evidence Outcome: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (Boundary Statement: Does not include quantitative measurement of energy.)

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

Evidence Outcome: Ask questions and predict outcomes about the changes in energy that occur when objects collide. (Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.) (Boundary Statement: Does not include quantitative measures of energy.)

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

Evidence Outcome: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.) (Boundary Statement: Does not include quantitative measures of changes in speed of an object or on any precise or quantitative definition of energy.)

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

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)

GLE: 2. Students can answer the question: How are forces related to energy?
Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)
(PG Feedback) Disagree:
(PG Feedback) Agree:
(PG Feedback) Agree:

Evidence Outcome: Ask questions and predict outcomes about the changes in energy that occur when objects collide. (Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.) (Boundary Statement: Does not include quantitative measures of energy.)
Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)

GLE: 3. Students can answer the questions: How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?
Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)
(PG Feedback) Disagree:
(PG Feedback) Agree:
(PG Feedback) Agree:
Evidence Outcome: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.) (Boundary Statement: Does not include quantitative measures of changes in speed of an object or on any precise or quantitative definition of energy.)

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 4. Students can answer the question: What are the characteristic properties and behaviors of waves?

Disagree: (no comment)
Agree: (no comment)
Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty." .... even for this grade level.
Agree: (no comment)

(PG Feedback) Disagree: This whole topic seems to be "biting off more than teachers can chew". It's a huge shift.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.) (Boundary Statement: Does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.)

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

Agree: (no comment)
Agree: (no comment)
GLE: 5. Students can answer the questions: What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there?

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

**(PG Feedback) Disagree:** Why introduce waves so much earlier and then come back to them years later?
**(PG Feedback) Agree:**
**(PG Feedback) Agree:**

Evidence Outcome: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (Boundary Statement: Does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.)

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 6. Students can answer the question: How are instruments that transmit and detect waves used to extend human senses?

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

**(PG Feedback) Disagree:**
**(PG Feedback) Agree:**
**(PG Feedback) Agree:**

Evidence Outcome: Generate and compare multiple solutions that use patterns to transfer information. (Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.)

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

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

*Agree: (no comment)*
Online Feedback  Science Fourth Grade

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?

Neutral: (no comment)

Disagree: Why only one grade level expectation? The one they do have seems like it should be in third grade rather than 4th. Ecosystems should be taught in 4th grade so that the students can benefit from the easy interdisciplinary connections to the 4th grade Colorado History and Geography standards. As an informal educator who works closely with 4th grade classrooms year-round, I have written curriculum and regularly teach programs for 4th grade students. The materials we use were purchased and planned based around the 4th grade Academic Standards and we have found ecosystems are a topic that complements the other standards, such as Social Studies, and is at a developmental level appropriate for 4th grade.

Agree: (no comment)

Disagree: This GLE seems like it would be a better fit for 3rd grade. I am also wondering, why is there only one GLE for 4th grade where there are 3 for 3rd grade? I work closely with 4th grade classrooms throughout the state and have based our curriculum and lessons on ecosystems. We’ve found that ecosystems and what drives change within them are an excellent fit for 4th grade and complements other standards such as what they also study in 4th grade in social studies about Colorado history.

Disagree: I feel this is a subject best placed at the 3rd Grade level.

Agree: (no comment)

(PG Feedback) Neutral: I suppose this is close enough to the fifth grade human body systems standards in the current standards, but it seems it is much broader and may require schools/districts to purchase/develop/etc. new curricula and place a great strain on teachers to learn new content as well as a new approach.

(PG Feedback) Comment: Why only one prepared graduate statement and grade level expectation where there are so many in 3rd grade?

(PG Feedback) Disagree: I would like to advocate for keeping the concept of ecology in the fourth-grade standards. So many of the proposed science standards are connected to ecology (as ecology is what connects everything!), that it seems like a missed opportunity to name the branch of science. Removing ecology also has serious repercussions for Colorado Parks and Wildlife’s SOLE program, which provides Colorado fourth-graders and their families with free, hands-on, and experiential learning opportunities related to science and the outdoors.

(PG Feedback) Disagree: My concern over planned revisions is not keeping ecosystems in 4th grade and thus losing the interdisciplinary and natural connection of ecosystems with Colorado history.

(PG Feedback) Agree:

(PG Feedback) Disagree: Although Fourth graders should be thinking critically about life structures and reproduction, I believe this is a subject better mastered at an earlier age. Fourth Grade should maintain ecosystems in their studies.

(PG Feedback) Agree:

55
Evidence Outcome: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction. (Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lungs, brain, and skin.) (Boundary Statement: Stress at this level is on understanding the macroscale systems and their functions, not the microscopic scale.)

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

Evidence Outcome: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. (Clarification Statement: Emphasis is on systems information transfer.) (Boundary Statement: Does not include the mechanisms by which the brain stores and recalls information or the mechanism of how sensory receptors function.)

Neutral: The standard as written is satisfactory. However, it should be noted that "information" -- as well as thoughts, memories, and consciousness -- are nonmaterial entities which cannot be reduced to material causation. Material (naturalistic) vs. nonmaterial (teleological) causation should not be discussed at this grade level.

Agree: (no comment)
Agree: (no comment)
Disagree: Not all animals process through a brain. For example, insects have a rudimentary nervous system that responds to stimuli.

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

Agree: (no comment)
Agree: (no comment)
Disagree: The word "brain" should be replaced with nervous system. Insects lack brains, but do have a rudimentary nervous system.

Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: How can water, ice, wind, and vegetation change the land?

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

(PG Feedback) Agree: There may be some confusion with the weathering and erosion addressed in second grade and clarification for teachers might be necessary. Teachers often only see their own grade level, not the progression of skills and concepts.

(PG Feedback) Agree:

(PG Feedback) Agree:
Evidence Outcome: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from water to land over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.) (Boundary Statement: Does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers, and should only include relative time.)

**Agree:** (no comment)

**Disagree:** Where do students learn that the Earth's crust is made of minerals and rocks? I disagree that students should not learn about minerals and rocks--they are curious in lower elementary grades and are picking up rocks all the time.

**Agree:** (no comment)

**Disagree:** The clarification statement is a bit vague. Most fossils are found in water (fresh or marine). Coal and tree fossils come from swamps, which are wet places. To preserve sediments or fossils you need a sinking landscape with sediment being deposited. An exception would be the ocean, but except for the deeper parts, accommodation space needs to be created for thousands of feet of sediment to accumulate. Under "boundary statement," students do need some understanding of rock formation (e.g., transportation and deposition of sediments, burial, and cementation). Related to this, under the Elaborating on GLE, #2, this section discusses the erosion (weathering and transportation) component of the rock cycle.

Evidence Outcome: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of flow.) (Boundary Statement: Limit to a single form of weathering or erosion.)

**Agree:** (no comment)

**Comment:** This is the first time I've noticed an "investigation" of any kind. In previous grades students "gather information" from sources (books?? or the computer???) to get their data. I am very disappointed in grades K-4 (so far) there is not focus on investigations!

**Agree:** (no comment)

**Agree:** (no comment)

Colorado Essential Skills and Science and Engineering Practices:

**Agree:** (no comment)

**Agree:** (no comment)

Cross Cutting Concepts:

**Agree:** (no comment)

**Agree:** (no comment)

Elaboration on the GLE:

**Agree:** (no comment)

**Disagree:** Earth's place in the universe is not related to this performance expectation--water, wind, and ice changing the Earth's surface. "The presence and location of certain...." - is not complete?? Delete "universe" - rainfall only happens on Earth to our knowledge--not other places in the universe!

**Agree:** (no comment)

**Disagree:** The second sentence doesn't make sense. A better sentence is: “The presence and location of certain fossil types indicates the types of environments where organisms live and the evolution of organisms with time.”
GLE: 2. Students can answer the questions: What patterns of Earth's features can be determined with the use of maps? How do living organisms alter Earth's processes and structures?

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

Evidence Outcome: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.) (Boundary Statement: Limited to a single form of weathering or erosion.)

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

Evidence Outcome: Analyze and interpret data from maps to describe patterns of Earth's features. (Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes)

  Agree: (no comment)
  Disagree: Topographic maps are difficult to read, even by adults. The topo map area at the USGS closed some number of years ago so I'm curious about how the maps will be obtained? I think they are selling maps digitally now. Can schools afford those? Maps don't show earthquakes.
  Agree: (no comment)

Evidence Outcome: Make observations and/or measurements to provide evidence of the ways living things affect the physical characteristic of their region and that many types of rocks and minerals are formed from the remains of organism or are altered by their activities. (e.g., plants' roots hold soil in place, beaver shelters and human built dams alter the flow of water, plants' respiration affects the air.

  Agree: (no comment)
  Disagree: No minerals are formed by plants and animals--that's part of the definition of minerals--they have never been alive! Plant roots don't hold soil in place. The soil would stay there without the plant on a horizontal surface. Plants on a slope help hold the soil from eroding away.
  Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

  Agree: (no comment)

Cross Cutting Concepts:

  Agree: (no comment)

Elaboration on the GLE:

  Agree: (no comment)
  Disagree: Minerals and rocks can be observed; plate tectonics (mountain ranges, trenches, etc.) cannot be observed and therefore plate tectonics should not be taught at 4th grade. If you are expecting 4th graders
to look for patterns of where mountains are found worldwide, that is okay. Biogeology is not a science word!

Agree: (no comment)

GLE: 3. Students can answer the question: How do Earth's surface processes and human activities affect each other?

Comment: Earth's resources—minerals and rocks, fuels (coal, oil and gas), etc. is not mentioned here but the first student outcome is all about "resources."

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; nonrenewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels)

Neutral: The standard as written is satisfactory. However, if the intent is to compare renewable and nonrenewable energy sources, then an objective cost-benefit analysis should be included.

Comment: At this grade level, it is important for teachers to help students see that use of Earth's resources has both positive and negative impacts (or there are trade-offs). Use of coal, for example, provides much of our electricity to run our lights, computers, charge our cell phones, etc.; burning of coal causes air pollution.

Agree: (no comment)

Evidence Outcome: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. 4-ESS3-2. (Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.) (Boundary Statement: Limited to earthquakes, floods, tsunamis, and volcanic eruptions.)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Science Fifth Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the question: How do particles combine to form the variety of matter one observes?

Disagree: (no comment)

Agree: I like the way the GLE is described through the evidence outcomes, Elaboration on the GLE, cross-cutting concepts and science and engineering practices.
Online Feedback  Science Fifth Grade

Agree: (no comment)

Disagree: Is it just "combine?" Seems like INTERACT or a term more inclusive would be good to raise the level here.

Agree: (no comment)

(PG Feedback) Disagree: Moving this from sixth grade to fifth is a huge shift for teachers because of the elementary/middle school gap and given how little science is taught in elementary, may cause teachers to have to "double up/catch up" on standards. The gap between fifth and seventh from atomic structure to molecular structure is also problematic.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Develop a model to describe that matter is made of particles too small to be seen. (Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water. Does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.)

Agree: (no comment)

Agree: (no comment)

Comment: It looks like this is a straight adaptation of the NGSS PEs. Using the PEs as standards has caused a lot of problems for the states that have adapted NGSS this way. It would be better to adopt these standards by having the SEPs and DCIs separately. Then the SEP and DCIs can be used in any combination. This will allow greater freedom in the classroom and for assessments. Several states recently got together and it was recommended that the PEs be used as an examples but not standards. I think we should transition to NGSS as they are the national trend and well thought out standards, but we should not adopt the PEs as our EOs because that will send the message that only certain SEPs should be paired with certain DCIs, which is not the original intent of the standards.

Agree: (no comment)

Disagree: The sentence, "Develop a model ..." should end with "...particles too small to be seen with the naked eye."

Evidence Outcome: Make observations and measurements to identify materials based on their properties. (Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property. Does not include density or distinguishing mass and weight.) (Assessment Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)

Comment: We're not distinguishing mass and weight yet we are going to teach about gravity in other units?

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Comment: Why can't density be used? You could explain density without distinguishing between mass and weight.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
Cross Cutting Concepts:

Comment: Are the math standards going to be changed to cover proportion and scale?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Comment: We’re supposed to teach that matter can be broken into particles, particles can be combined and build models to demo this without actually defining these particles?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the question: What underlying forces explain the variety of interactions observed?

Disagree: (no comment)
Agree: (no comment)
Disagree: "... observed." What- When- How about adding "between objects.' or something that completes the question.
Agree: (no comment)
(PG Feedback) Disagree: This will feel like a very big "jump" to teachers and better retained in middle school.
(PG Feedback) Agree:
(PG Feedback) Agree:

Evidence Outcome: Support an argument that the gravitational force exerted by Earth on objects is directed down. (Clarification Statement: “Down” is a local description of the direction that points toward the center of the spherical Earth. Boundary Statements: does not include mathematical representation of gravitational force)

Disagree: Gravity exerts "down," seriously? We go from the rigor of teaching atomic structures to 10 year olds, now you want us to spend time teaching that gravity goes down and that's it? I'm pretty sure that any 5th grader can already tell you gravity pulls down. How is this going to build into something important/worthwhile?
Agree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

Agree: (no comment)
GLE: 3. Students can answer the questions: How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?

Agree: (no comment)

Agree: This is definitely more rigorous and appropriate than the previous standards. This will help with the vertical progression for all students.

Comment: Identical questions in 7th grade?

Agree: (no comment)

Disagree: Modify wording of first statement to be more than combine. How about pulling interact out and just using that?

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances. Does not include distinguishing mass and weight.) (Boundary Statement: Mass and weight are not distinguished at this grade level.)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

GLE: 4. Students can answer the questions: How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?
Evidence Outcome: Use models to describe that energy in animals’ food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. (Clarification Statement: Examples of models could include diagrams, and flowcharts.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do organisms obtain and use the matter and energy they need to live and grow?

Disagree: (no comment)

Agree: (no comment)

Comment: Where are the standards regarding the human body systems?

Disagree: I think this belongs in 4th grade. 4th grade Social Studies standards has a natural connection between the history of our state, its natural resources and the roles of both within in our ecosystems. It is very important for educators to have interdisciplinary ways to incorporate standards into lessons. Again, with Colorado history studied in 4th grade, I feel there is such a strong natural connection between the state’s history and how our ecosystems have been affected by human influence.

Agree: (no comment)

Disagree: Current curricular resources for this are aligned to second grade. This would be a very stressful shift for teachers, schools, and districts requiring the development or purchase of new materials.

Agree: (no comment)

Evidence Outcome: Support an argument that plants get the materials they need for growth chiefly from air and water. (Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)
Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 2. Students can answer the questions: How do organisms interact with the living and nonliving environments to obtain matter and energy? How do matter and energy move through an ecosystem?

Neutral: (no comment)

Disagree: In Colorado, 4th grade is the ideal time for students to gain a deeper understanding and connection to the place they live. For example, the Colorado history studied within the 4th grade Social Studies standards has a natural connection between the history of our state, its natural resources and the roles both have played in our ecosystems. It is incredibly important for teachers to have logical and easy ways to incorporate key concepts across different academic disciplines so their students can continuously apply what they have learned in the classroom throughout the year. In addition, much of the 5th grade is focused on testing and if any grade should have less grade level expectations, it should be 5th grade and not 4th. This concept needs to be discussed in 4th grade.

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

(PG Feedback) Neutral: Moving from fourth to fifth grade should not cause undo strain

(PG Feedback) Agree:

Evidence Outcome: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth Boundary Statements: does not include molecular explanations.)

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

Disagree: The use of the word “food” in the sentence starting with the word “emphasis” is too vague. Food should be defined as “food for animals.”

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

Disagree: Change the sentence, "Matter cycles between the air and soil..." to "Matter cycles between the air, water, and soil..."
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: What is the universe, and what goes on in stars?

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

Comment: What does it mean: "what goes on in stars?"
Agree: (no comment)

(PG Feedback) Neutral: Moving this topic from fourth to fifth grade makes sense for sequential understanding and should not cause undue strain on teachers, schools, or districts to adopt new curricular resources.

(PG Feedback) Disagree: Where are the weather standards?

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. (Limited to relative distances, not sizes, of stars. does not include other factors that affect apparent brightness (such as stellar masses, age, stage).

Comment: This doesn't seem rigorous or worthwhile. An entire standard on learning that lights get smaller the farther away they are?
Agree: (no comment)

Comment: What happened to "investigations"? Here is a perfect opportunity to do an investigation. Use flashlights and distance to see how the "apparent" brightness changes. Students can collect data and analyze it. Doing investigations, collecting data, and analyzing data and drawing conclusions is LOST in this revision of standards!
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Neutral: Sure, but this is so vague.

Elaboration on the GLE:

Agree: (no comment)

Comment: All stars except the Sun are light years (one light year is 6 trillion miles) away. Millions, billions, and trillions are not age-appropriate!
Agree: (no comment)

GLE: 2. Students can answer the question: What are the predictable patterns caused by Earth’s movement in the solar system?

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

(PG Feedback) Agree:

(PG Feedback) Agree:
Evidence Outcome: Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.) (Boundary Statement: Does not include causes of seasons.)

Comment: "...patterns caused by Earth’s movement in the solar system..." but were not talking about seasonal changes?

Agree: (no comment)

Disagree: What happened to seasons!?? Seasons is one thing in science that all people including kids have experience with and need to understand how and why we have seasons. Seasons are much more important to know about that distance/apparent brightness of stars!

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Comment: Where do you expect students to get data?

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: Seasons should not be an "extension" but the main part of this performance expectation.

Agree: (no comment)

GLE: 3. Students can answer the question: How do Earth’s major systems interact? How do the properties and movements of water shape Earth’s surface and affect its systems?

Comment: Similar to questions in 6th and 7th grade.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.) (Boundary Statement: Limited to the interactions of two systems at a time.)

Agree: (no comment)

Disagree: The expectation focuses only on "water"! The geosphere, biosphere, etc. is not appropriate to the expectation.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Comment: This description of an extension is a year-long college course! Get real--focus on the students.
Agree: (no comment)

GLE: 4. Students can answer the question: How do the properties and movements of water shape Earth’s surface and affect its systems?
Comment: Same question as the second part from above (#3). Also is in 6th and 7th grades.
Agree: (no comment)
Agree: (no comment)

Evidence Outcome: Describe and graph the amounts of saltwater and freshwater in various reservoirs to provide evidence about the distribution of water on Earth. (Boundary Statement: Limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.)

Agree: (no comment)
Comment: Properties of water not addressed in the outcomes. Properties include that water is a liquid at average temperatures on planet Earth; water can freeze and evaporate at Earth’s temperatures. Water is a molecule made up of two hydrogen atoms and one oxygen atom and can dissolve many solids.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Comment: Area and volume of what?
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Comment: I would include water quality here (though it does appear in the 6th grade expectations). Quality is just as important as quantity for full understanding.
Agree: (no comment)

GLE: 5. Students can answer the question: How do humans change the planet?
Agree: It is imperative that students undersatnd the impact of human activity including but not limited to greenhouse gases.
Agree: (no comment)
Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!
Evidence Outcome: Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

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

Disagree: The expectation is about how humans "change the planet." Not addressed in outcome. Here's another example of where "investigations" are dropped!

- Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

Science Sixth Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the question: What is energy?

- Agree: (no comment)

Comment: I am so glad to see the revisions to the prepared graduate statements and the grade level expectations for science. These proposed standards represent a significant advance in the structure and expectations for science learning compared to the previous state standards. These will bring Colorado into close conversation with and alignment with science education efforts currently underway in other states and countries. Thank you to everyone involved in making these revisions for science education in Colorado!

Agree: It would be helpful to code the way NGSS does for clarity and ease of use for resources.

Agree: Nice to see physical science in 6th grade with a topic they can grasp. Please reference NGSS to make better sense of the alignment

Neutral: This is super broad. I understand the Evidence Outcomes and Context/Connections provide more detail but this statement is just so general that I think it could use some work.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Can we add the NGSS coding to make this more clear and for cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: (no comment)

Disagree: This is an extremely abstract concept, better suited for 8th grade students.
**Disagree:** Should be in 8th grade.

**Agree:** (no comment)

**Disagree:** Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

**Disagree:** Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

**Disagree:** (no comment)

**Comment:** It's hard to give specific feedback and know what's appropriate for each of the middle grades without knowing the assessment the work will be tied to, will the assessment be cumulative or based on grade level? What support does the state plan to give districts to support this massive change both in training teachers and revamping curriculum that districts have worked so hard to align to CAS?

(31) **Feedback**

(31) **Agree:** Alignment to NGSS would help make the science and engineering practices that correspond with this statement more accessible for both teachers and students.

(31) **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

(31) **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

(31) **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

(31) **Agree:** Can the NGSS coding be added for more clarity and cross referencing purposes?

(31) **Agree:** Can the NGSS coding be added for more clarity and cross referencing purposes?

Evidence Outcome: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred)

**Agree:** (no comment)

**Agree:** It would be helpful to code the way NGSS does for clarity and ease of use for resources.

**Agree:** Please reference NGSS to make better sense of the alignment

**Agree:** Alignment to NGSS would help with clarity and cross referencing

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Comment:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Neutral:** (no comment)

**Agree:** (no comment)

**Comment:** For those EOS that are repeats or show in more then one GLE indicate with at least some type of note or something.

**Disagree:** (no comment)
Evidence Outcome: Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.) (Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)

Agree: (no comment)
Agree: It would be helpful to code the way NGSS does for clarity and ease of use for resources.
Agree: Alignment to NGSS would help with clarity and cross referencing
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)
Comment: For those EOs that are repeats or show in more then one GLE indicate with at least some type of note or something.
Disagree: (no comment)

Evidence Outcome: Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.) (Boundary Statement: Does not include calculations of energy)

Agree: (no comment)
Agree: It would be helpful to code the way NGSS does for clarity and ease of use for resources.
Agree: Alignment to NGSS would help with clarity and cross referencing
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)
Comment: For those EOs that are repeats or show in more then one GLE indicate with at least some type of note or something.
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: Love adding the descriptions.
Agree: Coding for NGSS would really help here.
Agree: Alignment to NGSS would help with clarity and cross referencing
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: The descriptions really help clarify their meaning of the concepts.
Agree: Alignment to NGSS would help with clarity and cross referencing
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: It would be helpful to code the way NGSS does for clarity and ease of use for resources.
Agree: Alignment to NGSS would help with clarity and cross referencing
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the questions: What is meant by conservation of energy? How is energy transferred between objects and systems?
Agree: (no comment)
Agree: Alignment to NGSS would help with clarity and cross referencing
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Disagree: This concept is extremely abstract and would be difficult for most 6th graders to grasp. It is better suited for 8th grade students.

Agree: (no comment)

Disagree: Again, not developmentally appropriate. Too abstract of an idea; better left at 8th grade.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: The statement is reasonable but I do not agree with moving this to 6th grade from 8th!

Disagree: How is this different than the previous standard?

(PG Feedback) Agree:

(PG Feedback) Agree: Alignment to NGSS would help with clarity and cross referencing

(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) Neutral:

(PG Feedback) Disagree: Should be in 8th grade. This is a hard concept even for 8th graders - 6th graders are not developmentally ready.

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.) [Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)

Agree: (no comment)

Neutral: These evidence outcomes are exactly same as for the last GLE. Do we need separate GLEs to address the same EOs?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Are these the same EOs for #1 as well?

Agree: (no comment)

Comment: For those EOs that are repeats or show in more then one GLE indicate with at least some type of note or something.

Disagree: (no comment)

Evidence Outcome: Plan and investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [Boundary Statement: Does not include calculating the total amount of thermal energy transferred.)

Agree: (no comment)
Neutral: These evidence outcomes are exactly same as for the last GLE. Do we need separate GLEs to address the same EOs?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Is this the same as #1?

Agree: (no comment)

Comment: For those EOs that are repeats or show in more than one GLE indicate with at least some type of note or something.

Disagree: (no comment)

Evidence Outcome: Construct, use, and present arguments to support the claim that when kinetic energy of an object changes, energy is transferred to or from the object. (Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.) (Boundary Statement: Does not include calculations of energy.)

Agree: (no comment)

Neutral: These evidence outcomes are exactly same as for the last GLE. Do we need separate GLEs to address the same EOs?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Are these the same as #1?

Agree: (no comment)

Comment: For those EOs that are repeats or show in more than one GLE indicate with at least some type of note or something.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: Coding for NGSS would help here!

Agree: Closer alignment to NGSS would help with clarity and resource support.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Are these the same as #1?

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: Explicit alignment to NGSS would help with clarity and resource support.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Are these the same as #1?
Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Neutral: Like the EOs, this is the same for the previous GLE. It would be a better use of our time to have less GLEs than more with the same topics.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Are these the same as #1?

Disagree: Are these the same as #1?

Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do the structures of organisms enable life’s functions?

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Can we add the NGSS coding to make this more clear and for cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Love this - clear, concise, and related to the content and cross-cutting skill (structure/function).

Disagree: They have not learned it.

Disagree: (no comment)

Disagree: This concept is very abstract, which is better suited for 7th graders.

Disagree: To abstract for 6th graders - this needs to be in 7th or higher.

Agree: (no comment)

Disagree: Leave Cells as a 7th grade standard. Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment with NGSS would help with clarity and the identification of teaching resources.

(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) Disagree: The whole first part of this is "Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems..." is wordy and unhelpful. The idea that we’re spiraling in the practices and aiming to experiment/solve problems is well-stated in the evidence statements and connections sections below. This (and all of the other "prepared graduate" statements are wordy and unhelpful. When I look at the overarching themes that a teacher is suppose to cover,
this format would be much more helpful: LS1: From Molecules to Organisms: Structures and Processes
There is also a grammatical error in the statement as it stands.

(PG Feedback) Disagree: Leave this for 7th grade

(PG Feedback) Disagree:

(PG Feedback) Agree:

Evidence Outcome: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.)

Agree: (no comment)

Comment: code for NGSS

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Give an example here of an experiment teachers could do.

Disagree: Student’s will not have the background needed for this material because biotic and abiotic are not taught until 7th grade.

Disagree: Cell structure is not know.

Disagree: This is currently in 7th grade and should stay there. 6th grade currently serves the function of setting up students with the concepts of atoms, compounds, molecules. It belongs in 7th grade, as it pairs well with human body and adaptations of organisms

Agree: (no comment)

Disagree: This should be left in 7th grade. Having taught 6th-8th grades 7th graders are developmentally ready to study these, many 6th graders (especially low income who often have little background exposure) are not really ready for the level at which the need to understand this in Middle School.

Disagree: (no comment)

Evidence Outcome: Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. (Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.) (Boundary Statement: Limited to the cell wall and cell membrane. Function of the other organelles is limited to their relationship to the whole cell. Does not include the biochemical function of cells or cell parts.)

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: I appreciate places where boundaries are identified and clarified explicitly.
Disagree: (no comment)
Disagree: This is currently in 7th grade and should stay there. 6th grade currently serves the function of setting up students with the concepts of atoms, compounds, molecules. It belongs in 7th grade, as it pairs well with human body and adaptations of organisms
Agree: (no comment)
Disagree: Cell structure and function is developmentally inappropriate for grade 6, not to mention, cell theory. Sixth graders need more concrete concepts.
Disagree: Keep in 7th grade, see comment above
Disagree: (no comment)
Disagree: Again, seventh graders can do this. It needs to stay in seventh grade. They can describe relationships. Cells and organs can be understood with relationships in seventh grade.

Evidence Outcome: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.) (Boundary Statement: Does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.)
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification. I also really like the idea of argument as it will make students justify their position.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: This standard is taught in 5th grade so students will feel that they are just repeating the same information again.
Disagree: Should be taught in elementary and more in depth in 7th grade
Disagree: STRONGLY DISAGREE. This is in 7th grade and needs to stay there. We build off of it when we talk about animal cells and then into the human body. The concepts are too advanced for 6th grade, especially when the reproductive systems come about. 7th grade teachers have spent a lot of time and energy into developing a human body curriculum
Agree: (no comment)
Disagree: (no comment)
Disagree: Seventh graders can grasp this better and make connections between and among systems. Instead of missing that crucial part of homeostasis, this needs to be taught in seventh grade where it already is.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: NGSS coding would provide clarity.
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Disagree: Needs to be taught in 5th and 6th grade
Agree: (no comment)
Disagree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Needs to be in 7th grade
Disagree: (no comment)
Agree: (no comment)
Disagree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Students will not have the base of information needed for this concept.
Disagree: Best for 7th grade.
Agree: (no comment)
Disagree: (no comment)
Comment: Is this really the only associated DCI for those three PEs?

GLE: 2. Students can answer the question: How do organisms grow and develop?
Agree: (no comment)
Agree: This is really broad. It would be nice to see this refined a bit more. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Ecology unit for 6th grade
Agree: (no comment)
Disagree: Too vague. This leaves it wide open and difficult to meet the standard specifically. What is this asking? Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) Agree:

Evidence Outcome: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.)

Agree: (no comment)

Agree: I really love this as it is a rich EO and explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Students will not have the basic understanding and background needed to fully comprehend this topic.

Disagree: 7th grade standards

Disagree: This belongs in 7th grade with human body, animal cells, and then evolution/adaptations.

Agree: (no comment)

Disagree: (no comment)

Evidence Outcome: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.)

Agree: (no comment)

Agree: Great real life application! Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: 7th standards
Agree: (no comment)
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: NGSS coding would really help here!
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: 7th grade standards.
Agree: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: 8th standards
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: 7th grade standards cover this, stay with 7th grade
Disagree: This belongs in 7th grade with the adaptations, evolution, animal cells, and human body unit
Agree: (no comment)

GLE: 3. Students can answer the question: How do organisms detect, process, and use information about the environment?
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Agree: (no comment)
Disagree: ??? Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
(PG Feedback) Agree:
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
(PG Feedback) Disagree:
(PG Feedback) Agree:
Evidence Outcome: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (Boundary Statement: Does not include mechanisms for the transmission of this information.)
Agree: (no comment)
Agree: More great real-world applications. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Disagree: (no comment)
Disagree: This belongs with 7th grade when the nervous system is discussed
Agree: (no comment)
Disagree: (no comment)
Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: NGSS coding would really help here!
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Agree: (no comment)
Cross Cutting Concepts:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Disagree: (no comment)
Agree: (no comment)

Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: How do the properties and movements of water shape Earth’s surface and affect its systems?
Agree: (no comment)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Comment: This is also in 5th and 7th grade?
Agree: (no comment)
Comment: Wasn’t this the same for 5th grade?
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Disagree: Instead of splitting the middle school NGSS standards into 6th, 7th, and 8th grades, could we please keep the original MS standards as a bucket and let districts decide how to bundle them for each grade level?
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
(PG Feedback) Comment:
(PG Feedback) Disagree: Full range?... these are sixth graders
(PG Feedback) Agree:

(PG Feedback) Comment: Scientific method should be a separate standard in Middle School with purposeful instruction (Old standard 1 prior to 2009). Just imbedding it is not enough, many standards do not lend themselves to much experimentation---it does need to be specifically taught and then embedded.

Evidence Outcome: Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity. (Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.) (Boundary Statement: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.)

Agree: (no comment)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: This standard also appeared in the 7th grade standards
Agree: (no comment)
Disagree: This is identical to 7th Grade GLE 3 Evidence outcome A in Earth Science.
Agree: (no comment)
Comment: Seems like very little Earth Science in 6th Grade. The observable nature of Earth science makes 6th a good place to learn it, very tangible. Strange there is so little of it in 6th
Disagree: (no comment)
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Agree: NGSS Coding would really help here!
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: This is over kill to learn the water cycle
Agree: (no comment)
Agree: (no comment)
Comment: I've read the Pre-K through 5th grade expectations and this is the first time (in 6th grade) that the word "experiments" or "investigations" was used. Investigations is how scientists learn what they learn about how the world works. Students in grades Pre-K through 5th grade should be doing investigations too! That appears to have been deleted from this version of the standards.
Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Online Feedback

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: Constructive and Destructive forces belong wherever Earth's natural disasters goes. 6th grade likes to do a program, but it fits better with 7th grade. Constructive/destructive forces should not be separate from earth's processes
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.
Comment: The 3rd DCI statement focuses on ocean circulation which requires a knowledge of density that is proposed to be taught in 7th grade. Students will likely struggle with ocean circulation in 6th grade without a more robust understanding of density.
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the question: What regulates weather and climate?
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.
Disagree: How does anything "regulate" weather? I'm confused by this. What influences weather maybe? How do you explain the changes in weather and climate?
Agree: Good move - able to be understood by 6th graders.
Agree: (no comment)
Disagree: Climate not age-appropriate.
Agree: Thank you for including language to build students understanding of Climate and Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.
**Disagree:** Leave as an 8th grade standard. Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

**Disagree:** It is easier for students to understand weather if they have the background of Earth processes being proposed in 7th grade. This seems backwards.

(PG Feedback) **Agree:**

(PG Feedback) **Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) **Comment:** I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

(PG Feedback) **Agree:**

Evidence Outcome: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. (Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth’s history. Examples of Earth’s major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.) (Boundary Statement : Does not include recalling the names of specific periods or epochs and events within them.)

**Agree:** (no comment)

**Agree:** Please reference NGSS to make better sense of the alignment

**Agree:** Great EO! Very rich! Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Comment:** Could the NGSS coding be added for more clarity and cross referencing purposes.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Comment:** This isn’t aligned! The first part, "Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions." DOES NOT go with the Clarification Statement..."(Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth’s history. Examples of Earth’s major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.) (Boundary Statement : Does not include recalling the names of specific periods or epochs and events within them.)"

**Comment:** The clarification statement does not match the performance expectation. Understanding air mass interactions are largely dependent on students’ understanding of water cycling process, so pairing it with water cycling content is a good move toward coherence. However, understanding air mass interactions (like ocean circulation) requires an understanding of density of fluids which is proposed to be moved to the 7th grade. Global scale processes—like atmospheric and ocean circulation—tend to be more readily accessible to 8th graders compared to 6th graders when you consider the body of research on spatial thinking which suggest that significant jumps in scale from local scale phenomena (often taught in elementary grades) to global scale (taught in middle school) are challenging for students to make. This is something to consider if these complex and global processes are moved to 6th grade content.

**Disagree:** This seems to be in the wrong place
Agree: (no comment)

Disagree: Statement starts by saying something about weather and then changes to rocks and fossils! Error??? There are no fossils for the oldest age of the Earth—4.5 billion years. Life had not evolved yet.

Disagree: Weather is ever changing and better taught at 8th grade.

Disagree: (no comment)

Comment: Honestly, it is incredibly discouraging to see the degree of changes being proposed here. Weather and energy from from 8th to 6th, and structures and functions of organisms from 7th to 6th. Moving content to an earlier grade does not mean there will be increased rigor. Also, the coherence will be lost for 3 years of students in this transition process.

Evidence Outcome: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.) (Boundary Statement: Does not include the dynamics of the Coriolis effect.)

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Research on spatial thinking suggests that 6th graders are likely to struggle more with large-scale systems such as atmospheric circulation and ocean circulation systems much more compared to 8th-grade students. At 6th grade students are likely to bring a readiness for tracing the flow of materials—such as rocks, sediment, and water, and opposed to large scale air circulation.

Agree: (no comment)

Agree: (no comment)

Disagree: Climates not age appropriate. Don’t mention Coriolis effect!

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: NGSS coding would help with clarity!

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Disagree: In #3, the statement should include human caused climate change.

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Comment: "probabilistically" - not a very good word plus it is misspelled!

GLE: 3. Students can answer the question: How do people model and predict the effects of human activities on Earth’s climate?
Agree: such an important topic
Agree: (no comment)
Agree: (no comment)
Agree: I love the emphasis on human activity here. Great real-world application. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Disagree: Climate is not appropriate for 6th grade.
Agree: The GLE identifies a core concept of disciplinary literacy in Earth science that can be rigorously answered with scientific evidence. The question for students is clearly stated and supports educational opportunities to explore in depth and use a variety of science and engineering practices, with specificity to guide educators but without prescription of their methods. Humans’ impact on climate will have profound and unmistakable educational, career and civic relevance for young people being educated today. Colorado youth must be equipped with the rigorous knowledge needed to make personal and collective decisions about climate and its human impact.
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!
Disagree: The richness provided by analyzing data will be difficult with our 6th grade students and many students in high school do not revisit this important topic. The importance will be lost.

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

(PG Feedback) Agree: It is important to include scientific research on how humans are impacting our planet.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth’s surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state’s economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.

Evidence Outcome: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.)

Agree: (no comment)

Agree: Please reference NGSS to make better sense of the alignment

Agree: (no comment)

Agree: Love this. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: An understanding of how invisible gases in the atmosphere interact with different forms of radiation resulting in the greenhouse effect and the enhanced greenhouse effect requires a level of knowledge about matter and energy that 6th grade students will not yet have. A concern here is that the global processes in this standard require physical science content not yet taught to students.

Agree: (no comment)

Disagree: This standard promotes anthropogenic global warming, an unproven hypothesis. There is debate on the extent to which greenhouse gases contribute to warming and whether human intervention can have any appreciable effect on rising temperatures. This standard needs to be modified to provide objectivity on this subject,

Agree: (no comment)

Comment: Climate not age-appropriate. Focusing on "human" activities is not a good idea. The climate is changing but there can be other natural events causing the change.
Disagree: This statement should include the words climate change. The statement dances all the way around the idea of human caused climate change but needs to explicitly use those words.

Evidence Outcome: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land.).)

Agree: (no comment)

Agree: This is also great real-world application. Kids will see how they can make a difference in the world. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Waste of time and not necessary to understanding climate change

Agree: (no comment)

Disagree: This needs to be deleted as it has nothing to do with "climate"--in the expectation.

Agree: This holistic and comprehensive expectation would be strengthened by including similar inclusion of water quality/pollution and built environment, especially as it pertains to water for human uses, in 5th grade.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: NGSS coding would really help with clarity!

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: An over emphasis in engineering can decrease the amount of science being taught

Agree: (no comment)
Online Feedback

Science Seventh Grade

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: It is imperative that students understand the impact of human activities on the earth, specifically greenhouse gases.

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Is this level of understanding to advanced for 6th graders. Our own president and most of congress struggles with this. Lets remember who these are written for.

Disagree: The human effect on global warming is controversial. At best anthropogenic warming is a hypothesis, not proven fact. The standard should be modified to present an objective view of the subject.

Agree: (no comment)

Agree: I would like to see something inserted regarding handle issues that pop up with arguments against man made climate change.

Agree: The 8th grade standards should have a similar statement about climate change in the earth science section.

Science Seventh Grade

Standard: 1. Physical Science

PG: 1. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 10. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth’s surface processes interact.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 2. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.

Disagree: Too broad, not specific enough, the old ones was MUCH better.
PG: 3. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 5. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 6. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 7. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

PG: 9. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth’s place in it.

Disagree: Too broad, not specific enough, the old ones was MUCH better.

GLE: 1. Students can answer the question: How do particles combine to form the variety of matter one observes?

Comment: Should we use a more scientific word vs the word particles? Maybe atoms or molecules

Agree: Please reference NGSS to make better sense of the alignment

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Replace "Particles: with "atoms".

Disagree: This standard needs to be in 6th or 8th. The problem with all the revisions is that 7th grade no longer has flow. Most of these physical science concepts fit better in 8th grade.

Comment: I find it difficult for anyone to understand and explain "How do particles combine" if they are not allowed to use the concept of valence elections. Without knowledge of valence electrons it is very difficult to understand why Hydrogen makes one bond, helium doesn't bond, or carbon makes four bonds.

Agree: (no comment)

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

Evidence Outcome: Develop models to describe the atomic composition of simple molecules and extended structures. (Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.) (Boundary Statement: Does not include valence electrons and bonding energy, discussing the ionic nature of sub-units of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.)

Agree: (no comment)

Agree: Please reference NGSS to make better sense of the alignment

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Disagree: This should be in 8th grade. 7th graders are not developmentally ready for this and it fits better in 8th grade. You should move this to 8th grade and move genetics back to 7th grade. Cells, genetics, evolution and fossil record all go together. It is important for students to have a flow in their learning.

Disagree: I think that for students to understand the way that molecules form they need to understand the structure of valence electrons. It explains why carbon always forms 4 bonds, or why molecules have the chemical formulas that they do.
Disagree: Why would we not want to expect students to understand that the energy in the molecule is stored in the bonds of the molecule? Also in the life science expectation we are trying to explain that food is broken down and used in the creation of energy for organisms. Where is the energy coming from in the food?
Agree: (no comment)
Disagree: (no comment)

Evidence Outcome: Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.) (Boundary statement: Limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor)
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Disagree: The evidence outcome has students determine if a chemical reaction or chemical change has occurred but the boundary statement limits it to all physical properties. If I am limited to physical changes/properties (density, melting point, boiling point, solubility, flammability, etc...) it is difficult to teach chemical changes.
Agree: (no comment)
Disagree: (no comment)

Evidence Outcome: Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.) (Boundary Statement: Limited to qualitative information.)
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Disagree: (no comment)
Evidence Outcome: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. (Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawing and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.)

Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Strongly agree with analyzing multiple source of information. Information sources must be grade appropriate in content and length.
Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)
Agree: This is really dense. Could it be broken up? Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
GLE: 2. Students can answer the questions: How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Disagree: Still disagree with moving this to 7th - there is no connection and flow and this is a hard concept for 7th graders.

Comment: Identical questions in 5th grade?

Agree: (no comment)

Disagree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: (no comment)

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: (no comment)

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: Please reference NGSS to make better sense of the alignment

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

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Agree: (no comment)

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: (no comment)

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
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Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

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Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: Students should be able to balance equations or at least identify a balanced equation vs. a non balanced equation.

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: Students should be able to distinguish between an endothermic and exothermic reaction.

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Disagree: Needs to be in 8th grade. Students will struggle with this and it does not flow well with the other 7th grade concepts.

Disagree: Since students are supposed to understand that the "total number of atoms does not change" they will need to see balanced equations. It seems like a logical extension for students who understand the concept to go deeper into balancing equations.
Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Disagree: Chemical processes that release or absorb thermal energy appear nowhere else in these 7th grade standards. There is nowhere else where students are learning about chemical processes specific to thermal energy. WHY are they asked to build a device to achieve a goal that they have learned nothing about? HOW would you expect a student to apply a concept that they are not first asked to understand?

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Agree: (no comment)

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Agree: (no comment)

Evidence Outcome: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.) (Boundary Statement: Does not include the use of atomic masses, balancing symbolic equations, or inter-molecular forces.)

Disagree: (no comment)

Evidence Outcome: Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. (Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.) (Boundary Statement: Limited to the criteria of amount, time, and temperature of substance in testing the device.)

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)
Agree: Students should know that energy is not created or destroyed (much like matter). It changes from form to form.
Agree: (no comment)

Elaboration on the GLE:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Compounds do not have the same properties as their individual elements. Example: NaCl
Agree: (no comment)

Standard: 2. Life Science

GLE: 1. Students can answer the question: How do organisms obtain and use the matter and energy they need to live and grow?
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: Identify how both plants and animals obtain energy.
Disagree: This works best in 6th grade - they can understand this and ecology works best in 6th grade. These are concepts that they can really understand at the 6th grade level.
Agree: (no comment)
Comment: Really should have something about the Kingdoms, characteristics of each to understand how different types of organisms use energy. This should come before going into webs. Could be covered when covering cells if cells were moved back to 7th where they make more sense.
Disagree: Leave as a 6th grade standard. Changing the standards this significantly will lead to teacher burn-out. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Disagree: This builds on the fifth grade standards. It should be moved to sixth grade.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Neutral:
(PG Feedback) Agree: Identify diotic as living and abiotic as nonliving.
(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

Evidence Outcome: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.) (Boundary Statement: Does not include the biochemical mechanisms of photosynthesis.)

Agree: Please reference NGSS to make better sense of the alignment Clarification statement and assessment boundary are a great addition Great to have this will all chemistry

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: Energy flows from lower level organisms to higher level organisms. Make sure that it is clear that diagrams are showing energy flow and not a food chain (who consumes who).

Neutral: What exactly does "Biochemical Mechanisms" mean? This seems to be a deeper teaching than the previous strand at 6th grade that focused primarily on plants as producers, but I wonder if teaching photosynthesis is limited by the ability to teach the chemical reaction of photosynthesis. I definitely don't believe that students need to understand the electron transport chain or NADH+.

Agree: (no comment)

Disagree: If sixth grade is learning about energy already under physical science, it makes more sense for them to have this standard.

Evidence Outcome: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.) (Boundary Statement: Does not include details of the chemical reactions for photosynthesis or respiration.)

Agree: Please reference NGSS to make better sense of the alignment

Agree: I like the connection with Physical Science here. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: Food contains stored (chemical) energy. That energy is converted to organism's thermal and kinetic energy.
Disagree: The boundary statement limits the ability to describe how the matter gets rearranged. Without using the chemical reactions for photosynthesis or respiration how are we to show that the molecules (and atoms within) are broken down and rearranged?

Disagree: The boundary statement limits the ability to describe how the matter gets rearranged. Without using the chemical reactions for photosynthesis or respiration how are we to show that the molecules (and atoms within) are broken down and rearranged?

Agree: (no comment)

Agree: This only makes sense if you DO mention photosynthesis, which requires an understanding of cell organelles. That would require a lot of review so it makes more sense to move cells and cell processes back to seventh grade where it is now.

Colorado Essential Skills and Science and Engineering Practices:

Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: (no comment)
Agree: (no comment)

Cross Cutting Concepts:

Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: (no comment)
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
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Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Agree: (no comment)
Neutral: The elaboration in the GLE seems to contradict the boundary statements within this standard.
Agree: (no comment)

GLE: 2. Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?

Agree: I like the students will be able to see how the world interacts around them and how they are also a part of this world. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Disagree: This should be in 6th grade - all energy flow and ecology should be in 6th. They can understand it and it works well in 6th grade.
Agree: (no comment)
Disagree: Clarify that the interaction is with the living and non-living COMPONENTS OF THE environment.
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Disagree: Again this fits with sixth grade and the movement of energy.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree:
(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.
(PG Feedback) Agree:
Evidence Outcome: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Disagree: (no comment)
Evidence Outcome: Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
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Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
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Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Agree: (no comment)

GLE: 3. Students can answer the question: How do matter and energy move through an ecosystem?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)
Disagree: This concept fits better for 6th grade.
Disagree: Needs to be in 6th grade - 6th graders need to be learning the macro concepts that are not abstract. They should be doing all ecosystems. They need to not be doing concepts that are abstract.
Disagree: Ecosystems is such a basic concept that 6th grade would be the best fit from a developmental stand point.
Agree: (no comment)
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree:
(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.
(PG Feedback) Agree:
Evidence Outcome: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.) (Boundary Statement: Does not include the use of chemical reactions to describe the processes.)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Disagree: If the emphasis is on the "conservation of matter" it seems limited by the boundary statement that removes the ability to show the same number of each atom before and after without using chemical reactions.
Agree: (no comment)
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
- Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: (no comment)
- Agree: (no comment)
- Agree: (no comment)

Cross Cutting Concepts:
- Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: (no comment)
- Neutral: (no comment)
- Agree: (no comment)

Elaboration on the GLE:
- Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: It would be great to use the NGSS coding for more clarity and cross references.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Disagree: (no comment)
- Agree: (no comment)

GLE: 4. Students can answer the question: What happens to ecosystems when the environment changes?
- Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
- Agree: (no comment)
- Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
- Agree: (no comment)
- Agree: Include Global Warming!
- Disagree: Conceptually, this fits better in 6th grade as prerequisite for 7th grade cells.
- Disagree: Needs to be in 6th for the same reasons as all of the others.
- Agree: (no comment)
- Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."
**Disagree:** Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

**(PG Feedback) Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

**(PG Feedback) Agree:**

**(PG Feedback) Disagree:** "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

**(PG Feedback) Agree:**

**Evidence Outcome:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.)

**Agree:** Please reference NGSS to make better sense of the alignment

**Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** It would be great to use the NGSS coding for more clarity and cross references.

**Comment:** Could the NGSS coding be added for more clarity and cross referencing purposes.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Neutral:** (no comment)

**Agree:** (no comment)

**Disagree:** (no comment)

**Evidence Outcome:** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.)

**Agree:** This is great! I love how complex this is. Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** It would be great to use the NGSS coding for more clarity and cross references.

**Comment:** Could the NGSS coding be added for more clarity and cross referencing purposes.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Disagree:** (no comment)

**Agree:** (no comment)

**Disagree:** (no comment)

**Colorado Essential Skills and Science and Engineering Practices:**

**Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Neutral: (no comment)
Agree: (no comment)

Cross Cutting Concepts:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: (no comment)
Agree: Keystone species.
Agree: (no comment)

Elaboration on the GLE:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

GLE: 5. Students can answer the question: What is biodiversity, how do humans affect it, and how does it affect humans?
Agree: Again, I love the connection to human impact. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Disagree: Should be in 6th grade for the same reasons as above
Agree: (no comment)
Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Neutral:

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

Agree: Please reference NGSS to make better sense of the alignment
Neutral: This EO is the same as for the previous GLE. I don't know that we need separate GLEs to address the same EOs. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: (no comment)
Disagree: This seems redundant. It appears to be the exact same standard as Life Science #4 Evidence Outcome B.
Agree: (no comment)
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: (no comment)
Agree: (no comment)

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Neutral: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: How do Earth’s major systems interact?

Agree: Kind of broad but I can see how this is pulling from 6th grade Earth Science standards. I like that the spiraling is so evident. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

Disagree: This does not flow well. You cannot change this many things on teachers!

Agree: (no comment)

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Comment: This age level would be ready to under present day systems interactions of water cycling, weather and climate. These concepts depend on prior knowledge of matter and energy that 6th graders might not yet have, but could be leverage after 6th grade and during 7th grade.

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree: Evidence Outcome: Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process. (Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth’s materials.) (Boundary Statement: Does not include the identification and naming of minerals.)

Agree: Please reference NGSS to make better sense of the alignment

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Disagree: When you take out identification of common rocks and minerals is like asking to teach reading without learning the letters.

Disagree: How do you teach formation of minerals, without knowing about names of minerals
Neutral: Are we allowed to use mineral names? I understand that we don’t want to use hardness scales or crystallization structure to actually look at and identify the different minerals like in a geology class.

Agree: (no comment)

Comment: Studying minerals and finding out their characteristics is age appropriate for 4-6th grade students. It is important to know maybe 20 common minerals because they make up most of the rocks and resources we use them for. For example, we use quartz which is a very hard mineral to make glass for windows in our houses and cars.

Disagree: (no comment)

Evidence Outcome: Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales. (Clarification Statement: Emphasis is on how processes change Earth’s surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Comment: Standards should be written for the students, and parents not just the teacher. This language seems overly technical for a seventh grader. Who are you people trying to impress.

Agree: (no comment)

Comment: Students can’t construct an explanation without collecting data in an investigation.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Comment: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.
Agree: (no comment)

GLE: 2. Students can answer the question: Why do the continents move, and what causes earthquakes and volcanoes?
Agree: Nice to have this before students study earth history. Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: It would be great to use the NGSS coding for more clarity and cross references.
Agree: (no comment)

Neutral: I think 6th and 7th can both understand this but it seems to fit well with ecosystems and rock cycle.
Comment: The geologic time scale standard that is currently in 8th grade is so closely related to this standard that they should go together in 7th grade.
Agree: (no comment)

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Disagree: This is needed before the teaching of weather. Out of order.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.
(PG Feedback) Agree:
Evidence Outcome: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches). (Boundary Statement: Paleomagnetic anomalies in oceanic and continental crust are not assessed.)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Comment: How are they suppose to examine data that include similarities of rock and fossil types on different continents, the shapes of the continents if they don’t know one rock from another?

Neutral: Constructive/destructive forces belong here, not in 6th grade. Or move all of this unit to 6th grade

Disagree: Why limit the concept of ocean ridges and ocean structures without allowing us to use the magnetic signatures?

Agree: (no comment)

Comment: Paleomagnetic changes should not even be mentioned at this grade level!

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Agree: It is very important to recognize the provisional nature of scientific discovery and that hypotheses are revised in the light of new experimental evidence.

Agree: (no comment)

Comment: What does Number 1 mean? It doesn’t make sense.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: (no comment)

Agree: (no comment)

GLE: 3. Students can answer the question: How do the properties and movements of water shape Earth’s surface and affect its systems?

Agree: Please reference NGSS to make better sense of the alignment

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Disagree: (no comment)
Agree: (no comment)
Disagree: Water should be in 6th grade with ecosystems.
Comment: This question is also in 5th and 6th?
Disagree: Keep this in 6th grade
Agree: (no comment)
Comment: This expectation was already at a previous grade level. I don't know if it is a typo or is being repeated!
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Disagree: More natural flow for this to follow water in 6th grade

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Comment: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.
(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree: Evidence Outcome: Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity. (Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.) (Boundary Statement: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.)
Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Disagree: (no comment)
Comment: This was also listed as a 6th grade standard. Should be bundled with weather and climate standards and other water cycling standards
Disagree: Word for word identical to 6th grade GLE 3 Evidence outcome 1A in Earth Science.
Agree: I like to see the cycling of water as a corresponding standard with the cycling of matter. It makes sense to have these two concepts taught at the same grade level.
Disagree: Keep in 6th grade.
Agree: (no comment)
Comment: I think this is a repeat from grade 6.
Disagree: (no comment)
Evidence Outcome: Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales. (Clarification Statement: Emphasis is on how processes change Earth’s surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.)

Agree: Really rich! Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Disagree: (no comment)

Comment: Standards should be written for the students, and parents not just the teacher. This language seems overly technical for a sixth grader. Who are you people trying to impress.

Disagree: Why do you include events such as earthquakes, volcanoes, and meteor impacts under a standard specific to the cycling of water?

Disagree: Keep in 6th grade

Agree: (no comment)

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Disagree: (no comment)
Agree: (no comment)
Agree: (no comment)

GLE: 4. Students can answer the question: How do people reconstruct and date events in Earth’s planetary history?

Agree: great topic
Agree: This will get kids really thinking like scientists! Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Disagree: This needs to go with weather
Agree: (no comment)
Comment: Delete "planetary."

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Comment: I disagree in the spiraling of topics. This type of cafeteria teaching leads to watering down of the curriculum and promotes holes in the subject matter.

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

(PG Feedback) Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Evidence Outcome: Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process. (Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth’s materials.) (Boundary Statement: Does not include the identification and naming of minerals.

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Disagree: Why not include the identification and naming of minerals? You are asking them to compare and understand evidence from rocks without the ability to know one from another.
Disagree: This evidence outcome is the exact same evidence outcome that is found under Earth and Space Science Grade Level Expectations #1 Evidence Outcome "A." I struggle to see how the cycling of Earth’s materials applies to "reconstruct and date events in Earth's planetary history." By describing Earth's history as "planetary" seems like a bigger scale within the solar system.
Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)

Cross Cutting Concepts:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: (no comment)

Elaboration on the GLE:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Agree: (no comment)

GLE: 5. Students can answer the question: How do humans depend on Earth’s resources?
Agree: very relevant
Agree: (no comment)
Agree: I love that students will be making a connection with the world around them and also be able to see their own impact on the Earth. Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)
Disagree: Should be in 6th grade with the ecosystem unit

Agree: (no comment)

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state’s economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.

Evidence Outcome: Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes. (Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil locations of active weathering and/or deposition of rock).

Agree: Please reference NGSS to make better sense of the alignment

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Comment: Standards should be written for the students, and parents not just the teacher. This language seems overly technical for a sixth grader. Who are you people trying to impress.

Agree: (no comment)

Disagree: Removed Language: Make a plan to positively impact a local ecosystem There are few opportunities within the standards for students to create plans. This is a critical part of Colorado’s Essential Skills,
particularly Entrepreneurial Skills/Critical Thinking/Problem Solving. The standards throughout have a strong focus on designing solutions, but there needs to be opportunities to identify the steps it would take to enact those solutions. This also relates to personal skills (initiative/self direction and personal responsibility). Personal responsibility could be emphasized more directly in science.

Disagree: (no comment)

Evidence Outcome: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems. (Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth’s systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.)

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Comment: Standards should be written for the students, and parents not just the teacher. This language seems overly technical for a sixth grader. Who are you people trying to impress.

Agree: (no comment)

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Comment: What does number 2 mean? Doesn't make sense.

Cross Cutting Concepts:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: (no comment)

Agree: (no comment)

GLE: 6. Students can answer the question: How do natural hazards affect individuals and societies?

Agree: This is exactly what middle schoolers should be thinking and learning about

Agree: More connections between people and their natural environment! Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: It would be great to use the NGSS coding for more clarity and cross references.

Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.

Disagree: This should also be in 6th with weather and plate tectonics. These macro concepts should be in 6th grade.

Disagree: "Affecting individuals and societies" seems to border on a concept that relates more with the humanities than science.

Agree: (no comment)

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Disagree: "Engineering practices" does not apply to every standard equally. It appears that the newest buzzword of "engineering" has been added to science. Science and Engineering are two separate concepts and disciplines and if you want students to learn Engineering skills and practices, there should be separate Engineering skills and practices standards that spell out what is expected.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state's economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.
Evidence Outcome: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado prone regions or reservoirs to mitigate droughts).

Agree: Please reference NGSS to make better sense of the alignment
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Comment: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.
Agree: (no comment)
Comment: For weather-related natural hazards, I'd suggest the standard focus on winter storms (common in Colorado), thunderstorms (common in Colorado), and possibly tornadoes. Other hazards could include landslides, floods, etc. I wouldn't list hurricanes, earthquakes, volcanoes, etc. that are not common--those can be extensions for kids who want to explore more.
Disagree: Removed Language: Differentiate between basic and severe weather conditions, and develop an appropriate action plan for personal safety and the safety of others. There are few opportunities within the standards for students to create plans. This is a critical part of Colorado's Essential Skills, particularly Entrepreneurial Skills/Critical Thinking/Problem Solving. The standards throughout have a strong focus on designing solutions, but there needs to be opportunities to identify the steps it would take to enact those solutions. This also relates to personal skills (initiative/self direction and personal responsibility). Personal responsibility could be emphasized more directly in science.
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: (no comment)

Cross Cutting Concepts:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: It would be great to use the NGSS coding for more clarity and cross references.
Agree: (no comment)

Elaboration on the GLE:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: It would be great to use the NGSS coding for more clarity and cross references.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes.
Agree: (no comment)

Science Eighth Grade

Standard: 1. Physical Science

GLE: 1. Students can answer the question: How can one predict an object’s continued motion, changes in motion, or stability?

Agree: Please reference NGSS to make better sense of the alignment
Comment: Could we include NGSS coding into these to clarify?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: I’d clarify the term stability (often also learning about radioactivity and other/different uses of this term)
Agree: ****Not sure where to put this however students need to review the Scientific Method so they are able to create, develop labs, collect/analyze data and draw conclusions based on the data.
Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Comment: While I appreciate the additional clarity of boundary statements and clarification statements, often they seem to limit beyond what is required to meet many of the given standards at this level. Additionally, they often seem to limit areas to spiral curriculum and set-up success on achieving other standards by going further in instructions of content to have deeper levels of understanding.

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

(PG Feedback) Comment: I am just writing a comment here but it is general to all the revisions. First I like the movement and balance of the standards. I do think they are more rigorous and balanced than before. I like the movement toward NGSS and STEM. With that said, it is a pretty major change and as an 8th grade science teacher with little district support in science, I feel it is important that there are many training opportunities in implementing the new standards, especially for rural/western slope districts.
Evidence Outcome: Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects. (Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.) (Boundary Statement: Limited to vertical or horizontal interactions in one dimension)

Comment: Could we include NGSS coding into these to clarify?
Agree: Great! Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object. (Clarification Statement: Emphasis is on balanced (Newton’s First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton’s Second Law), frame of reference, and specification of units.) (Boundary Statement: Limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.)

Comment: Could we include NGSS coding into these to clarify?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: Clarification that this does not include calculating Newton’s 2nd law?
Agree: (no comment)
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Neutral: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Comment: #2: Students will be understand this process if they review the Scientific Method in the beginning of the year.
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?
Agree: This is kind of dense. Could it be broken down more? Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)
Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 2. Students can answer the question: What underlying forces explain the variety of interactions observed?

Comment: Could we include NGSS coding into these to clarify?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: This question is confusing.

Comment: Need to clarify what type of interactions
Neutral: The statement seems vague, "variety of interactions observed" could mean a lot of different things. Maybe something about "outcomes of interactions between forces"? Not sure, but seems unclear.

Comment: ****Students need to review the Scientific Method so they are able to create, develop labs, collect/analyze data and draw conclusions based on the data. This question is the first step of the Scientific Method. Please put in the Scientific Method.
Agree: (no comment)

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural
districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Disagree:** Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) **Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) **Neutral:** This standard explains why the Scientific Method needs to be included. "solve problems"

(PG Feedback) **Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Evidence Outcome:** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. (Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.) (Boundary Statement: Limited to questions that require quantitative answers is limited to proportional reasoning and algebraic thinking)

**Comment:** Could we include NGSS coding into these to clarify?

**Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Comment:** This is a new concept being taught in 8th grade. Will need specific vocabulary to know precisely what is required of this standard.

**Agree:** (no comment)

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Disagree:** (no comment)

**Evidence Outcome:** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.) (Boundary Statement: Does not include Newton’s Law of Gravitation or Kepler’s Laws.)

**Comment:** Could we include NGSS coding into these to clarify?

**Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?

**Neutral:** Personally, this standards fits better with Earth Science and the solar system.

**Disagree:** If you want the teacher to teach gravitational interactions between masses, then include (don’t rule out) Newton’s Law of Gravitation and Kepler’s Laws.
Disagree: seems that we would need Newton’s Law of Gravitation (listed in a boundary statement) to meet this evidence outcome.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.) (Boundary Statement: Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Eliminate "this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations." This concept does not have enough teaching background in the Middle School.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Comment: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: A reason to Scientific Method: "frame a hypothesis based on observations and scientific principles"

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural
districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: We do not teach electrical currents. Delete Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: Same question asked in 6th grade. Consider changing both questions to reflect something relevant to the learning in the unit.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**GLE: 3. Students can answer the question: What is energy?**

Comment: Could we include NGSS coding into these to clarify?
Agree: This is super broad. Could it be tailored to the EOs to be more specific? Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: ****Not sure where to put this however students need to review the Scientific Method so they are able to create, develop labs, collect/analyze data and draw conclusions based on the data.
Agree: (no comment)
Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: Same question asked in 6th grade. Consider changing both questions to reflect something relevant to the learning in the unit.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Agree:
Evidence Outcome: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and the speed of an object. (Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a whiffle ball versus a tennis ball.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: It is unclear from this the depth of student understanding of the types of kinetic and potential energy. This is just kinetic and potential or all the types within them?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Disagree: Why does this only include kinetic but not potential energy?

Colorado Essential Skills and Science and Engineering Practices:

Comment: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Comment: Often sources show Kinetic to be an overarching type above (motion/mechanical, thermal, electrical, Radiant/EM, & sound), I'd be careful with the statement: "Motion energy is properly called kinetic energy"

Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 4. Students can answer the question: How are forces related to energy?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: **Not sure where to put this however students need to review the Scientific Method so they are able to create, develop labs, collect/analyze data and draw conclusions based on the data.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree: 

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate’s hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.) (Boundary Statement: Limited to two objects and electric, magnetic, and gravitational interactions.

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: Electrical Charge: ? Will there be enough background?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)
Evidence Outcome: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate’s hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.) (Boundary Statement: Limited to two objects and electric, magnetic, and gravitational interactions.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Same as a. Should this be different?

Agree: (no comment)

Disagree: It seems to me that having this EO repeat that there is confusion created and if there is different intent it should be indicated in other areas not by repeating the exact wording.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Comment: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)
**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**GLE: 5. Students can answer the question: What are the characteristic properties and behaviors of waves?**

- **Comment:** Could we include NGSS coding into these to clarify?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Agree:** Great revisions!
- **Agree:** (no comment)
- **Disagree:** Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Disagree:** Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

**(PG Feedback) Agree:**

**(PG Feedback) Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Evidence Outcome:** Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in the wave. (Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.) (Boundary Statement: Does not include electromagnetic waves and is limited to standard repeating waves.)

- **Comment:** Could we include NGSS coding into these to clarify?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Disagree:** Electromagnetic energy should be included. It provides a strong connection between other topics taught in 8th grade (weather-radiant energy, forms of energy-radiant energy, etc.). Why limit the type of waves taught when we are covering waves?
- **Agree:** (no comment)
- **Agree:** (no comment)

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**(PG Feedback) Disagree:**

**(PG Feedback) Agree:**

**Colorado Essential Skills and Science and Engineering Practices:**

- **Neutral:** (no comment)
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: "Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet" Put in High School!

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 6. Students can answer the question: How can one explain the varied effects that involve light?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: "varied effects" seems unusual verbiage so please choose a different word or phrase.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: This is a great revision!

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Evidence Outcome: Develop and use a model to describe that waves are reflected, absorbed or transmitted through various materials. (Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.) (Boundary Statement: Limited to qualitative applications pertaining to light and mechanical waves.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: This belongs with wherever photosynthesis ends up.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Neutral: (no comment)

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 7. Students can answer the question: How are instruments that transmit and detect waves used to extend human senses?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Neutral: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(NGG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. (Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.) (Boundary Statement: Does not include binary counting or the specific mechanism of any given device.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Neutral: (no comment)

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Standard: 2. Life Science

GLE: 1. Students can answer the questions: How are the characteristics of one generation related to the previous generation? Why do individuals of the same species vary in how they look, function, and behave?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: I like how specific this is. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: This should be in 7th grade. The flow should be cells, genetics, evolution, fossil record. These flow together and work well together. They are concepts that 7th graders can understand and should be in 7th grade. It needs to flow in an understandable way. All of these proposed changes make every grade level disconnected. They are separate units and don't connect - students need connections.

Disagree: This would fit much better with the standards in human body and evolution.

Agree: (no comment)

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree: Could you code for NGSS for clarity and cross-referencing purposes?

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Comment: Will this include the idea of natural selection and/or the process of evolution of a species? Clarity around this would be helpful

(PG Feedback) Agree: It is critical to introduce principles of biological evolution early in a student's science education. I worry that you will get public input denouncing the teaching of biological evolution, and I want to strongly voice my support for maintaining strong SCIENCE standards, particularly in this area.

(PG Feedback) Agree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Evidence Outcome: Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.) (Boundary Statement: Does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Please relate to the NGSS to provide more clarity for teachers and parents
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: It should be noted that mutations are almost always neutral or harmful in their effect. Also, the accumulation of mutations over time leads to a loss of fitness for the organism, and eventual extinction. This standard is more appropriate for High School Life Science.

Disagree: Stay with 6th grade.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Currently students are taught about pedigree charts to follow a trait through generations of a family. Please provide more clarity as to specifics to be taught so that teachers have a clarity around this.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Cross Cutting Concepts:**

- **Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Disagree:** #2: Remove
- **Agree:** (no comment)

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Elaboration on the GLE:**

- **Comment:** Could we include NGSS coding into these to clarify?
- **Agree:** Could you code for NGSS for clarity and cross-referencing purposes?
- **Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Disagree:** High School material: mutations may result in changes to the structure and function of proteins.
- **Agree:** (no comment)

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**GLE: 2. Students can answer the question: What evidence shows that different species are related?**

- **Comment:** Could we include NGSS coding into these to clarify?
- **Agree:** Could you code for NGSS for clarity and cross-referencing purposes?
- **Agree:** Explicit alignment to NGSS would assist with clarity and resource identification.
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Agree:** Could the NGSS coding be added for more clarity and cross referencing purposes?
- **Disagree:** This connects most clearly with evolution standards, which are included in 7th grade. Students struggle when concepts do not clearly connect to prior learning
- **Disagree:** Should be in 7th grade for reasons explained in previous standard.
- **Disagree:** 8th grade has way to much in its year. This topic is basic enough for lower grades to comprehend.
- **Disagree:** Put Earth Science in High School where the depth can be given.
- **Agree:** (no comment)

**Disagree:** Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: This should be connected with evolution. The 7th grade curriculum discusses evolution in depth and this concept should be with that standard. The flow for students is clear and connected. To disconnect these two ideas is wrong.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.) (Boundary Statement: Does not include the names of individual species or geological eras in the fossil record.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: I really like how this brings together several ideas from previous grade levels as well as other science standards. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: I applaud this standard moving away from memorizing facts and names about the timeline of life's history. The focus should be on understanding evidence that fossils contain and how to interpret it. In Colorado, there should be some inclusion of our state's rich history of paleontology.

Disagree: This belongs in 7th grade, when natural disasters is discussed

Neutral: Although not directly stated, the intent of the standard seems to be to support biological evolution or common descent, an unproven hypothesis. For age-appropriateness, this standard should be delayed until High School Life Science.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: I fully support this concept, but it is too vague. Emphasis needs to be on explanations that involve the building of evolutionary trees. Trees are a powerful key conceptual tool in biology spanning evolution, genetics, and medicine. Students are capable of understanding these trees in elementary school and at this age should not be saying "birds and bats are related because they both fly". Analysis should involve multiple characters (wings, feathers or fur, etc).

Disagree: This belongs in 7th grade for evolution. It needs to stay where it is. It fits best with the human body, adaptations, and finally the movement of the earth. 7th grade teachers have planned a lot of lessons and they are all shifting around.

Disagree: The standard assumes, using methodological naturalism, that "evolutionary relationships" exist. Homologies (similarities) can be used to support either biological evolution or teleology (intentional design). The standard involves macroevolution and should be identified as such. For age-appropriateness, this standard should be delayed until High School Life Science.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. (Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.) (Boundary Statement: Limited to gross appearance of anatomical structures in embryological development.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: This standard involves macroevolution and should be identified as such. For age-appropriateness, the standard (if included at all) should be moved the High School Life Science. Embryological development has been discredited as evidence for macroevolution (common descent).

Disagree: No! Cut out "general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures."

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: The fossil record can be interpreted as evidence for either common ancestry (macroevolution) or common design (teleology). Embryological development has been discredited as evidence for macroevolution, and this implication should be removed.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 3. Students can answer the question: How does genetic variation among organisms affect survival and reproduction?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Should be in 7th grade for reasons stated above.

Disagree: There are FAR too many standards/topics in 8th grade.

Disagree: Lessen the depth!

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals’ probability of surviving and reproducing in a specific environment. (Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. (Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: (no comment)

Agree: This is really engaging and very timely. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Evidence Outcome: Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. (Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.) (Boundary Statement: Limited to gross appearance of anatomical structures in embryological development.)

Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: For age-appropriateness, the standard (if included at all) should be moved to High School Life Science. Embryological development has been discredited as evidence for macroevolution, and this implication should be removed.
Disagree: Too much depth/High School: "embryological development across multiple species "
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:
Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 4. Students can answer the question: How does the environment influence populations of organisms over multiple generations?

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: I really like the connection between earth and life science here.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Should be in 7th grade

Disagree: Again, simple enough idea for lower middle school grades to understand. There is too much on the plate of 8th grade.

Disagree: Delete this. This can be altered to a lesser detail.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.) (Boundary Statement: Does not include Hardy Weinberg calculations.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: (no comment)

Agree: I like the explicit tie to mathematics. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: This is best for 7th grade, when we teach the human body, adaptations, etc.

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

**Colorado Essential Skills and Science and Engineering Practices:**

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: (no comment)

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Standard: 3. Earth and Space Science

GLE: 1. Students can answer the question: How do people reconstruct and date events in Earth’s planetary history?

Agree: This will be very interesting for middle schoolers

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.

Disagree: I feel like this information would tie into the 6th grade topics. It seems out of place with the 8th grade curriculum. I don’t see how it fits into a cohesive story within 8th grade.

Neutral: Keep this very general. This portion of Earth Science should be in High School.

Agree: (no comment)

Comment: What does Earth’s history have to do with the universe and Earth’s place in it? The universe and Earth’s place in it has to do with astronomical events such as days, years, lunar phases. Earth’s history has to do with what has happened on Earth and is shown by evidence in the rocks and fossils.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: I feel like we are taking the well-written NGSS and editing them into a worse document. I would GREATLY prefer the use of the original document. Why are we not including the DCI of engineering and technology?

Disagree: Why move this from 7th to 8th? 7th graders have the ability to understand and apply this learning.

Disagree: This question should be with evolution or the rock cycle (6th/7th grade standards). It is a great connection to review minimally in 8th grade but it is unprofessional to force students to flow within the Universe, Earth-Sun-Moon cycle and the awkward history of Earth/time scale. This is wrong to force that connection in 8th grade which is not clear nor seamless within the standards of Earth and Space Science.

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Comment: These standards make sense as 8th grade concepts, though the first standard on Earth’s history might be better paired with students exploration of the rock cycle, and changing Earth surface, as opposed to being paired with celestial motion and astronomy.

(PG Feedback) Agree:

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Evidence Outcome: Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history. (Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth’s history. Examples of Earth’s major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.) (Boundary Statement: Does not include recalling the names of specific periods or epochs and events within them.)

Agree: Please reference NGSS to make better sense of the alignment

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: How are they suppose to analyses of rock formations when they can’t tell one rock from another?

Disagree: This would be a great connection to what is already in the 6th grade curriculum.

Agree: (no comment)

Disagree: Earliest fossils of homo sapiens--there aren’t many! Most fossils are small organisms such as clams, snails, worms, etc. Dinosaur Ridge near Morrison has dinosaur fossil bones and footprints. But there are very few human fossils. Change the wording.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Agree: I like the inclusion of the NGSS like concepts

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: The guiding question "How do people reconstruct and date events in Earth’s planetary history?" is poorly connected to this standard. This is an awkward standard to give to the 8th grade curriculum. This needs to be corrected.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: Geology should not be moved into 8th grade. This is an enormous change from existing placement and the subsequent chaos it will cause for 8th grade teachers to figure out how to properly teach it will not be worth it. Students' learning will suffer as educators figure out how to teach it over a matter of years.

Agree: (no comment)

Disagree: Radiometric dating of igneous rock strata provides "absolute" dating. Statement is not correct.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Including the specific detail of what goes on in stars implies that this might be more important than the composition and life history of other planetary objects. Given the evidence outcomes outlined, it makes more sense to include a question relating to these big picture ideas like gravity and scale. A suggestion revision might be: What is the universe and how do our planet and our solar system fit into it? What is gravity and where does it work?

Neutral: This is really broad. I would like to see this fleshed out a bit more. Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Disagree: These kind of broad statements do not take into account all the learning, preparing and time that needs to happen to get the students to the point where they and do big picture work like this.

Disagree: I don't see how this statement connections to the evidence outcomes. The evidence outcomes are about gravity, and how objects in the solar system interact with each other. "What goes on in stars" is not included in these outcomes.

Agree: (no comment)

Disagree: "What goes on in stars?" This seems a little loose and too general.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and
see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Disagree: These seem like two totally different concepts. Tacking on the composition of stars to the end of this questions seems like an afterthought.

Agree: (no comment)

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students’ school or state).) (Boundary Statement: Does not include Kepler’s Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Neutral: not sure why Kepler’s laws are a boundary. It is not like it is more complex than the other subjects.

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: (no comment)

Evidence Outcome: Analyze and interpret data to determine scale properties of objects in the solar system. (Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object’s layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.) (Boundary Statement: Does not include recalling facts about properties of the planets and other solar system bodies.)

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:

Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:

Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Agree: The framing here for teachers is needed and appropriate

GLE: 3. Students can answer the question: What are the predictable patterns caused by Earth’s movement in the solar system?

Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.
Agree: (no comment)
Agree: I love this standard and the question of patterns.
(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
(PG Feedback) Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Evidence Outcome: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (Clarification Statement: Examples of models can be physical, graphical, or conceptual.)
Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.
Disagree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Cross Cutting Concepts:
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:
Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: (no comment)

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

GLE: 4. Students can answer the question: How do humans change the planet?

Agree: Great topic

Comment: Could we include NGSS coding into these to clarify?

Agree: Could you code for NGSS for clarity and cross-referencing purposes?

Agree: (no comment)

Agree: I absolutely love this! Explicit alignment to NGSS would assist with clarity and resource identification.

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?

Agree: (no comment)

Disagree: This belongs in the 6th grade Standard 2:1b,c,d

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Disagree: Changing the standards this significantly will lead to teacher burnout. It takes a few years for teachers to adopt the standards and reach a place where they can effectively engage their students and see the desired achievement of their performance. Leave the standards as is so that our small rural district can continue to grow our kids.

Neutral: Seems a natural connection here are energy resources. consider putting energy resources (renewable and non renewable) in 8th grade as well to provide the application and transfer piece.

Disagree: This question and standard seems to be awkwardly placed in 8th grade. This is unfair to connect Earth's history based on geologic rock strata, Earth-Sun-Moon connections, Universe and how humans impact Earth. There is not consistent nor logical flow as an educator, I can only assume how disconnected and wrong it would be to force these to connect for an 8th grader. This question/should be with the rock cycle/evolution (6th or 7th grade).

(PG Feedback) Agree:

(PG Feedback) Agree: Explicit alignment to NGSS would assist with clarity and resource identification.

(PG Feedback) Agree: It is important to include scientific research on how people are impacting our planet.

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state's economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.
(PG Feedback) **Disagree**: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Evidence Outcome**: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems. (Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth’s systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.)

**Comment**: Could we include NGSS coding into these to clarify?

**Agree**: Could you code for NGSS for clarity and cross-referencing purposes?

**Agree**: (no comment)

**Agree**: I love the tie in with Social Studies here. This will be a great EO for students to reflect on as they think about the type of impact they make on the world around them. Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree**: Could the NGSS coding be added for more clarity and cross referencing purposes?

**Agree**: Could the NGSS coding be added for more clarity and cross referencing purposes?

**Disagree**: This standard seems not well matched to the other Earth science content at this grade level. It might be better paired with the global climate change standard or environmental impact standard, as opposed to being a ‘lone’ standard stuck in 8th grade.

**Agree**: (no comment)

**Neutral**: Not sure this fits in with the rest of the 8th Science "Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems. " This fits 6th grade curriculum

**Disagree**: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Disagree**: (no comment)

**Disagree**: This needs to include the words human caused climate change. Not having that statement somewhere in the description seems like a political maneuver and pandering to a non-scientific group within our state. Obviously we impact the planet, but this statement needs to explicitly include the words "Climate Change."

**Colorado Essential Skills and Science and Engineering Practices:**

**Agree**: (no comment)

**Agree**: Explicit alignment to NGSS would assist with clarity and resource identification.

**Agree**: Could the NGSS coding be added for more clarity and cross referencing purposes?

**Disagree**: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

**Cross Cutting Concepts:**

**Agree**: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Elaboration on the GLE:
Comment: Could we include NGSS coding into these to clarify?
Agree: Could you code for NGSS for clarity and cross-referencing purposes?
Agree: (no comment)
Agree: Explicit alignment to NGSS would assist with clarity and resource identification.
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Agree: Could the NGSS coding be added for more clarity and cross referencing purposes?
Disagree: Science is an area in which rural districts are struggling to recruit and retain teachers. To change the standards this dramatically makes it more difficult. In addition, with the lack of funding going to rural districts to purchase appropriate curriculum for this rapidly changing standard system, it is becoming increasingly impossible for rural districts to compete.

Science High School

Standard: 1. Physical Science

PG: 4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Agree: Yes! Wave knowledge is useful in all the sciences.

GLE: 1. Students can answer the question: How do particles combine to form the variety of matter one observes?

Agree: We would like the NGSS coding for clarification please.
Neutral: Please include NGSS coding for the standards on-line.
Agree: A little awkwardly worded...
Agree: (no comment)
Agree: (no comment)

Comment: This goes for all the standards: I feel that requiring all students to meet these standards will require 4 years of science classes, and that a fair fraction of all students will not be able to meet these, just as not all students are able to pass a calculus class. And I wonder in how much detail all people really need to understand all these topics. As a science teacher (and engineer) I would LIKE all people to be proficient in these areas, but I realize that this is beyond some people.

Disagree: Is it just "combine" or should there be a more open-ended term here such as "interact"? Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree: We would like the NGSS coding for clarification please.
(PG Feedback) Neutral: Please include NGSS coding for the standards on-line.
(PG Feedback) Agree:
Comment: The language "make sense" is too vague. Does this mean they need to understand the concepts? explain them? Also, science and engineering practices should be changed to science and/or engineering practices. I don't teach any engineering, but the PGC seems to suggest that I will need to.

Agree:

Comment: We are covering all these concepts (except nuclear chemistry) in our current Chemistry and Advanced Chemistry classes. The concepts are very difficult for the regular chemistry students.

Evidence Outcome: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy levels of atoms. (Clarification Statement: Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.) (Boundary Statement: Limited to main group elements. Does not include quantitative understanding of ionization energy beyond relative trends.)

Agree: We would like the NGSS coding for clarification please.
Neutral: Please include NGSS coding for the standards on-line.
Agree: We could add specific properties that must be covered (e.g. atomic radius, ionization energy, etc.)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Evidence Outcome: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. (Clarification Statement: Emphasis is on understanding the strengths of forces between particles, and not on naming specific intermolecular forces (such as dipole-dipole). Examples of particles could include ions, atoms, molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.) (Boundary Statement: Does not include Raoult’s law calculations of vapor pressure.)

Neutral: We would like the NGSS coding for clarification please. "What do you mean by "bulk scale"?"
Neutral: which electrical forces specifically should students have an understanding of?
Agree: "Bulk Properties" do not come up in the Evidence Outcome, just in the clarification statement. Consider rewording: "Plan and conduct an investigation to gather evidence to compare how bulk properties determined by the structure of substances at the bulk scale are influenced or determined by strength of electrical forces between particles."
Comment: Why doesn’t it just say "intermolecular forces" and "VSEPR" shape?"
Neutral: (no comment)
Agree: (no comment)
Evidence Outcome: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. (Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.) (Boundary Statement: Does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.)

Agree: We would like the NGSS coding for clarification please.
**Disagree:** This Evidence Outcome is repeated in 1.2.b and seems to make a lot more sense in that standard. Considering that students should be able to master this Evidence Outcome in that standard, I would recommend seriously considering removing it from this standard (1.1.c). Also, this is one place where the boundary statement significantly limits the overall Evidence Outcome. With some simple algebra, students could get a much more clear understanding of the overall energy transfer in a chemical reaction—why was this expressly left out?

**Agree:** (no comment)

**Agree:** (no comment)

**Colorado Essential Skills and Science and Engineering Practices:**

**Neutral:** Please include NGSS coding for the standards on-line.

**Neutral:** We would like the NGSS coding for clarification please.

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Cross Cutting Concepts:**

**Neutral:** We would like the NGSS coding for clarification please.

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Elaboration on the GLE:**

**Agree:** We would like the NGSS coding for clarification please. What do you mean by "bulk scale"?

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**GLE: 10. Students can answer the question: What are the characteristic properties and behaviors of waves?**

**Neutral:** Evidence Outcome 4.10.c is repeated in standard 4.11. It is a much better fit in 4.11 and should be removed from 4.10. All parts of this Evidence Outcome can be covered under that standard and this will help greatly in making the standards clear and manageable.

**Neutral:** (no comment)

**Agree:** (no comment)

**Disagree:** Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(Prime Grades) **Agree:**

(Prime Grades) **Agree:**

(Prime Grades) **Agree:**

Evidence Outcome: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. (Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.) (Boundary Statement: Limited to algebraic relationships and describing those relationships qualitatively.)

**Agree:** (no comment)
Evidence Outcome: Evaluate questions about the advantages of using a digital transmission and storage of information. (Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.)

Neutral: (no comment)

Disagree: This Evidence Outcome is repeated in standard 4.11. It is a better fit there and all aspects of light can be covered in that standard while still covering the wave part of this standard.

Neutral: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Neutral: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Neutral: (no comment)

Neutral: (no comment)

Agree: (no comment)

**GLE: 11. Students can answer the questions: What is light? How can one explain the varied effects that involve light? What other forms of electromagnetic radiation are there?**

Disagree: Evidence Outcome 4.10.c is repeated in standard 4.11. It is a much better fit in 4.11 and should be removed from 4.10. All parts of this Evidence Outcome can be covered under that standard and this will help greatly in making the standards clear and manageable. Likewise, Evidence Outcome 4.11.c is repeated in 4.12 and is a much better fit in 4.12, so should be removed from here.

Agree: (no comment)

Agree: (no comment)

Disagree: The wording "varied effects that involve light" seems too narrow and unfamiliar to use here...... reword. Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."
Evidence Outcome: Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. (Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.) (Boundary Statement: Does not include using quantum theory.)

Agree: This Evidence Outcome should stay here and be removed from standard 4.10. Other than that, it seems that there is a better term than "claims" as this leads to the impression that students would be looking at wild guesses rather than peer-reviewed scientific studies.

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. (Clarification Statement: Emphasis is on the idea that different frequencies of light have different energies, and the damage to living tissue from electromagnetic radiation depends on the energy of the radiation. Examples of published materials could include trade books, magazines, web resources, videos, and other passages that may reflect bias.)

Disagree: I'm frankly unclear as to the meaning of this Evidence Outcome. Is there a conspiracy theory concerning electromagnetic radiation that I'm not aware of? Is there a big tanning company that is lobbying congress to say that ultraviolet radiation is good for skin? Is this based on the stereotype that schizophrenic people make hats out of aluminum foil to stop brain probes from the CIA? While there is clearly bad science and ignorance in some areas that overlap with the science standards (such as evolution, vaccines and climate change), I don't see where this apparently political standard is coming from. (Are they talking about Gamma radiation creating the Hulk? Because that's real...) So, I'd want to see some real clarification for this standard before I'd be ready to teach it and I'd definitely be wary of how this standard was assessed on a standardized test.

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. (Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.) (Boundary Statement: Limited to qualitative information and does not include band theory.)

Disagree: This Evidence Outcome is repeated in standard 4.12. It is a better fit there and should be removed from this standard.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)
GLE: 12. Students can answer the question: How are instruments that transmit and detect waves used to extend human senses?

Agree: I think this is one of the most relevant standards.

Evidence Outcome: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. (Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.) (Boundary Statement: Limited to qualitative information. Does not include band theory.)

Agree: This Evidence Outcome should stay here and be removed from standard 4.11.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

GLE: 2. Students can answer the questions: How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?
Disagree: Is it just "combine or change (react)" or should there be a more open-ended term here such as "interact or react"? Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen). (Boundary Statement: Limited to chemical reactions involving main group elements and combustion reactions).

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. (Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.). (Boundary Statement: Does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.).

Agree: This Evidence Outcome is found in standard 1.1.c above, but is a much better fit here and should be removed from 1.1. Also, this is one place where the boundary statement significantly limits the overall Evidence Outcome. With some simple algebra, students could get a much more clear understanding of the overall energy transfer in a chemical reaction-why was this expressly left out?

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. (Clarification Statement: Emphasis is on student reasoning that focuses on the number and energy of collisions between molecules.). (Boundary Statement: Limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature.).

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. (Clarification Statement: Emphasis is on the application of Le Chatlier’s Principle and on refining designs of chemical reaction systems, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants or removing products.). (Boundary Statement: Limited to specifying the change in only one variable at a time. Does not include calculating equilibrium constants and concentrations).

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)
Evidence Outcome: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (Clarification Statement: Emphasis is on using mathematical ideas to communicate the proportional relationships between masses of atoms in the reactants and the products, and the translation of these relationships to the macroscopic scale using the mole as the conversion from the atomic to the macroscopic scale. Emphasis is on assessing students’ use of mathematical thinking and not on memorization and rote application of problem-solving techniques.) (Boundary Statement: Does not include complex chemical reactions.)

Agree: Consider moving this Evidence Outcome to standard 1.1 as it is more about the matter undergoing transformation than it is about the process of the reaction. Also, some extra clarification and/or boundary statements might be helpful here: Does this cover Avogadro's number, molar concept and stoichiometry, and if so, to what degree?

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

GLE: 3. Students can answer the question: What forces hold nuclei together and mediate nuclear processes?

Agree: (no comment)

Comment: What is the purpose of this element in the document? It is a very broad and vague statement with little value to instruction or assessment.

Agree: (no comment)

Agree: (no comment)

Disagree: I do not understand why there is specific focus on nuclear chemistry. Students are just being asked to memorize types of decay, which is not high level thinking. Physicists are not certain what holds the pieces of the nucleus together. Note that the AP Chemistry curriculum no longer includes nuclear chemistry.

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree: 

(PG Feedback) Agree:
Evidence Outcome: Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. (Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations. (Boundary Statement: Does not include quantitative calculation of energy released. Limited to alpha, beta, and gamma radioactive decays.))

Agree: Is discussion on half-lives and calculation of half-life decay included here? It seems ambiguous in the standard concerning radioactive dating in the Earth Science Standards.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Comment: but mass is not conserved-some is transformed into energy

Elaboration on the GLE:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Disagree: I don’t understand why nuclear chemistry is specifically called out as something all HS graduates should understand.

GLE: 4. Students can answer the question: How can one predict an object's continued motion, changes in motion, or stability?

Neutral: Please include NGSS coding for the standards on-line.

Agree: (no comment)

Disagree: Stability is not tied to any of the evidence outcomes. The other two terms are very clear and I can see how each of those relate to momentum and net force. In the clarification statement for b, add what it is intended by stability. What should students see if changes in momentum lead to a change in stability? As a chemist by training, stability implies electron orbital shell energy levels. Students probably just took Chemistry and have that same understanding of the term.

Agree: (no comment)

Agree: (no comment)

Agree: I think this is a very clear statement that could be used to design lesson plans as well as assessments.

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree:
(PG Feedback) Neutral: This seemed rather vague at first, but the GLE and EO's are very clear and after reading through them I see the need for the vague nature of this PGC.

Evidence Outcome: Analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.). (Boundary Statement: Limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.)

Agree: Please include NGSS coding for the standards on-line.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Much more specific and I like that it specifies one dimensional motion.

Evidence Outcome: Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. (Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.) (Boundary Statement: Limited to systems of two macroscopic bodies moving in one dimension.)

Agree: Please include NGSS coding for the standards on-line.

Agree: (no comment)

Disagree: Include what stability of a system means here so teachers understand how that part of the overarching question is connected to this outcome.

Agree: (no comment)

Agree: (no comment)

Agree: Good. Very clear and specific

Evidence Outcome: Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. (Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.) (Boundary Statement: Limited to qualitative evaluations and/or algebraic manipulations.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Was thrown off at first, but the boundary statement addresses the limits of assessment and math. Good conceptual knowledge builder

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Disagree: Laws describe observable phenomena through mathematical relationships. Theories explain the relationships between many laws.

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)
Elaboration on the GLE:

Disagree: The last sentence's complexity impedes understanding. Reword with less formal language and in smaller, simpler sentences. Example: When an outside object interacts with a system, the system's total momentum can change. The system's momentum change is equal to the momentum changes outside the system.

Agree: (no comment)

Agree: (no comment)

GLE: 5. Students can answer the question: What underlying forces explain the variety of interactions observed?

Disagree: Too vague. Interactions among what?

Disagree: NEEDS MORE.... "..... variety of interactions observed between objects."

(PG Feedback) Agree:

Evidence Outcome: Use mathematical representations of Newton’s Law of Gravitation and Coulomb’s Law to describe and predict the gravitational and electrostatic forces between objects. (Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.) (Boundary Statement: limited to systems with two objects.)

Agree: Consider adding statement of level of math required in the boundary statement.

Agree: (no comment)

Evidence Outcome: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. (Boundary Statement: Limited to designing and conducting investigations with provided materials and tools.)

Evidence Outcome: Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. (Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.) (Boundary Statement: Limited to provided molecular structures of specific designed materials.)
Colorado Essential Skills and Science and Engineering Practices:

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

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 6. Students can answer the question: What is energy?

Agree: This standard has 2 of 3 Evidence Outcomes that are repeated elsewhere. In both cases, there is a better fit for the Evidence Outcomes under the other standard. I recommend keeping this standard with just the second Evidence Outcome.
Agree: (no comment)
Agree: (no comment)

Disagree: Question is too simplistic and simultaneously difficult to answer.
Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

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

Evidence Outcome: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. (Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.) (Boundary Statement: Limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.)

Disagree: This Evidence Outcome is repeated in 3.7.a and makes much more sense there. When it is repeated, it makes the overall standards more confusing and massive then they need to be. Remove this Evidence Outcome and keep only in 3.7.
Neutral: (no comment)
Agree: Does this mean creating computer models OR simply using mathematical equations to solve problems?
Agree: (no comment)
Evidence Outcome: Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects). (Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.)

Agree: In the clarification statement, if "earth" is used as the proper noun planet rather than a patch of dirt, it should be capitalized as it is in the Life and Earth Science Standards.

Neutral: (no comment)

Agree: (no comment)

Evidence Outcome: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.) (Boundary Statement: Quantitative evaluations is limited to total output for a given input. Limited to devices constructed with materials provided to students.)

Disagree: This Evidence Outcome is repeated in 3.9.a and makes much more sense there. When it is repeated, it makes the overall standards more confusing and massive then they need to be. Remove this Evidence Outcome and keep only in 3.9.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: I think that the phrase "the relative position energy" should be "the relative position of the system energy".

Agree: (no comment)

Agree: (no comment)

GLE: 7. Students can answer the questions: What is meant by conservation of energy? How is energy transferred between objects or systems?

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree:

(PG Feedback) Agree:
(PG Feedback) Agree:
Evidence Outcome: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. (Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.) (Boundary Statement: Limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.)

Agree: This Evidence Outcome also appears in 3.6, but it is a much better fit here and it is best for teachers and students if each Evidence Outcome only appears once whenever possible. Therefore, I'd recommend keeping it here and taking it out of 3.6. When addressing this Evidence Outcome, teachers would have to address the nature of energy, so the expectations in 3.6 would be fulfilled without having to include a superfluous Evidence Outcome in 3.6.

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). (Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.) (Boundary Statement: Limited to investigations based on materials and tools provided to students.)

Agree: This Evidence Outcome also appears in 3.9, but it is a much better fit here and it is best for teachers and students if each Evidence Outcome only appears once whenever possible. Therefore, I'd recommend keeping it here and taking it out of 3.9.

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

GLE: 8. Students can answer the question: How are forces related to energy?

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Disagree: Too broad. Is a separate question (from the above) really required?
Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree:

(PG Feedback) Agree:

Evidence Outcome: Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. (Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.) (Boundary Statement: Limited to systems containing two objects.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

GLE: 9. Students can answer the questions: How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used?

Neutral: Of the 2 Evidence Outcomes in this standard, both are redundant in that they are found elsewhere in the High School Physical Science Standards. Of these, the first (a) is a good fit here and supports the standard, while I feel that the second (b) is a better fit in 3.7, Conservation of Energy. Please consider using each Evidence Outcome only once and allowing for the overlap in instruction where needed instead of repeating Evidence Outcomes multiple times.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

(PG Feedback) Agree:

(PG Feedback) Agree:
Evidence Outcome: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.) (Boundary Statement: Quantitative evaluations is limited to total output for a given input. Limited to devices constructed with materials provided to students.)

Agree: This Evidence Outcome also appears in 3.6, but it is a much better fit here and it is best for teachers and students if each Evidence Outcome only appears once whenever possible. Therefore, I'd recommend keeping it here and taking it out of 3.6. When addressing this Evidence Outcome, teachers would have to address the nature of energy, so the expectations in 3.6 would be fulfilled without having to include a superfluous Evidence Outcome in 3.6.

Agree: (no comment)

Evidence Outcome: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). (Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.) (Boundary Statement: Limited to investigations based on materials and tools provided to students.)

Disagree: This Evidence Outcome is repeated in 3.7.b and makes much more sense there. When it is repeated, it makes the overall standards more confusing and massive then they need to be. Remove this Evidence Outcome and keep only in 3.7.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Neutral: (no comment)

Agree: (no comment)

Standard: 2. Life Science

PG: 1. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Agree: • “These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”
Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 10. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth’s surface processes interact.

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 2. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.

Agree: **“These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.”**

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 3. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Agree: **“These standards give really good detail as to what’s expected of students, because what students are expected to know is blended with science and engineering practices.”**

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 4. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 5. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction.

Agree: **“These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.”**

Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?
Online Feedback  Science High School

PG: 6. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.
   Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 7. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.
   Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.
   Agree: These standards give really good detail as to what’s expected of students, because what students are expected to know is blended with science and engineering practices.
   Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

PG: 9. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth’s place in it.
   Agree: Can the science and engineering practices also be summarized in the PGS or included as an additional PGS?

GLE: 1. Students can answer the question: How do the structures of organisms enable life’s functions?
   Agree: (no comment)
   Agree: (no comment)
   Agree: (no comment)
   Agree: (no comment)
   Comment: How does the structure of an organism determine its function? How are structure and function interrelated?
   Comment: How does the structure of an organism determine its function? How are structure and function interrelated?
   Comment: Would prefer if the grade level expectations were written as statements but the elaboration on the GLE helps clarify the learning expectation.

(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Comment: Good, but a bit vague about the practices.
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:..."

(PG Feedback) Comment: The science and engineering phenomenon piece is WAY too redundant

Evidence Outcome: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (Boundary Statement: Does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.)

Agree: A clarification statement would be helpful here- the boundary statements take away so much that it’s hard to determine exactly what is expected.

Agree: (no comment)

Agree: (no comment)

Neutral: Does this include translation of mRNA?

Comment: Based on the boundary statement, how does one define "biochemistry of protein synthesis"? I am assuming this INCLUDES transcription and translation but does not include all of the enzymes and chemical pathways associated with the journey from DNA to protein? Also, it would be nice to know what is included in the boundary... for example, helicase - do students need to know all of the enzymes associated with unzipping DNA or no? If not, then I would word the Boundary Statement as follows: (Boundary Statement: Does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis--including enzymes such as RNA polymerase.)

Evidence Outcome: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.) (Boundary Statement: Does not include interactions and functions at the molecular or chemical reaction level.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Comment: This standard could be HUGE in scope or narrow. It needs more specificity.

Comment: Neural stimuli - included in the clarification statement. However, in the Boundary Statement says, "Does not include interactions and functions at the molecular or chemical reaction level." Wouldn’t neural stimuli subsume the chemical reaction level?

Comment: Clarification statement is very useful!

Evidence Outcome: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.) (Boundary Statement: Does not include the cellular processes involved in the feedback mechanism.)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: I love the clarification statement and information. It broadens the topic without making the content more difficult to teach.

Agree: Very clear & concise!
Colorado Essential Skills and Science and Engineering Practices:

**Agree**: Blanket statement: consider capitalization here, seems to be inconsistent across some standards.

**Neutral**: What about microscope skills? Would that fall under carrying out investigations?

**Agree**: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do.

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: Agreed...these skills are relevant but more explanation or examples would be helpful.

Cross Cutting Concepts:

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: (no comment)

**Comment**: elaborate here

Elaboration on the GLE:

**Neutral**: Mammalian red blood cells do not contain DNA in the usual form, i.e. chromosomes.

**Agree**: Blanket observation: This should either be presented as a paragraph (without the dashes), a numbered list or as bullets.

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: (no comment)

**Comment**: Perhaps change, "Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system" TO "Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is occurring inside the living system."

GLE: 10. Students can answer the question: Why do individuals of the same species vary in how they look, function, and behave?

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: (no comment)

**Agree**: Why isn't this under the evolution umbrella? Isn't this directly related to population genetics?

**Disagree**: #9 and 10 are repeats.

(PG Feedback) **Agree**:

(PG Feedback) **Agree**:

(PG Feedback) **Agree**:

(PG Feedback) **Agree**:

(PG Feedback) **Comment**: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:...."
Evidence Outcome: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. (Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.)

**Agree:** (no comment)

**Disagree:** The standard uses, but does not explain, methodological naturalism. The standard assumes that biological evolution is true. The evidence used to support evolution may also be interpreted to support the teleological alternative. The possibility of teleological causation in origins science should not be excluded.

**Agree:** It's important for students to understand that the evidence supporting evolution by natural selection serves as an organizing principle for the life sciences in the same way that Newton's and Einstein's mathematical laws unify concepts in the physical sciences. Also, students must realize that scientific theories are descriptions of nature supported by much evidence and not just "speculative alternatives" on the same level with "educated (but unsupported) guesses."

**Agree:** (no comment)

**Agree:** (no comment)

**Colorado Essential Skills and Science and Engineering Practices:**

**Agree:** I fully agree with these, but please keep #2 strong and do not allow for pseudo-scientific 'theories' to be granted time in the science classroom under the guise of being open to alternate theories. Science needs to teach the commonly held theories based on the best understanding of the greatest evidence. I am fully supportive of teaching the belief of creationism and/or intelligent design in a social studies (comparative religion) classroom. One or two (or honestly 10 or more) isolated or fabricated studies (or magazine articles, speeches, websites, sermons etc.) do not qualify as scientifically accepted alternative theories for the high school classroom. Please keep evolution the course of study in the science classroom!

**Agree:** These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

**Agree:** (no comment)

**Agree:** (no comment)

**Cross Cutting Concepts:**

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Elaboration on the GLE:**

**Agree:** (no comment)

**Disagree:** The evidence used to support biological evolution can also be used to support teleology. DNA similarities are not necessarily indicative of common descent. Embryological development has generally been discredited as evidence for biological evolution.

**Agree:** (no comment)

**Agree:** (no comment)

**GLE: 11. Students can answer the question: How does genetic variation among organisms affect survival and reproduction?**

**Agree:** Great

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)
Online Feedback

Science High School

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

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:...".

Evidence Outcome: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. (Clarification Statement: Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.) (Boundary Statement: Does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.

Agree: This standard is important for understanding the species and populations students interact with in their everyday lives. It is important for our youth to be able to explain and engage in conversations around how species change over time.

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Disagree: This standard pertains to microevolution (small-scale change, adaptation), and it should be noted as such. Microevolution and macroevolution (large-scale change, new body parts and plans) are different processes that should be covered in different standards.

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

Evidence Outcome: Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. (Clarification Statement: Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations.) (Boundary Statement: Limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.)

Agree: This standard is important for understanding the species and populations students interact with in their everyday lives. It is important for our youth to be able to explain and engage in conversations around how species change over time.

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

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

Colorado Essential Skills and Science and Engineering Practices:

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

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

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Agree: (no comment)

Agree: (no comment)

GLE: 12. Students can answer the question: How does the environment influence populations of organisms over multiple generations?

Agree: These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone.

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Construct an explanation based on evidence for how natural selection leads to adaptation of populations. (Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations)

Agree: This standard is important for understanding the species and populations students interact with in their everyday lives. It is important for our youth to be able to explain and engage in conversations around how species change over time.

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs. This standard is particularly sensitive to this as it addresses both evolution and climate change.

Disagree: "Adaptation" is microevolution and should be identified as such. Also, natural selection is only one factor in adaptation. Other processes include gene transposition, horizontal gene transfer, epigenetics, and genome duplication.

Agree: (no comment)

Agree: (no comment)
Evidence Outcome: Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. (Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species)

Agree: This standard is important for understanding the species and populations students interact with in their everyday lives. It is important for our youth to be able to explain and engage in conversations around how species change over time.

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Disagree: The subject is still microevolution or adaptation, and this should be noted. Any "new species" formed via environmental changes will closely resemble its predecessor (very similar body plan and body parts).

Agree: (no comment)

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Neutral: Misspelling in first sentence.

Neutral: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs. In particular, the phrase "a variety of sources" might incline some activists to try to include the Bible or other non-scientific source as a valid argument against the data-driven and well-substantiated theory of evolution. Please consider rewriting this part to not open the door to non-science being brought into the science classroom.

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: Please limit the study of evolution to the commonly held real science and do not waste time and water down the curriculum with creationism or other non-scientific beliefs.

Agree: (no comment)

Agree: (no comment)

GLE: 13. Students can answer the question: What is biodiversity, how do humans affect it, and how does it affect humans?

Agree: Excellent approach

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
Agree: (no comment)
Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:..."

Evidence Outcome: Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. (Clarification Statement: Emphasis is on testing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.)

Agree: The big idea of biodiversity is important to our ability to survive on earth and for other species to survive. We have daily examples in Colorado of where a lack of biodiversity could impact humans and the ecosystems. Emerald Ash Borer is one example.

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

Neutral: It sounds promising. The way this is written is a bit difficult to predict what the state is looking for however. How do they create or revise a simulation? Do you have examples for those of us who think very literally?

Colorado Essential Skills and Science and Engineering Practices:
Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do
Agree: (no comment)
Neutral: (no comment)

Cross Cutting Concepts:
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:
Agree: Words such as "enhancing" and "Inspirational value" quantify this statement as wholly human-centric and devalue the intrinsic importance of life in and of itself fully without regard to the value we may place on it for our own purposes (economic, medical, biological, environmental or even spiritual). A statement recognizing the intrinsic value of ecosystems in and of themselves would be helpful here.

Disagree: The emphasis is on negative effects of human activities. There needs to be a balance between negative and positive human effects.

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

GLE: 2. Students can answer the question: How do organisms grow and develop?
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Evidence Outcome: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. (Boundary Statement: Does not include specific gene control mechanisms or rote memorization of the steps of mitosis.)

Agree: Thank you for separating mitosis from meiosis.

Agree: Thank you for the boundary statement!

Neutral: While I like the elimination of "Rote Memorization" - I'd love more clarity about if we expect students to know the cellular anatomy involved with the process. What vocabulary do we expect them to have at the end of the unit? We love to use microscopes to have students identify the stages happening in cells:)

Agree: (no comment)

Comment: Would this include specific cell differentiation or maintain a very general "cells have special jobs."

Disagree: Per the language of the GLE, shouldn't this also include meiosis? "5...how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction." See adjustment: Use a model to illustrate the role of cellular division (mitosis) and differentiation (gene expression) in the development of complex organisms; including cellular mechanisms responsible for reproducing (meiosis). (Boundary Statement: Does not include specific gene control mechanisms or rote memorization of the steps of mitosis or meiosis.) (OR: add meiosis as a separate EO) This EO needs a Clarification statement regarding gene control mechanisms. Do we teach students about epigenetics and epistasis? If so, to what depth? If not, then specific terms need to be delineated to remove confusion from someone reading this and saying, "I wonder what 'they' mean by 'specific gene control mechanisms'..." Also missing: behavior; either remove from GLE or add EO.

Comment: what does it mean, boundary statement?

Agree: Boundary statement is very useful. Please add if not already to other evidence outcomes.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

Agree: (no comment)

Agree: (no comment)

Agree: These skills and practices are necessary but more elaboration is needed to clarify what students are expected to know and be able to do.

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)
Agree: These concepts are present in the evidence outcomes but more clarification and detail would be helpful to assist students and teachers with making connections between the science content and the concepts.

Elaboration on the GLE:

Neutral: Not all organisms require fertilized eggs go start a new generation, e.g. bdelloid rotifers.
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Comment: "Growth and Development of Organisms... with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells" This (meiosis; crossing-over) is missing from the EOs! Cellular division and differentiation...composed of systems of tissues and organs that work together to meet the needs of the whole organism. Also missing from EOs; either delete from here or add an additional EO.
Agree: Elaboration on GLE is very helpful to further define what students need to learn.

GLE: 3. Students can answer the question: How do organisms obtain and use the matter and energy they need to live and grow?

Agree: (no comment)
Agree: (no comment)
Comment: Could this include something about how photosynthesis and respiration are connected?
Agree: (no comment)
Agree: (no comment)
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:...".

Evidence Outcome: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. (Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.) (Boundary Statement: Does not include specific biochemical steps.)

Agree: Thank you for the boundary statement.
Agree: Love this! Such an important thing to teach.
Agree: (no comment)
Agree: By "Not including specific biochemical steps," is it meant that we would not be teaching the electron transport chain or Calvin cycle?

Evidence Outcome: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. (Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.) (Boundary Statement: Does not include the details of the specific chemical reactions or identification of macromolecules.)

Agree: (no comment)
Disagree: This standard does not make sense. Are you talking about the 4 macromolecules? If so, I believe knowing the names of them is Very Important for living in this world. Perhaps you're saying that they don't
need to know the structure of the molecules? Or that they don't need to know the names of all the different types of carbohydrates, etc. I like to tie macromolecule knowledge into diet, nutrition and diseases that can result from poor nutrition, etc. I'd love to see that in here.

**Disagree:** The wording implies that amino acids are large molecules. This is not true; proteins made from amino acids are large, but the amino acids themselves are small.

**Agree:** (no comment)

**Neutral:** (no comment)

**Evidence Outcome:** Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. (Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.)

**Agree:** (no comment)

**Comment:** Does this include ATP - ADP cycle? Or simply O2 + Sugar -> CO2 + ATP.

**Disagree:** The phrase "food molecules and oxygen molecules" is essentially redundant. That is, all food molecules contain oxygen.

**Agree:** (no comment)

**Agree:** Again, since we are just looking at inputs and outputs, are we forgoing glycolysis, Krebs, and the electron transport chain?

**Colorado Essential Skills and Science and Engineering Practices:**

**Agree:** (no comment)

**Agree:** These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** models for and not models of

**Cross Cutting Concepts:**

**Agree:** (no comment)

**Agree:** (no comment)

**Agree:** (no comment)

**Elaboration on the GLE:**

**Agree:** add commas around "for example" in "used for example to form new cells". In the statement: "As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another and release energy to the surrounding environment and to maintain body temperature." there is a subject-verb misalignment - what is releasing the energy? The reactions? The transfer? This needs a slight rewording.

**Disagree:** a. Most sugar molecules are polymers with oxygen linkages between the carbohydrate units. Thus these polymers do not have pure "hydrocarbon backbones." b. The phrase "food molecules and oxygen molecules" is essentially redundant. That is, all food molecules contain oxygen.

**Agree:** (no comment)

**Agree:** (no comment)

**GLE:** 4. Students can answer the question: How do organisms interact with the living and nonliving environments to obtain matter and energy?

**Agree:** (no comment)

**Agree:** (no comment)
Evidence Outcome: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. (Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.)

Agree: include "data from" before "population changes".

Comment: This seems like a big change! What resources are you thinking teachers will use? What is the boundary statement for this?

Agree: (no comment)

Agree: (no comment)

Evidence Outcome: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. (Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.)

Agree: (no comment)

Comment: Where are these data sets coming from?!

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Comment: 2 and 3 are identical.... was this intentional?

Agree: #1 seems redundant and could be reworded. #2 has some odd capitalization and seems to open the door for crackpot and conspiratorial theories - what is the intention of this statement?

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)
GLE: 5. Students can answer the question: How do matter and energy move through an ecosystem?

Agree: (no comment)
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 Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:...."

Evidence Outcome: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. (Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.)

Disagree: I don’t think this is as important as focusing on standard b below.
Agree: (no comment)
Comment: This seems like it belongs in a different standard... Cellular respiration and photosynthesis.
Agree: (no comment)
Disagree: (no comment)

Evidence Outcome: Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem)

Neutral: I fully support this standard, but it is crucial to connect this material explicitly to prior / concurrent learning about human activities and impacts on the environment that are due to altering cycles of matter. Specifically within this, the carbon cycle and climate change.

Agree: In the clarification statement, having two separate emphases is confusing- please combine (Emphases are...)
Agree: (no comment)
Neutral: I find "mathematical" and "evidence" to be vague and left to interpretation. I think this standard would be better if a baseline set of data were given that we could expand upon.

Evidence Outcome: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. (Clarification Statement: Examples of models could include simulations and mathematical models.)

Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Colorado Essential Skills and Science and Engineering Practices:

Agree: #1 Parenthetical statement needs a conjunction ('and' or 'or')
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do
Agree: (no comment)
Agree: I love using quantitative data, but I'm not sure what is meant by using mathematical representations. Just graphs? Some examples would be wonderful.

Cross Cutting Concepts:

Agree: The second use of the word "place" is unnecessary
Agree: (no comment)
Agree: (no comment)

Elaboration on the GLE:

Agree: #2: saying "Plants and algae form the lowest level of the food web" is incorrect in many cases. Producers may be the lowest level of a food (or trophic) pyramid, but webs are, by design, asymmetrical and there is not necessarily a set place for producers. This basic error is repeated throughout #2.
Agree: (no comment)
Agree: (no comment)

GLE: 6. Students can answer the question: What happens to ecosystems when the environment changes?

Agree: Very interesting framing for students
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:
(PG Feedback) Agree:

(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:..."

Evidence Outcome: Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. (Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.)

Agree: Understanding systems is a skill students will use often in their lives and knowing how to explain the how a change in an ecosystem might affect other changes is a large part of this.
Agree: Nicely written
Agree: (no comment)
Agree: (no comment)
Evidence Outcome: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.)

Agree: Human built environments will continue to be important as our youth grow up, its vital that they can reflect on how those interventions are impacting the ecosystems in which they are placed.

Agree: consider adding "intentional or unintentional" before "dissemination".

Agree: (no comment)

Agree: (no comment)

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore! I would encourage the language to include opportunities for students to plan the steps to implementing the solution.

Colorado Essential Skills and Science and Engineering Practices:

Disagree: This seems to be treading on political ground, so the wording is sensitive. I wholly support the teaching of accepted science, including anthropomorphic climate change, and I feel that the standards often need to be stronger in the defense of accepted scientific thought rather than arguments based on economic, religious or political reasoning. Leaving an opening to "Evaluate the claims, evidence, and reasoning behind currently accepted explanations" can result in many wasted hours of instruction wherein students are deluged with non-scientific arguments and poor reasoning in their science class. Please don't give boards (or educators) this opportunity. Stop the ridiculous practice of giving "equal time" between real science and poorly reasoned conspiracy theories based on false facts and outliers used to promote a religious or political agenda.

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Comment: Should Evolution be part of this?

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: #1- Well-worded and to the point, thank you #2-Changes in biodiversity are dynamic processes and speciation does not always increase biodiversity, but this is a bit nit-picky. Also, the word "enhancing" totally implies a human-centered value of natural resources (what is enhancing- more crops and livestock or more wild biodiversity?) and I’d recommend leaving it out. #3- likewise- all the values listed are for humans- consider including language of the value of natural and undisturbed ecosystems

Comment: At the end of listed item 3, please delete the period and add “, including the impact on the human rights of people in the affected area, and elsewhere in the world.”

Disagree: This emphasizes adverse effects of human activity on the environment and ecosystems. There needs to be a balance between positive and negative human effects.

Agree: (no comment)

Agree: (no comment)

GLE: 7. Students can answer the question: How do organisms interact in groups so as to benefit individuals?

Agree: (no comment)
Evidence Outcome: Evaluate evidence for the role of group behavior on individual and species’ chances to survive and reproduce. (Clarification Statement: Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.)

Agree: (no comment)
Agree: (no comment)
Agree: I really like this idea and how it can also tie in with population dynamics.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do
Agree: (no comment)
Agree: (no comment)

Cross Cutting Concepts:

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

Elaboration on the GLE:

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

GLE: 8. Students can answer the question: How are the characteristics of one generation related to the previous generation?

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

Disagree: Pretty low level question! Very content specific. This seems like a place to have something much more "meaty."

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

(PG Feedback) Agree:

(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:..."

Evidence Outcome: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. (Clarification Statement: Does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.)

Agree: (no comment)
Neutral: I'm curious to see how student's understanding will be affect by not knowing how meiosis works. The clarification statement sounds more like a boundary statement.
Agree: (no comment)
Disagree: This is far too vague and I fail to see the point in this.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do
Agree: (no comment)
Disagree: (no comment)

Cross Cutting Concepts:

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

Elaboration on the GLE:

Neutral: Not all cells contain chromosomes, i.e. mammalian red blood cells.
Agree: Not all cells have the same genetic content (i.e. mammalian red blood cells)
Agree: (no comment)
Agree: (no comment)

GLE: 9. Students can answer the question: Why do individuals of the same species vary in how they look, function, and behave?

Agree: (no comment)
Agree: Although I agree fully with the inclusion of this standard, I wonder if it is misplaced. This is essentially a genetics and gene expression standard for individual organisms and is included in the evolution umbrella instead of under genetics.
Agree: (no comment)
Agree: (no comment)
Agree: (no comment)
Disagree: #9 and 10 are repeats.

(PG Feedback) Agree:

(PG Feedback) Neutral: There are other, generally less powerful forces that drive evolution, e.g. genetic drift.
(PG Feedback) Agree:
(PG Feedback) Agree:

(PG Feedback) Agree:

(PG Feedback) Agree: Evolution is fundamental to understanding life. It is vitally important evolution is kept in standards across multiple grades.

(PG Feedback) Agree:

(PG Feedback) Comment: How are we defining this: "full range of science and engineering practices"? Will be helpful to have a clarification "such as:..."

Evidence Outcome: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. (Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.)

Agree: (no comment)

Agree: Are the steps of meiosis included? If not, this should be explained in a boundary statement.

Neutral: A "mutation" is a change in DNA. Thus all three of the processes noted are types of mutations.

Agree: (no comment)

Neutral: I feel that this is much bigger than is stated here. I feel that the process of transcription and translation are necessary in order to understand how mutations can occur as well as the meiosis section. Perhaps some clarification on whether or not transcription/translation is required here. As written, I'd teach it.

Evidence Outcome: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. (Clarification Statement: Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits.)

Agree: (no comment)

Neutral: Does this entail the explanation of expression of simple dominant and recessive traits? If not, where in the standards does this occur? If so, it needs to be more explicit.

Agree: (no comment)

Neutral: Is this Mendelian genetics for probability or are we talking more complicated?

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: In #2: I am unclear on what "(including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) " means exactly. If included, perhaps an example is in order here

Agree: These standards better prepare students for college and future careers, because they will give students a better understanding of what scientists and engineers do

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: #1 and #2 are exactly the same here- should there just be #1 alone, or is #2 misprinted?

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)
Online Feedback

Standard: 3. Earth and Space Science

PG: 11. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth’s surface processes interact.

Agree: This is a critical standard to ensure that students understand the interconnected nature of humans and the planet.

PG: 8. Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

Agree: (no comment)

GLE: 1. Students can answer the question: What is the universe and what goes on in stars?

Agree: I like the inclusion of this topic for today’s high schoolers in Colorado.

Neutral: The wording of this statement contributes to the misunderstanding that the universe is only what is outside of the Earth- consider revising.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: I feel the evidence outcome is more about what started the universe, not what it is. I would not be sure what answer I would be looking for. Instead of “what goes on in stars” maybe how do stars and formation of universe create elements.

Comment: "What is the universe and what goes on in stars?" I think it would be better to say, "How do scientists (or astronomers) define the universe..." Saying "what is the universe" is messy because that definition is arbitrary, sometimes even within the scientific field. It would be more correct to bound the term with a qualifier such as the one above because culturally, "the universe" means different things to different cultures.

Agree: (no comment)

Neutral: I am not certain whether the evidence outcomes for this particular expectation is realistic or important enough for college, career, or civic life to expect it of all students in CO.

Disagree: This too big. Also too vague

(PG Feedback) Comment: General Comment: We have so many earth science standards in Colorado. Is there a way to deleted or combine some of the standards? Earth Science is important, although the depth of some of the standards is pretty deep and it seem the district that do teach Earth Science teach it at 9th grade and the students hugely struggle across the board.

(PG Feedback) Agree:

(PG Feedback) Neutral: It would be nice if there was a specific list of "full range of science and engineering practices" to make sure we are meeting this expectation.

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.
Comment: It would be better to say "....explain natural phenomena...." Much of the natural world is outside of our ability to reason. We are not naturally equipped with a mindset that lets us think in particular scales or time frames. For instance it is nearly impossible to make sense or truly understand the sub-millimeter scale, or deep time. "Making sense" of these aspects is not important. What is important, is knowing that this information is REAL and how to use it. In other words, whether you can truly make sense of a topic or not doesn't matter. What is important is that you can explain it, and use that understanding to solve problems.

PG Feedback Agree:

PG Feedback Comment: Several items in the standards seem to be missing in this revision. These things I will expound upon below are critical to understanding how scientists knows what they know. I hope you will include them in the final version (there did not appear to be anywhere else in the document to place "general comments" such as these. 1. Investigations are the soul of learning science. Collecting data (making observations, collecting numerical data, researching credible sources of information, etc.), analyzing and interpreting the data, and drawing conclusions is "how" scientists know what they know. Investigations (or experiments) seem to be missing in this version of the standards and is not incorporated in the document until 6th and 7th grade (it was mentioned once in each grade level). 2. Climate, plate tectonics, and the universe are all abstract--you can't study climate without lots of data over millions of years; the theory of plate tectonics is put in motion by forces below the surface and this has been going on for 250 million years; and only the Moon, Sun, and a few planets are visible from Earth (so most of the universe is not observable). Students should be learning about weather, rocks and minerals, and the solar system in K-7 and climate, plate tectonics, and the universe and stars in 8-12th grades. Thanks for all your hard work. I was on the first team that wrote the standards in the early 1990's so I know how much work it takes. Focus grades K-5 on very concrete things such as weather (kids can collect temperature data, observe whether it is sunny or cloudy, determine the wind speed and direction, etc.); rocks and minerals which can be held in kids' hands and observed; and the solar system and Moon which objects can be observed on a daily basis. 3. By high school, science teachers want students to research various topics such as climate change. We want students to understand what a "credible" source of information is (not Facebook), and be able to analyze the data with what they already know about the subject. The current standards had statements such as "seek, evaluate, and use a variety of specialized resources"--this has been dropped from this version of the standards although it is extremely important for kids learning how to evaluate sources of information. I hope this will be put back in at the high school level (students are learning the science in K-8th grade so that they can research additional questions at the high school level). 4. Missing items that are important to understanding the Earth Sciences. - Minerals and rocks and their characteristics. Students only need to know the basics--about 20 common minerals and 10 common rocks. Rocks are visible all over Colorado and it would be useful for adults to know granite from sandstone! (Kids are curious about rocks and are constantly bringing them into the teacher in the lower elementary grades.) - The composition of Earth - crust, mantle, and core. These layers are important to understand how plate tectonics works and they align with how the Earth formed in the universe. 5. Although water does the most weathering and erosion on Earth, there appears to be too much focus on water when other items need to be learned. 6. Fossils as evidence of past life on Earth seems to be short-changed. Perhaps it is located in the life sciences. 7. I would also recommend that one person or a team of a couple people read over all the standards, expectations, outcomes, etc. so that they are written consistently. In some places, "Patterns" is listed; other places it is explained.

PG Feedback Comment: Please leave Earth Science courses in the HS. Eliminating this does not create well-rounded students.
Evidence Outcome: Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun’s core to release energy that eventually reaches Earth in the form of radiation. (Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun’s core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun’s radiation varies due to sudden solar flares (“space weather”), the 11-year sunspot cycle, and non-cyclic variations over centuries.) (Boundary Statement: Does not include details of the atomic and sub-atomic processes involved with the sun’s nuclear fusion.)

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: I like the details, very helpful.

Agree: (no comment)

Disagree: High school students should understand the atomic equations for fusion as they should know what atoms and molecules of elements are by now (haven’t reviewed the physical science standards).

Neutral: Sun is a proper noun and should be capitalized. Examples of evidence for the model include the electromagnetic radiation Earth receives. That is the key evidence for the amount of energy produced in the core of the Sun.

Evidence Outcome: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. (Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium)).

Agree: if "Big Bang" is capitalized, then "Big Bang Theory" should be as well. I believe it should be "evidence of astronomical light spectra" instead of "astronomical evidence of light spectra" - the stars are producing the light, not reviewing the evidence - also repeated in the clarification statement. Also, the final end parenthesis should be outside the period.

Comment: I think the wording "Big Bang Theory" makes some parents/students weary of the scientific consensus around the formation of the universe as we understand it based on scientific evidence.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: The standard should include the fact that the Big Bang predicts a beginning to the universe, and a beginning implies the existence of a "beginner" (designer). The fine-tuning of the universe for life should also be included.

Disagree: please understand that to teach this concept at the level you are asking requires at least 3 weeks. It is in this unit where I feel like I run out of time. Students do not even know the EM spectrum yet.

Comment: Its difficult for a student to rationalize that they need to explain something which no one has a REASON for. In other words, we do not have an explanation FOR the big bag, only that it has occurred. I would make this something more alone the lines of "Gather and synthesize astronomical evidence in an explanation on why scientists know the big bang occurred".

Agree: (no comment)

Agree: (no comment)
Evidence Outcome: Communicate scientific ideas about the way stars, over their life cycle, produce elements. (Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.) (Boundary Statement: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.)

Agree: Reword Clarification Statement: "Emphasis is on the way nucleosynthesis, and therefore the different elements created" to "Emphasis is on nucleosynthesis, and therefore the way different elements are created"

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: I love this.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: Under #4. "A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts" This should say "based on a body of evidence" or "empirical evidence" To use the word "facts" in a cross-cutting concept on the nature of science is ludicrous.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Elaboration on the GLE:

Agree: Very recent research has shown that much of the heaviest elements are created from massive collisions including the collision between two neutron starts reported on October 16, 2017. Perhaps this should be amended as new scientific research here.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Comment: Sun is a proper noun and should be capitalized.

GLE: 10. Students can answer the question: How do natural hazards affect individuals and societies?

Disagree: This standard have only one Evidence Outcome, which is the exact same as one in standard 11-9. Because it is the only evidence outcome for this standard, please consider combining with 11-9 or 11-11 as one overall standard.

Disagree: this is repeating what you just said above. Can we embed this in the above specific examples?

Agree: (no comment)

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

*PG Feedback* Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state's economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.

Evidence Outcome: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

*(Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.)*

Disagree: This standard have only one Evidence Outcome, which is the exact same as one in standard 11-9. It is redundant and does not need to be repeated. Because it is the only evidence outcome for this standard, please consider combining with 11-9 or 11-11 as one overall standard.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: The EO is clearly stated and provides sufficient specificity to make clear what student performance is expected, without prescribing teacher behaviors or curriculum choice. The clarification text elucidates the level of rigor that is expected and includes ideas that are complex, developmentally appropriate for high school. Because the Colorado economy is very dependent on our state's natural resources and climate - through agriculture and tourism - it is important that students attain these understandings to support both good citizenship and good opportunities for jobs and new business innovations.

Colorado Essential Skills and Science and Engineering Practices:

Disagree: Please consider combining with 11-9 or 11-11 as one overall standard.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Disagree: Please consider combining with 11-9 or 11-11 as one overall standard.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Elaboration on the GLE:

Disagree: Please consider combining with 11-9 or 11-11 as one overall standard.
Disagree: This is not the core science ideas that students should focus on around natural hazards. Perhaps something like: natural hazards occur in predictable patterns/locations on Earth’s surface based on Earth’s systems and human populations are affected in different ways based on the extent of the a degree of the hazard and the vulnerability and preparedness of the human population affected.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

**GLE: 11. Students can answer the question: How do humans change the planet?**

Agree: Extremely relevant and interesting for students

Agree: (no comment)

Agree: (no comment)

Disagree: I like the standard but hate the wording of this. Can we use the words cause and effect in the question.

Agree: (no comment)

Agree: This is extremely important for students to learn about within our ever changing society on a dynamic earth!

Agree: The GLE identifies a core concept of disciplinary literacy in Earth science that can be rigorously answered with scientific evidence. The question that students are to answer is clearly stated and supports educational opportunities to explore in depth in a variety of domains, thus also providing breadth. The GLE is specific enough to be clear to educators but does not prescribe how the content should be presented or taught. Humans’ impact on the planet is a central issue that students now being educated must grapple with as citizens, workers and innovators.

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth’s surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state’s economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.
Evidence Outcome: Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity. (Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.) (Boundary Statement: Computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.)

Agree: Big data and computational thinking are essential tools of science today to help us evaluate the impacts human beings are having on the planet, and also to weigh alternatives for designing solutions to problem. Students need these skills, too, for computer science.

Agree: (no comment)

Agree: (no comment)

Disagree: they create a computer model??? While I discuss this topic, I am not sure where you are going with this?

Agree: (no comment)

Evidence Outcome: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. (Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoengineering design solutions (such as altering global temperatures by making large changes to the atmosphere or ocean).)

Agree: Science plays an important role in designing solutions that can minimize negative effects of human activity on the planet, including the climate. This is students’ chance to learn the science behind different proposed solutions and to use science practices to evaluate those solutions. We must not take that away from them.

Agree: (no comment)

Agree: LOVE, Solving environmental issues is the PERFECT place for STEM.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Agree: (no comment)

GLE: 12. Students can answer the question: How do people model and predict the effects of human activities on Earth’s climate?

Agree: Exactly the right topic for high schoolers.

Agree: These standards give really good detail as to what’s expected of students, because what students are expected to know is blended with science and engineering practices

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

Agree: This is extremely important for students to learn. They must be current with how earth is changing and our affect on it. Understanding the many different factors of climate change, such as how models can help us understand the rate at which climate change is occurring, or the increase of extreme weather events, this will be vital to their future understanding and problem solving as the next generation of scientists.

Agree: The GLE identifies a core concept of disciplinary literacy in Earth science that can be rigorously answered with scientific evidence. The question for students is clearly stated and supports educational opportunities to explore in depth and use a variety of science and engineering practices, with specificity to guide educators but without prescription of their methods. Humans' impact on climate will have profound and unmistakable educational, career and civic relevance for young people being educated today. Colorado youth must be equipped with the rigorous knowledge needed to make personal and collective decisions about climate and its human impact.

Agree: (no comment)

Agree: Thank you for including language regarding Climate Change and human activities in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

(PG Feedback) Agree: This is a critical standard. It is imperative that students understand the impact of human activity on the earth.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state's economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.

Evidence Outcome: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems. (Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).) (Boundary Statement: Limited to one example of a climate change and its associated impacts.)

Agree: Students need experience in making sense of climate models. Especially since skeptics call into question some of these models, they need to know the evidence behind them.

Agree: (no comment)

Agree: Students should be able to use data and models to explain how these models work and to be able to discuss and interact with others about the models that make future predictions.

Agree: (no comment)

Comment: Let’s make sure this standard emphasizes on the human role in producing greenhouse gasses that contribute to climate change
Disagree: It should be noted that climate models can vary widely on their predictions, depending on the data inputed and the assumptions made. Such models are often used to predict dire consequences from global warming. This subject requires objective coverage of the tentative nature of climate predictions.

Agree: students have not been exposed to this content yet.

Agree: (no comment)

Agree: The EO is scientifically rigorous, clearly stated, and represents a core concept of disciplinary literacy. In achieving this EO students will address complex concepts and apply science practices at a developmentally appropriate level to achieve coherence across the grade levels. The modeling required to achieve the EO is evidence-based and highly relevant to students' educational, career and civic futures. The clarification statement and boundary statement provide helpful information to educators that makes the standard accessible and clear without being prescriptive.

Agree: This expectation is important for 21st century civic life because it will prepare students to participate in the public debate about how to manage and respond to human-caused climate change. But it is also essential for college and career because modeling dynamic systems will be increasingly important in the 21st century.

Agree: Thank you for including language regarding Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

Evidence Outcome: Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.) (Boundary Statement: Does not include running computational representations but is limited to using the published results of scientific computational models.)

Agree: Again, students need to be exposed to the arguments behind the science of climate change. If the scientific community is near complete consensus on the reality of climate change and its causes, then what is the basis for that? Only with exposure to the arguments in depth can students evaluate for themselves whether they agree with the scientific consensus.

Agree: (no comment)

Agree: This is important for youth to understand and be able to explain.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: The EO is scientifically rigorous, clearly stated, and represents a core concept of disciplinary literacy. In achieving this EO students will address complex concepts and apply science practices at a developmentally appropriate level to achieve coherence across the grade levels. Students will think rigorously and deeply in developing the representation required by the EO; they will use existing evidence and scientific practices to address a topic that is very relevant to their educational, career and civic futures. The clarification statement and boundary statement assist educators by making the standard accessible and clear without being prescriptive.

Agree: Thank you for including language regarding Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Agree: in #4, use "scientific" instead of "science"

Agree: (no comment)
Cross Cutting Concepts:

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

Elaboration on the GLE:

Agree: These standards are better aligned to national and international benchmarks than the old Colorado standards. They help us catch up to where many states have already gone
Agree: (no comment)
Agree: (no comment)

GLE: 2. Students can answer the question: What are the predictable patterns caused by Earth's movement in the solar system?

Agree: (no comment)
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.
Disagree: I think it is important to talk about formation of the solar system when we talk about stars and supernovas, but this only focuses on their motion. Are you looking for them to solve an equation??
Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree: Why are these all on top, the organization is confusing at first?

(PG Feedback) Agree:

Evidence Outcome: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. (Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.) (Boundary Statement: Mathematical representations for the gravitational attraction of bodies and Kepler’s Laws of orbital motions should not deal with more than two bodies, nor involve calculus.)

Agree: Good clarification
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.
Agree: (no comment)
Neutral: I am not certain that it is realistic for high school students to be able to express orbits mathematically without using calculus. Nor am I convinced that this expectation is important enough for college, career, or citizenship to be included.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.
Agree: (no comment)
Cross Cutting Concepts:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

GLE: 3. Students can answer the question: How do people reconstruct and date events in Earth’s planetary history?

Agree: I think this is a critical topic for high schoolers.

Agree: (no comment)

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: I like how you tied plate tectonics to understanding what is driving it and why that matters when we date events.

Comment: If possible I would add another learning outcome. Specifically, using evidence of earth processes today to explain things in the past (uniformitarianism). In other words, examine the rock record today to explain what was happening at that location in the past. For example, fossil coral demonstrates that an area used to be a warm shallow ocean. The concept of using evidence to reconstruct the past is a MAJOR aspect of the earth sciences and it is largely missing in these outcomes. Or perhaps I am not seeing it?

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

Evidence Outcome: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. (Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal rocks. Examples include evidence of the ages oceanic crust increasing with distance from mid-ocean ridges (a result of plate spreading) and the ages of North American continental crust decreasing with distance away from a central ancient core of the continental plate (a result of past plate interactions).)

Agree: Reword "evidence of the ages oceanic crust increasing with distance" to "evidence of the oceanic crust age increasing with distance" or at least "evidence of the ages of oceanic crust increasing with distance"
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Disagree: While plate tectonics helps explain the age of oceanic plates, it does little to explain the age of continental plates (which do not subduct under other plates). Many Earth processes help recycle continental crust materials (e.g., chemical and physical weathering, erosion, etc.)

Agree: (no comment)

Neutral: I am not convinced that explaining the age of crustal rocks is the most important use of this understanding.

Evidence Outcome: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. (Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.)

Agree: Can a boundary statement be added to state what students are expected to know about the process and calculations involved with radiometric dating? Are they expected to perform exponential graphing of radiometric decay, or just understand the concept of half lives?

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Comment: Should this be with stars??

Agree: I just want to say I really like this learning outcome! Cheers!

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: This is another area where religious arguments might be made to dispute scientific theory, particularly about the age and beginning of the Earth. Please keep the standards strong and keep non-scientific beliefs and 'theories' out of the science classroom.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: under #3. "A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts" Should say "body of evidence" or "empirical evidence." We don't use the "facts" word in science.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Neutral: This might just be picky. By for # 2 here. "much of science deals with USING EVIDENCE to construct....."

Agree: (no comment)
Elaboration on the GLE:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: Solid!

Agree: (no comment)

GLE: 4. Students can answer the question: How do Earth’s major systems interact?

Agree: Another essential topic for high schoolers.

Agree: Thank you for correctly capitalizing "Earth".

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Comment: Like the content but this question is soooo vague. Maybe break it down into parts.

Neutral: By Earth systems do you mean earth processes? Or do you mean the interaction of Earth’s spheres? E.g., Biosphere, Atmosphere, Geosphere, hydrosphere.

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Comment: From what I understand, geographic information systems and remote-sensing as viable technologies are in danger of being cut from standards. These tools are critical for fostering critical and spatial thinking and they need to be preserved in the standards.

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

Evidence Outcome: Develop a model to illustrate how Earth’s internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. (Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).) (Boundary Statement: Does not include memorization of the details of the formation of specific geographic features of Earth’s surface.)

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

Agree: I think that understanding the processes that shape the earth’s surface is critically important for citizens of the modern world.
Evidence Outcome: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. (Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.)

Agree: I question the wide acceptance and use of the term "geoscience" in general, but at least in this specific usage, shouldn't it be "geoscientific" as the adjective? Also, considering the wide audience, it might behoove the state to use "Feedback forces" or "feedback systems" rather than "feedbacks".

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: Anthropogenic global warming is an unproven hypothesis and should be identified as such. The major contributor to global warming/cooling cycles is the periodic variation in solar radiation. There is debate about the contribution of greenhouse gases to warming and whether human intervention can significantly reduce warming.

Comment: Maybe put this with climate. While discussing the ice melting is important, the ocean's changes need to be specifically addressed.

Agree: Solid learning outcome.

Agree: (no comment)

Agree: This standard is critically important for understanding human impacts.

Evidence Outcome: Develop a model based on evidence of Earth’s interior to describe the cycling of matter by thermal convection. (Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth’s three-dimensional structure obtained from seismic waves, records of the rate of change of Earth’s magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth’s layers from high-pressure laboratory experiments.)

Agree: Considering the audience for these standards, I would recommend reconsidering the use of "one-dimensional" and "two dimensional modeling" in this instance. While these terms make sense in terms of geologic flow modeling, they are apt to cause confusion, and I absolutely would not assume that all high school teachers responsible for imparting these standards are familiar with these terms.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: love

Agree: (no comment)
Evidence Outcome: Use a model to describe how variations in the flow of energy into and out of Earth’s systems result in changes in climate. (Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth’s orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.) [Boundary Statement: Results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.)

Agree: The big ideas in earth science, like changes in earth system interactions, are important for youth to engage in discussions relevant to their lives today and are vital for youth to learn as they consider their future lives and careers.

Agree: Good that this is kept at the high school level- also seems to overlap with life science standard about impact of human action on biodiversity

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: I love how you broke it down into time scales.

Agree: (no comment)

Agree: This expectation is critically important for 21st century citizenship where the debate about how to respond to human impacts on the climate is going to continue to be important.

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

GLE: 5. Students can answer the question: Why do the continents move, and what causes earthquakes and volcanoes?

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)
Neutral: If you are going to use plate tectonics to explain those two phenomenon you should also include "the location of major mountain ranges." The biggest mysteries in geology before the paradigm shift to plate tectonics was the explanation of mountains and mountain ranges. This should be included in this grade level explanation.

Agree: (no comment)

Agree: (no comment)

Disagree: add "..... Earth's continents......"

Disagree: This is too specific Continents do not move, plates do. The question could be a stand alone standard

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

Evidence Outcome: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. (Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).) (Boundary Statement: Does not include memorization of the details of the formation of specific geographic features of Earth's surface.)

Agree: (no comment)

Comment: Why are these duplicated above?

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: You have repeated this evidence outcome, why not just keep it here but only focus on volcanic and put the rest with surface processes?

Agree: (no comment)

Evidence Outcome: Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. (Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments)

Agree: Considering the audience for these standards, I would recommend reconsidering the use of "one-" and "two dimensional modeling" in this instance. While these terms make sense in terms of geologic flow modeling, they are apt to cause confusion, and I absolutely would not assume that all high school teachers responsible for imparting these standards are familiar with these terms.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: Wasn't this in the one above, why are we repeating it. Love the content, organization is confusing.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Agree: (no comment)
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

GLE: 6. Students can answer the question: How do the properties and movements of water shape Earth's surface and affects its systems?

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

Evidence Outcome: Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).)

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

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

**Colorado Essential Skills and Science and Engineering Practices:**

Agree: (no comment)

**Comment:** I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

**Cross Cutting Concepts:**

Agree: (no comment)

**Comment:** I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

**Elaboration on the GLE:**

Agree: (no comment)

**Comment:** I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: This is great!

Agree: (no comment)

**GLE: 7. Students can answer the question: What regulates weather and climate?**

Agree: Learning about climate is so important for students to be able make a difference in their world.

Agree: (no comment)

Agree: (no comment)

**Comment:** I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) **Comment:** I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:
Evidence Outcome: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. (Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.)

Agree: Developing models of processes and feedback mechanisms on Earth are important for youth to engage in evidence used to understand and make decisions about energy use in the world today.

Disagree: This exact same Evidence Outcome is listed in standard 10-4 above. It looks like the effects of water can be fully covered in that standard, why is it repeated here?

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: Should include something on the effect of man made changes to greenhouse gasses.

Disagree: Anthropogenic global warming is an unproven hypothesis and should be identified as such. The major contributor to global warming/cooling cycles is the periodic variation in solar radiation. There is debate about the contribution of greenhouse gases to warming and whether human intervention can significantly reduce warming.

Agree: Please add ocean changes (acidification, warming, thermal expansion, etc) The oceans are getting forgotten in the climate discussion.

Agree: (no comment)

Disagree: The student should understand the basic science of various cycles on earth and the radiation and heat coming from the sun. This science is supported by validated theories. The student should separate out those climate models, from the basic science, which are not validated theories of man made global warming. The student should separately evaluate the predictive power of model and its track record for accurate predictions. The student should separate out those economic models from the basic science. Rational - Many previous predictions don’t pass the "Laugh Test." Solar activity is declining—what to expect? August 17, 2015 by Tomasz Nowakowski https://phys.org/news/2015-08-solar-decliningwhat.html 20 New Science Papers Find Climate is Driven by Solar Changes Published on April 28, 2017 http://principia-scientific.org/20-new-science-papers-find-climate-driven-solar-changes/ How many previous predictions have not passed the "Laugh Test?" http://dailysignal.com/2017/04/26/heres-how-wrong-past-environmental-predictions-have-been/?utm_source=TDS_Email&utm_medium=email&utm_campaign=MorningBell&mkt_tok=eylPjoITURBMIWpUaGxafVprTkjDJNSILnQIOUkcvYJSkk4UTh2dENvVEdOT-mdQTHBmjhQ3NVQIRZyjVT0xHeEY4eUJhY1RjUG1w The

Agree: Thank you for including language regarding Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

Evidence Outcome: Use a model to describe how variations in the flow of energy into and out of Earth’s systems result in changes in climate. (Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth’s orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.) (Boundary Statement: Results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.)

Agree: The big ideas in earth science are important for youth to engage in discussions relevant to their lives today and are vital for youth to learn as they consider their future lives and careers.
Disagree: This exact same Evidence Outcome is listed in standard 10 - 4 above. It looks like the effects of water can be fully covered in that standard, why is it repeated here?

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

Agree: Thank you for including language regarding Climate Change in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

Evidence Outcome: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.)

Agree: Humans are a key part on the systems on Earth and necessary to include for accurate understanding of how the Earth systems function.

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: Love but reword so that the ocean as a carbon sink and its role in creating sedimentary rocks is included. Kids come from biology thinking photosynthesis/respiration is all there is to the carbon cycle.

Agree: Very solid!

Agree: (no comment)

Neutral: While it is important that students be able to construct a model of carbon cycling, I'm not convinced that it is essential that students be able to create a "quantitative" model of carbon cycling. A qualitative model would be sufficient.

Agree: Thank you for including language regarding human impact in the Colorado Academic Standards. This is an important science understanding for students to have mastered.

Evidence Outcome: Construct an argument based on evidence about the simultaneous coevolution of Earth’s systems and life on Earth. (Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth’s other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth’s surface. Examples include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.) [Boundary Statement: Does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth’s other systems.)

Agree: System interactions and feedback mechanisms are things that youth interact with constantly in their lives. This standard is important for seeing the big picture of change over time.

Agree: Consider using "feedback systems" rather than "feedbacks" and "geoscientific" as the proper adjective for the factors. Also, I'd recommend saying these factors "influence" rather than "control" the process of evolution. Considering that coevolution has been removed as a requirement in the life science standards and this is a fairly obscure term, consider using "simultaneously evolved" instead- I realize this removes part of the 'give and take' implication of the term, but it might be better understood by the larger audience. Either way, the term "instantaneous coevolution" is excessively redundant. Finally, the brackets near the end should be parentheses.
Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Disagree: The standard assumes that life evolved via materialistic processes; this may or may not be true. The standard employs methodological naturalism, an assumption that needs to be adequately explained. The possibility of teleological causation in the history of the earth and life should be considered.

Agree: Love the marriage between biology and earth science. You could include the Paleozoic mass extinction due to rapid climate change as an example.

Agree: (no comment)

Agree: I think it is critically important that students have the robust understanding of the bi-directional influence of the natural environment and living systems that this expectation calls for.

Colorado Essential Skills and Science and Engineering Practices:

Agree: This an an area where political and economic arguments may attempt to insert themselves in the science classroom. It is good to know the counter arguments and reasons, but do not require 'equal time' or that non-scientific reasoning take up a major part of the curriculum. Please keep the science standards strong and focused on the real scientific process.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Agree: (no comment)

Elaboration on the GLE:

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: (no comment)

Agree: (no comment)

Agree: Very interesting exploration of evolution. Appropriate for high schoolers.
Disagree: This standard have only one Evidence Outcome, which is the exact same as one in standard 10-7. Because it is the only evidence outcome for this standard, consider combining it with 10-7 as one overall standard.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: Couldn’t it be the other way around too? How does earth science affect biology. Wasn’t this an example above?

Agree: (no comment)

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

Evidence Outcome: Construct an argument based on evidence about the simultaneous coevolution of Earth’s systems and life on Earth. (Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth’s other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth’s surface. Examples include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.) (Boundary Statement: Does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth’s other systems.)

Agree: (no comment)

Disagree: This is the exact same Evidence Outcome as 10-7. Because it is the only evidence outcome for this standard, consider combining with 10-7 as one overall standard.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Neutral: Why is this in two standards?

Comment: The standard assumes that life evolved via materialistic processes; this may or may not be true. The standard employs methodological naturalism, an assumption that needs to be adequately explained. The possibility of teleological causation in the history of the earth and life should be considered.

Agree: (no comment)

Colorado Essential Skills and Science and Engineering Practices:

Disagree: consider combining with standard 10-7

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Disagree: consider combining with standard 10-7

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.
Agree: (no comment)

Elaboration on the GLE:

Disagree: consider combining with standard 10-7, and either use "coevolution" or "co-evolution", not both as seen in different parts of this standard, although I'd actually recommend neither as this term has been removed from the Life Science Standards.

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

GLE: 9. Students can answer the question: How do humans depend on Earth's resources?

Agree: Great topic.

Agree: (no comment)

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Agree: This is a crucial element of disciplinary literacy in addressing the basis of human survival and human economies on natural resources. The phrasing here permits varied use of the science and engineering practices to explore the question and develop the idea in depth and with breadth across different types of resources.

Agree: This is a critically important expectation to be prepared for civic life in the 21st century.

Agree: Thank you for including language around human and environment interactions. This is an important concept for students to explore!

(PG Feedback) Agree:

(PG Feedback) Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

(PG Feedback) Agree:

(PG Feedback) Agree: This PGS is an important idea for disciplinary literacy for young people growing up in the 21st century to understand. Understanding how human activities interact with processes at and near Earth's surface is essential for students - our future citizens and leaders - to make wise decisions about using and conserving natural resources, providing energy to support our homes, businesses and transportation, responding to natural disasters and environmental hazards, and protecting the quality of water, food and air that we consume. Our state's economy, and the job prospects for Colorado graduates, are highly dependent on these resources in domains such as tourism, agriculture, mines and forests. As stated here, the PGS supports the grade-level standards which provide specificity, depth and breadth that are developmentally appropriate, allowing for the Earth and space science standards as a whole to be conceptually coherent.
Evidence Outcome: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. (Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.)

Agree: Our resources come from the Earth and students benefit from access to those resources daily. It's important for them to be able to explain their connection to the Earth.

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Disagree: I would reword. I love the idea of earth as a system and our mining practices change many things in the system, ex: water pollution but I have always struggled with the natural disaster portion. Yup, tsunami's kill people, where am I to go with this at the high school level??

Agree: (no comment)

Agree: The EO is clearly stated and provides sufficient specificity to make clear what student performance is expected, without prescribing teacher behaviors or curriculum choice. The clarification text elucidates the level of rigor that is expected. Because the Colorado economy is very dependent on our state’s natural resources and climate - through agriculture and tourism - it is important that students attain these understandings to support both good citizenship and good opportunities for jobs and new business innovations.

Agree: This expectation is particularly relevant to Colorado where the economy, quality of life, and conservation of the environment depends so much on the use and management of natural resources.

Disagree: Removed Language: Create a plan to reduce environmental impacts due to resource consumption There are few opportunities within the standards for students to create plans. This is a critical part of Colorado’s Essential Skills, particularly Entrepreneurial Skills/Critical Thinking/Problem Solving. The standards throughout have a strong focus on designing solutions, but there needs to be opportunities to identify the steps it would take to enact those solutions. This also relates to personal skills (initiative/self direction and personal responsibility). Personal responsibility could be emphasized more directly in science.

Evidence Outcome: Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. (Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen)

Agree: This is an absolutely critical standard for students to master. They need to be able to marshal scientific evidence to support claims related to how best to address trade-offs involved in extracting resources from Earth, in terms of long-term survival of people that accounts for different factors involved.

Agree: Problem solving and engineering are great ways to promote resilience and understanding of how to address problems in our world.

Comment: At end of first sentence, please change wording to “cost-benefit ratios that take into consideration, among other things, the human rights implications, both in the United States and the rest of the world, of the competing design solutions.”

Agree: "Science knowledge" should be "scientific knowledge" and needs a period at the end for consistency with rest of standards.
Online Feedback

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: yes yes, please keep this standard. So important for students to see both sides of this argument in this state. Do you dare list fracking as a specific example?

Agree: (no comment)

Agree: The EO is clearly stated and provides sufficient specificity to make clear what student performance is expected, without prescribing teacher behaviors or curriculum choice. The EO provides a needed opportunity to apply and develop engineering processes in considering different designs, as engineering processes are otherwise under-emphasized in these standards.

Agree: This is a critically important expectation for Colorado.

Colorado Essential Skills and Science and Engineering Practices:

Comment: At the end of listed item 2, please change wording to “(e.g., economic, societal, environmental, human rights, and ethical considerations).”

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Cross Cutting Concepts:

Comment: Please add sentence to end of listed item 2: “Because scientists are also humans, they must nevertheless consider the human rights implications of their work.”

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)

Elaboration on the GLE:

Comment: Please change wording to “associated economic, social, environmental, human rights, and geopolitical costs and risks as well as benefits.”

Agree: (no comment)

Comment: I would like to see the NGSS coding and more specific grade levels than just 9-12. In addition, I think it is important to clearly explain what students should be able to do (explain, interpret, analyze mathematically, summarize, etc.) for each of the standards.

Agree: (no comment)