The Next Frontier: MTSS for Math

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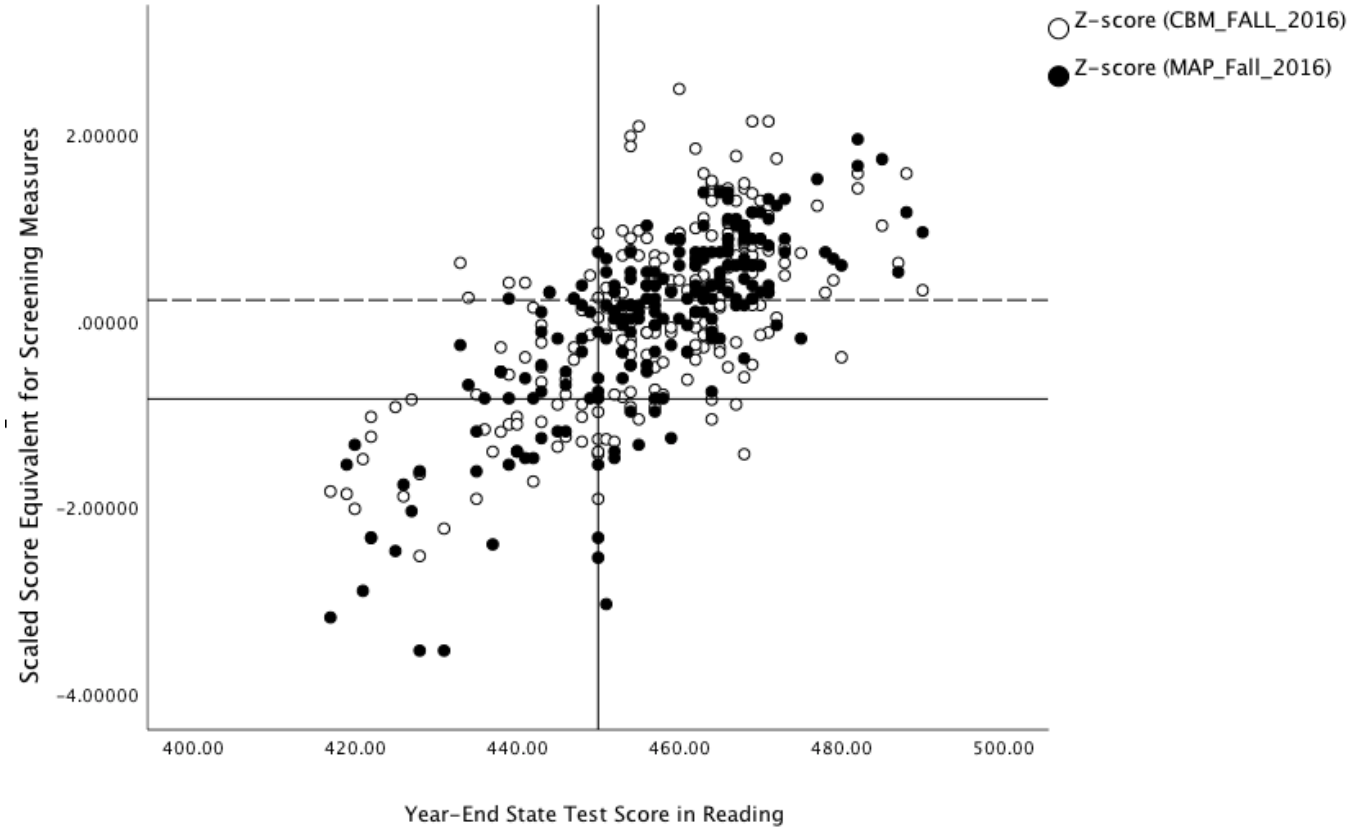
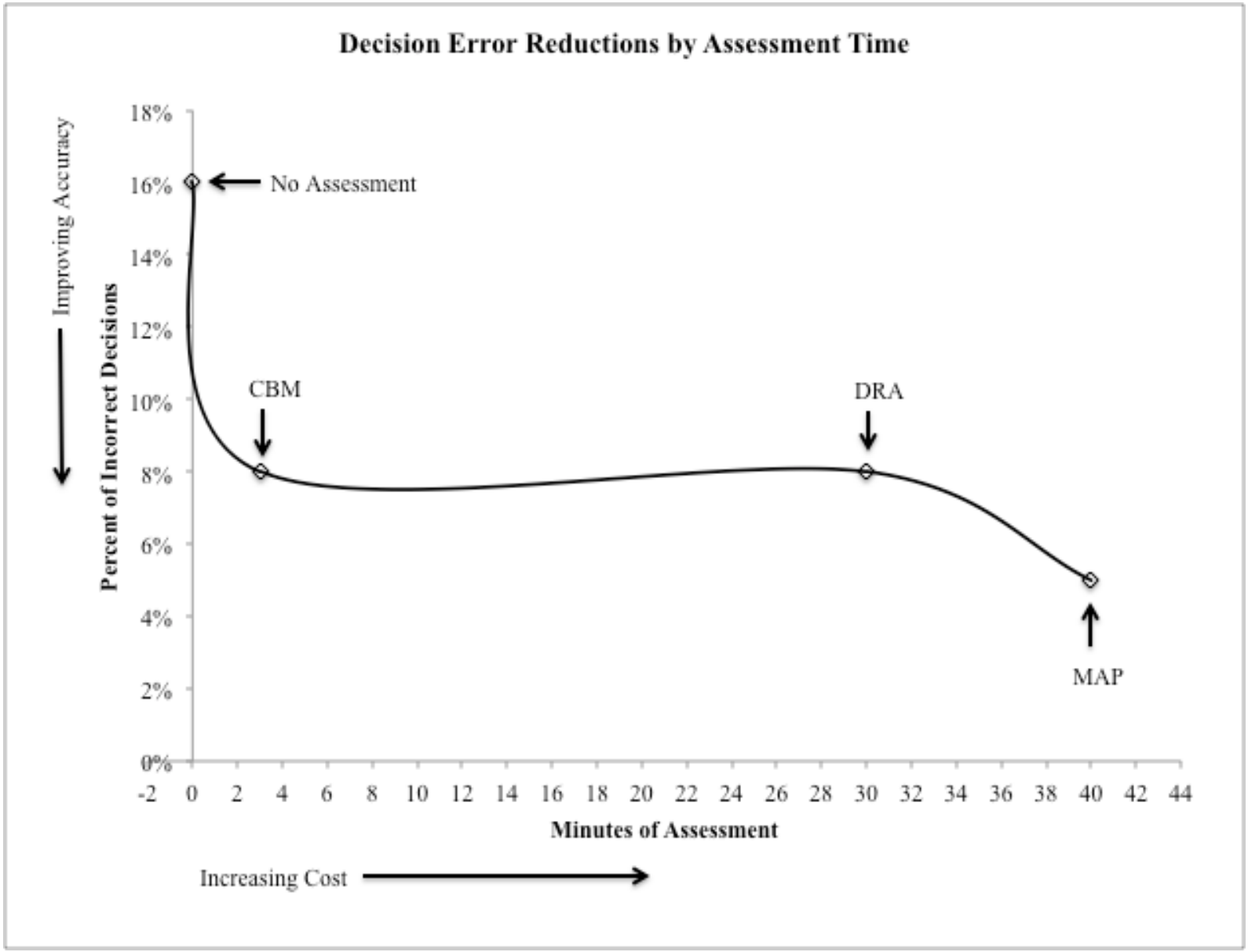
Step 2: Effective Screening

Concurrent Correlated Measures Do Not Increase Accuracy of Risk Decision



Avoid Over-Assessment

All Assessments Come at a Cost



Avoid Over-Assessment

In Math Screening Specifically

The preceding year-end test score is not bad to determine fall risk status

Single-skill computation measures work very well

Single-skill computation probes tend to be more sensitive than other measures.

But teachers tend to like measures that look like their instruction (reflect the full breadth of their instructional objectives)

Intervention trials make screening more accurate (because changes the base rate or prevalence of failure).

Big Ideas in Math Assessment

	Grades
	K 1 2 3 4 5 6 7 8
Combining Rational Numbers and Variables	
Taking Rational Numbers and Variables	
Quantity Comparison, Ordinal Position, Place Value	
Multiplicative Reasoning	
Proportional Reasoning	
Solving for Unknowns	
Creating Equivalent Quantities	

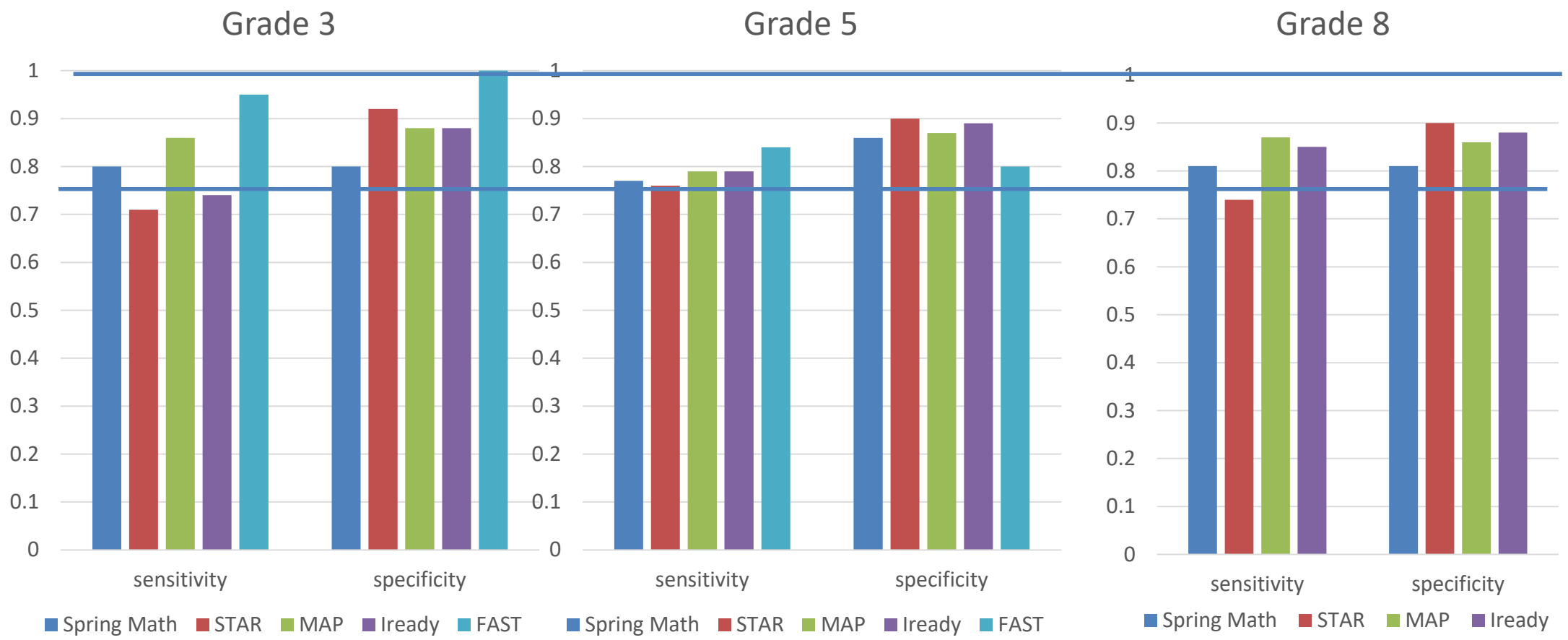
	Screening Fall	Screening Winter	Screening Spring
Kindergarten	• Counting Objects to 10, Circle Answer • Identify Number, Draw Circles to 10 • Quantity Comparison with Dots to 10 • Missing Number 0-10	• Count Objects, Write Number to 20 • Identify Number, Draw Circles • Quantity Comparison with Dots to 20 • Missing Number 0-20	• Change Quantity with Dots to 10 • Missing Number 0-20 • Sums to 5 Kinder • Subtraction 0-5 Kinder
1st Grade	• Sums to 6 • Subtraction 0-5 • Quantity Comparison 20-99	• Sums to 12 • Subtraction 0-5 • Fact Families Addition & Subtraction 0-5 • Quantity Comparison 101-999	• Sums to 20 • Subtraction 0-20 • Fact Families Addition & Subtraction 0-9
2nd Grade	• Sums to 20 • Subtraction 0-20 • Fact Families Addition & Subtraction 0-20 • Quantity Comparison 1001-9999	• 2-dig add without regrouping • 2-dig sub without regrouping • Quantity Comparison Sums/Differences to 20	• 2-digit Addition with regrouping • 2-digit Subtraction with regrouping • Create equivalent Addition & Subtraction Problems (using place value & decomposition) • Create equivalent Addition & Subtraction problems (Using Associative Property & Near Easy)
3rd Grade	• Fact Families +/- 0-20 • 3-dig add with & without regrouping • 3-dig sub with & without regrouping	• Multiplication 0-9 • Division 0-9 • Fact Families Multiplication & Division 0-9	• Multiply 1 by 2-3 digit without Regrouping • Divide 1-digit into 2-3 digit without remainders • Quantity Comparison fractions with Like Denominators • Place Fractions on Number Line (2, 4, 8)

Screening Measures Used in Spring Math

4th Grade	• Fact Families Multiply/Divide 0-12 • Multiply 1 by 2-3 with & without regrouping • Place Fractions on Number Line (2, 3, 4, 5, 6, 8, 10) • Quantity Comparison Decimals to Hundredths	• Multiply 2 x 2 with & without regrouping • Add & Subtract Mixed Numbers with Like Denominators & Regrouping • Quantity Comparison for Fractions with Unlike Denominators	• Add & Subtract with Decimals to Hundredths • Convert Decimals to Fractions & Fractions to Decimals • Quantity Comparison fractions, decimals, whole numbers • Create Equivalent Multiplication Problems by Factoring
5th Grade	• Fact Families Mult/Div 0-12 • Add & Sub Decimals to 100ths • Multiply 2 x 2 with and without Regrouping • Find Least Common Denominator	• Convert Improper Fractions to Mixed Numbers • Add & Subtract Fractions with Unlike Denominators • Quantity Comparison fractions, decimals, whole numbers	• Simplify Fractions • Multiply & Divide Decimals • Multiply & Divide Proper & Improper Fractions • Quantity Comparison with whole numbers, fractions, decimals, percents
6th Grade	• Add & Subtract Fractions with Unlike Denominators • Convert Improper Fractions to Mixed Numbers • Order of Operations	• Multiply & Divide Mixed Numbers • Multiply 2 x 2 with decimals • Distributive Property of Expression	• Mixed Fraction Operations • Substitute Whole Number to Solve Equations • Mixed Decimal Operations • Collect Like Terms
7th Grade	• Solve Algebraic Proportions • Solve Missing Value in a Percentage Problem • Mixed Operations Integers	• Order of Operations • Inverse Operations with Addition & Subtraction • Inverse Operations with Multiplication & Division	• Solve 2-step Equations • Translate Verbal Expressions into Math Equations • Solve 2-step Equations with Fractions
8th Grade	• Order of Operations • Distributive Property to Simplify Expressions • Collect Like Terms to Simplify Expressions	• Mixed Operations with Exponents • Simplify Expressions • Solve for Slope & Intercept using Linear Function	• Linear Combinations to Solve Equations • Substitute Equation to Solve Linear Equations • Comparison Method to Solve Linear Equations

Screening Measures Used in Spring Math

Screening Accuracy Must Be Strong



Teacher: _____

Grade: _____

Student: _____

Count Objects 1-20, Circle Answer

Date: 11/10/2016 (version: e210)

Say, "Let's do the first problem together. How many dots do we have? Let's count and see. [Count the dots in the first problem]. How many? That's right, we have [say number] of dots. Your job is to find that number over here and circle that number. When I tell you to begin, try to work as many as you can before the time is up. Be sure to count silently, inside your head." Set timer for one minute. Say, "Ready? Begin." After the timer sounds, say, "Stop. Hold your paper up in the air so I can pick it up."

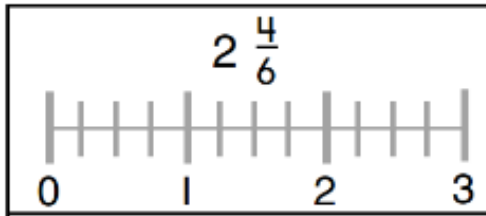
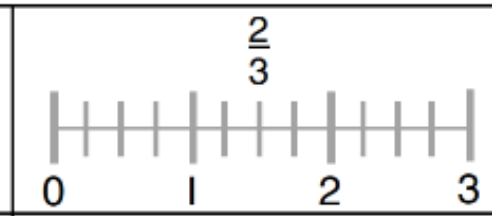
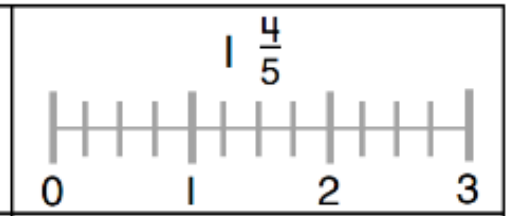
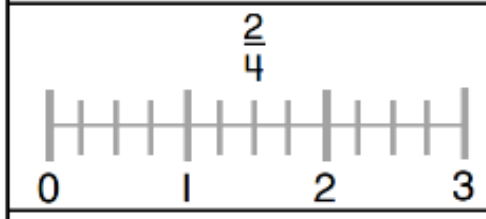
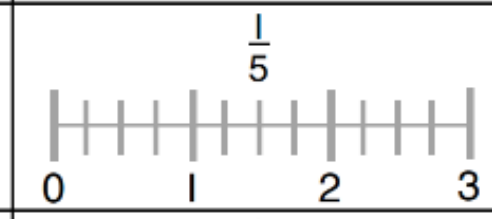
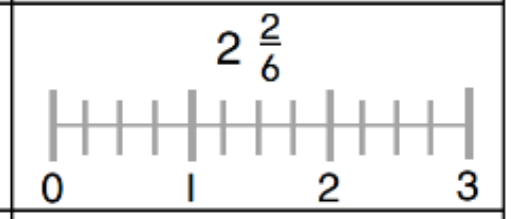
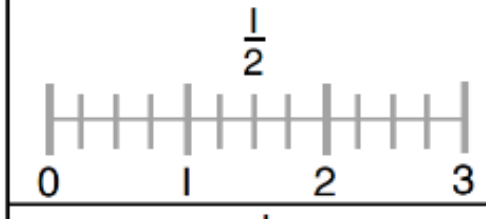
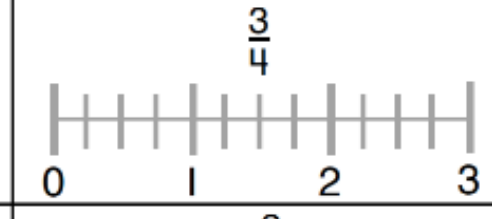
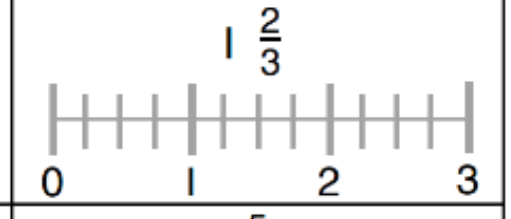
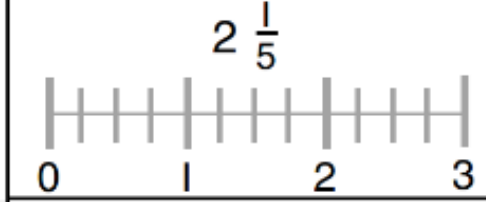
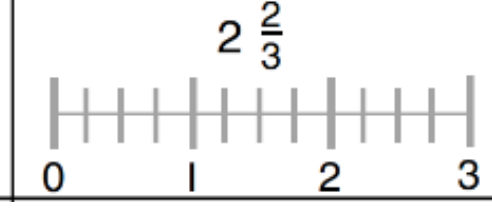
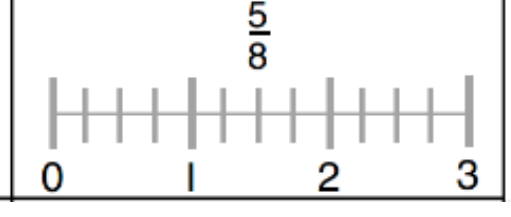
	11 13 5 4
Click to add text	7 10 6 21
	4 9 18 13
	11 10 1 14
	1 7 4 11

Teacher: _____
Grade: _____
Student: _____

Place Fractions on Number Line (denominators: 1,2,3,4,5,6,8,10)

Date: 11/10/2016 (version: d985)

For these problems, you will locate and mark the fraction quantity on the number line. This number line begins at 0 and ends at 3. Mark the quantity with a dot. Let's do the first one together." Work the first problem to verify student understanding. "When I say begin, start with the second problem on the first row and work across. Don't skip any problems. Work as many problems as you can before the time is up. Do you have any questions?" Set timer for 2 minutes, start timer, and say, "Begin." Stop student after 2 minutes and count up problems correct.

			( )/3
			( )/6
			( )/9
			( )/12

Spring 2017-18 Screening Results

The results are in. Let's take a look...

Classroom Performance

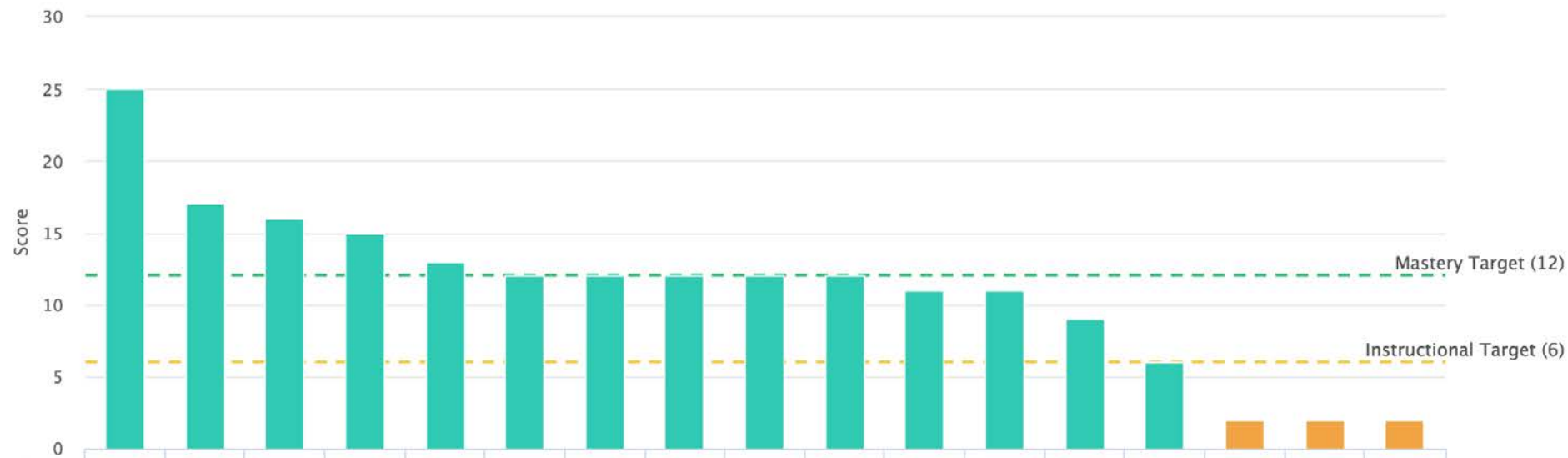
6% of your class reached the target on all of the screening assessments. Extra practice will help you reach mastery at this grade level.

The classwide intervention has already been started.

82%	12%	94%	24%
Measure 1	*Measure 2*	*Measure 3*	*Measure 4*

Measure 1: Multiply 1 Digit by 2-3 Digit w/ & w/o Regrouping

Your students' screening scores compared to the target score.



Use Class-wide Intervention if Needed

Classwide Intervention | Screening | Students

Classroom Performance

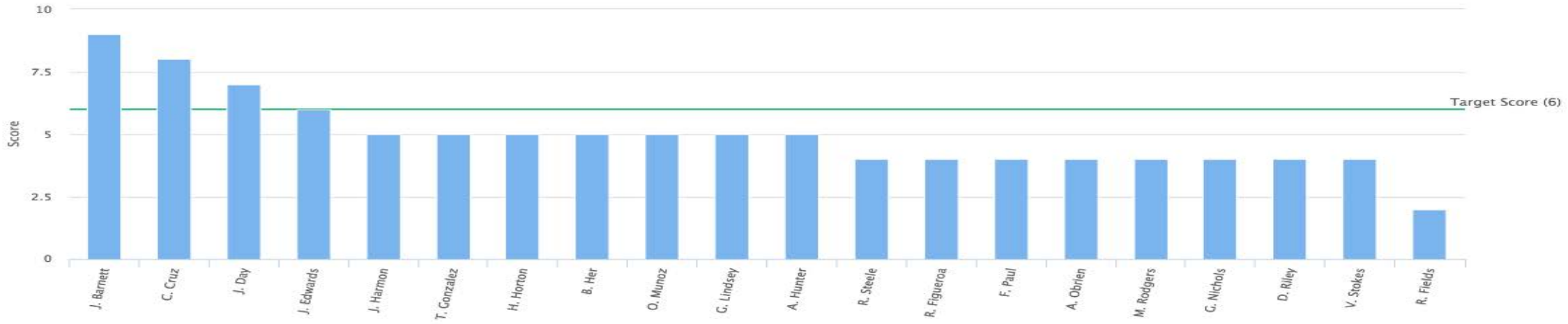
80% of your class appears to be at risk and in need of intervention to benefit from grade-level instruction.

We call this a classwide problem and *recommend a classwide intervention*.

20% !	20% !	25% !	30% !
Measure 1	*Measure 2*	*Measure 3*	*Measure 4*

Measure 1: Multiply 1 Digit by 2-3 Digit w/ & w/o Regrouping

Your students' screening scores compared to the target score.



Next Steps: Performing Class Wide Interventions

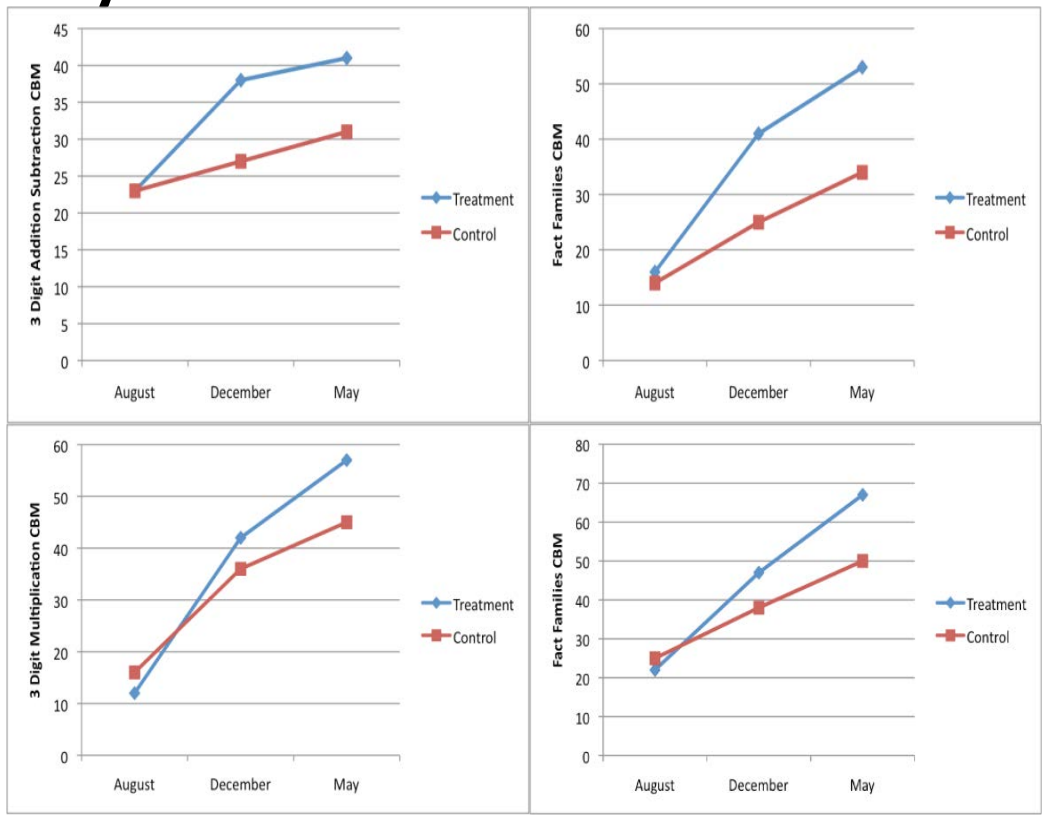
Skill packets will be provided to help practice foundational math skills.

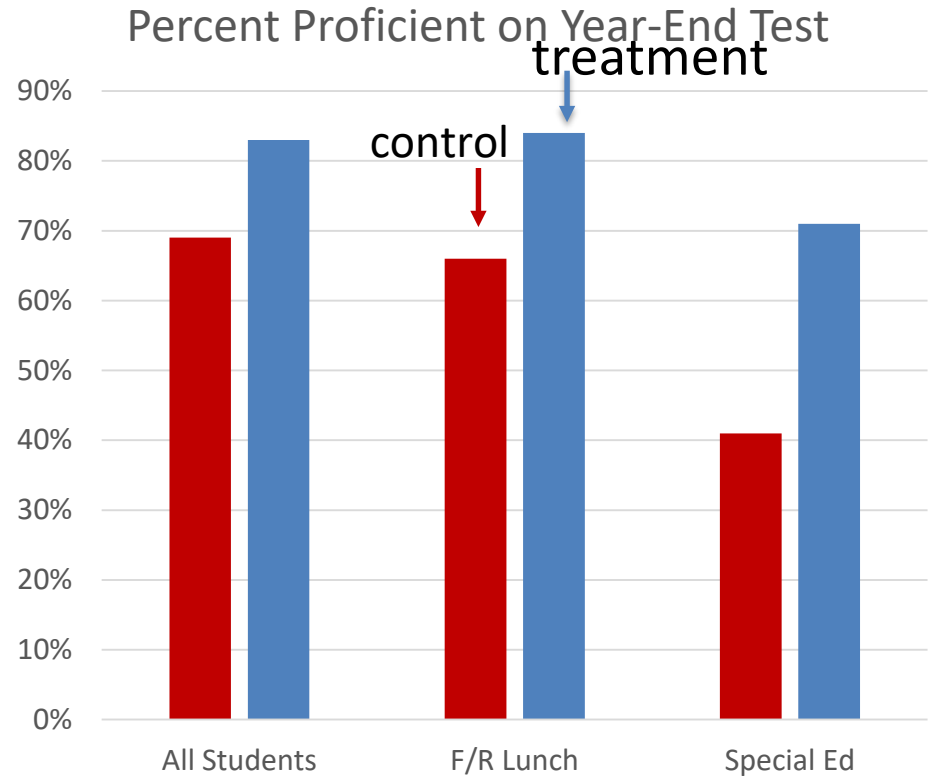
As you complete skills you will receive new packets and be able to view your class' skill progress.

How-To for Classwide Intervention

Not your mama’s drill & kill intervention

Why Classwide Intervention?





All	Title	Study	Study Type	Participants	Design	Fidelity of Impl.	Measures (Targeted)	Measures (Broader)
☐	Spring Math	Codding, VanDerHeyden, Martin, & Perrault (2016)	Group Design	●	◒	●	●	●
☐	Spring Math	VanDerHeyden, McLaughlin, Algina, & Snyder (2012)	Group Design	●	●	●	●	●

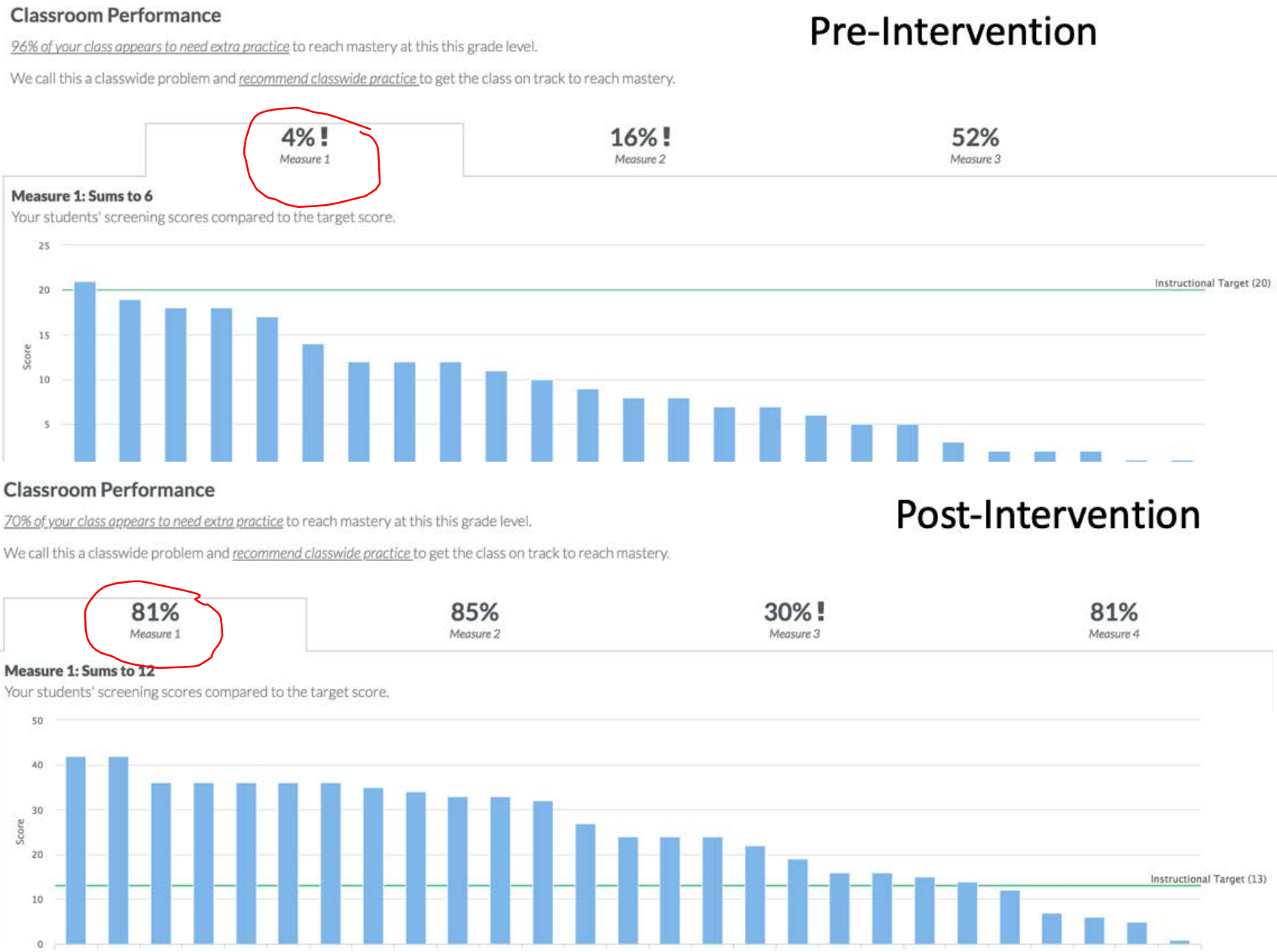
ES = .68 CBMs
ES = .18 Gr 4
ES = .79 for at-risk

http://www.intensiveintervention.org/chart/instructional-intervention-tools (NCII)

High-Yield Action: Use Class-wide Intervention

Pre

Post



When Managed, Classwide Intervention Works!

	Absolute Risk Reduction	Number Needed to Treat
All Students	15%	7
Students receiving F/R Lunch	18%	6
Students receiving Special Education Services	39%	3
Low-Performing Students	44%	3

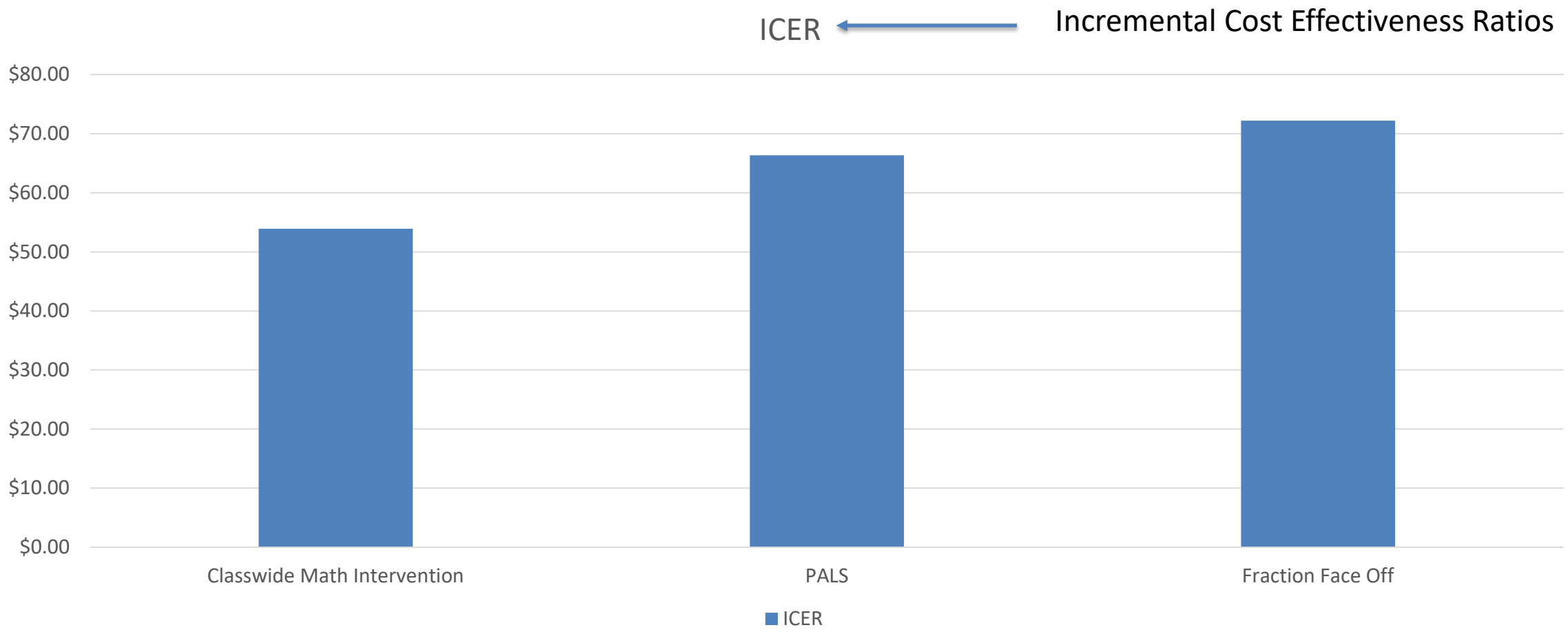
$377.44 to prevent 1 failure

$161.76 to prevent 1 failure

Source: VanDerHeyden, McLaughlin, Algina, & Snyder, 2012; VanDerHeyden & Codding, 2015

Think about Return on Investment

Per Student, Per 1 SD gain in outcome



"Changing math curricula as an approach for whole-school intervention when large numbers of students do not achieve proficiency is more costly than targeted, preventative math intervention" (Morsi et al.)

Suggested Student Pairings

Adams, Maximus	Goyette, Dangelo
Homenick, Darrin	Rolfson, Keegan
Lehner, Salvador	Blick, Jerald
Collins, Lamont	Waelchi, Jacinthe
Reichert, Marlen	Skiles, Daphnee
Greenholt, Clovis	Kozey, Monserrat
Kreiger, Selena	Turcotte, Kayleigh
Larson, Kobe	Champlin, Gertrude

Close

Workers

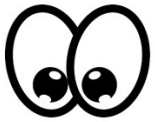
We use our **brains** to **think**.

We use our **mouths** to **explain**.

We use our **hands** to **write**.

Helpers

We use our **ears** to **listen**.



We use our **eyes** to **watch**.

We use our **mouths** to **help**.

Intervention Protocol

Classwide Fact Families: Add/Subtract 0-9

Student:

Grade: 01

Teacher: Paul Muyskens

Class name: 1 Mathematics (-Hayden-)

Date: 1/22/2019

Classwide Math Intervention

Preparation:

- This is your master set of materials for the week.
- Make 1.5 copies of the practice sheets Day 1-5 for each student in your class (ex. if you have 20 students make 30 copies). Each student will have one copy for independent practice, while each pair of students will have one copy for paired practice.
- If you are using flashcards to practice, you can make only 1 copy per student.
- To set up your student pairs click on "Students" in your dashboard, then "Suggested Student Pairs."
- Identify the first "Worker," which should be the higher-performing student. This student will always work first.

☐ Say, **It's time for Spring Math. Please get together with your math partner. Please take out your practice materials, have your colored pen and pencil out, and show me you are ready.**

☐ Say, **Workers, your job is to work as many problems correctly as you can. As you work, be sure to talk through the problem so your partner can HEAR and SEE you solve the problem. Use a quiet voice while you work.**

☐ Say, **Helpers, your job is to follow along, listen and watch as the worker is working problems. If you see an error, speak up! Say, "Stop, Let's check this one."**

You should give the worker a hint, point to the exact error, but don't give them the answer. See if the worker can fix the error.

If the worker is stuck, give the answer but solve it aloud so the worker knows how you got that answer. If you get really stuck, circle the problem and ask me for help.

☐ Set the timer for 3 minutes.

☐ Say, **Remember, your goal is to work as many problems as possible with 100% accuracy. Ready? Begin!**Start the timer when you say Begin.

Active Ingredients

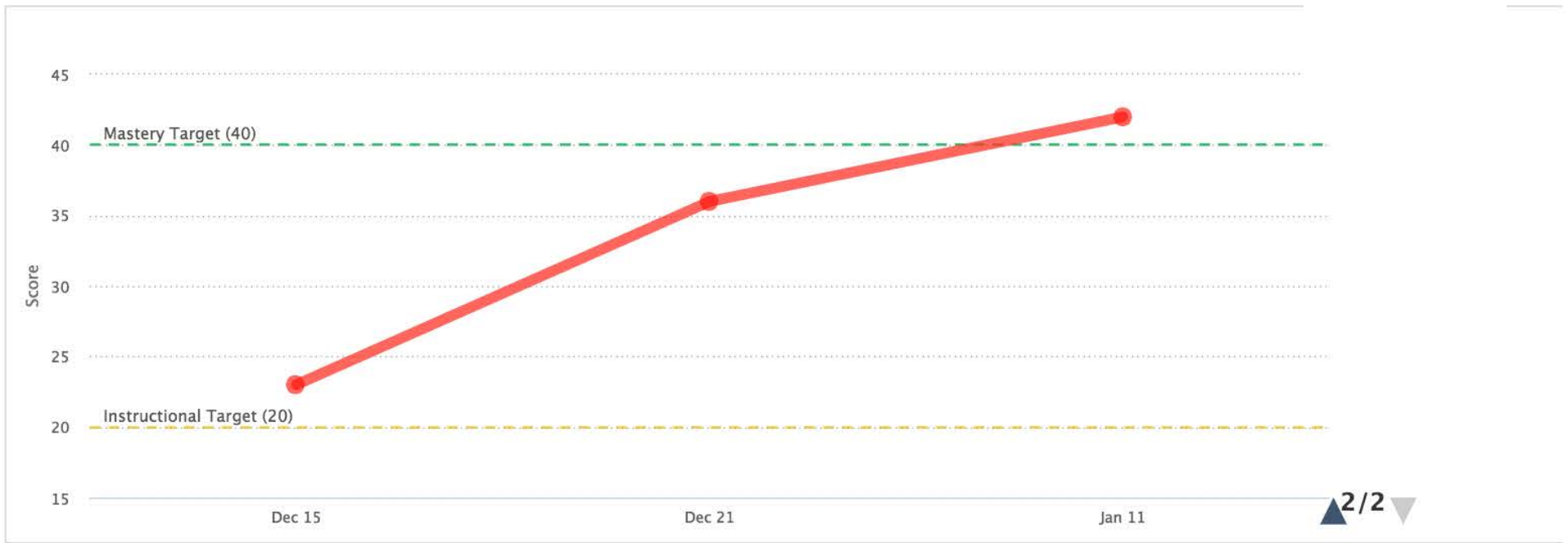
- Modeling
- Practice for the right level of difficulty (opps to respond, complete learning trials)
- Corrective feedback & repetition loop
- Goal setting
- Delayed error correction w verbal rehearsal component
- Reward
- Advances difficulty based on proficiency

It's time to start Winter screening! Start Screenir

Classwide Intervention Progress

Subtraction 0-9

Classwide Rate of Improvement: 4.1



Skill Tree Progress

- Sums to 6
- Sums to 12
- Subtraction 0-5
- Sums to 20
- Subtraction 0-9
- Fact Families: Add/Subtract 0-9
- Subtraction 0-12
- Subtraction 0-15
- Subtraction 0-20

Improves Learning, but Makes it Clear Who Needs More

Classwide Intervention | Individual Interventions | Screening | Students | Growth

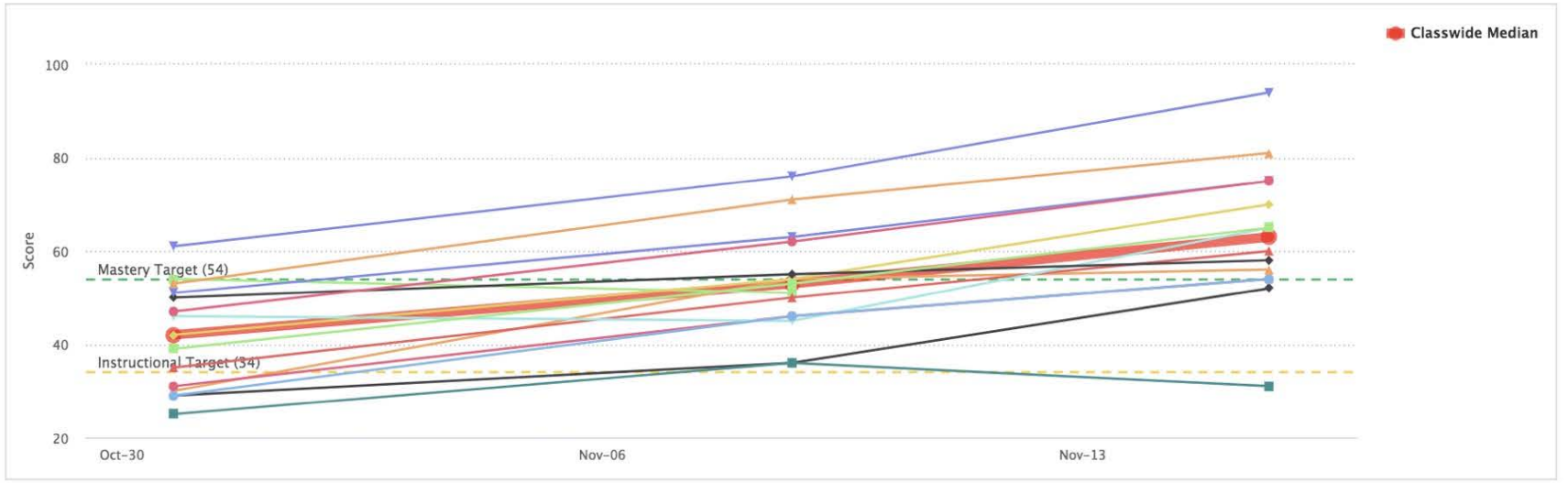
Great work, your class is ready to start working on a new intervention skill!

Your class is currently in class wide intervention. Complete intervention activities daily and enter progress monitoring scores weekly.

Mixed Addition/Subtraction 0-20

Create Intervention Materials

Classwide Rate of Improvement: 9.2



Hide Students scores

Intervention Progress

- ✓ Mixed Addition/Subtraction 0-20
- ✓ Fact Families: Add/Subtract 0-20
- ✓ Addition/Subtraction 3-Digit Numbers w & w/o Regrouping
- ✓ Multiplication 0-12
- ✓ Division 0-12
- ✓ Fact Families: Multiplication/Division 0-12
- ✓ 1-Digit Mult by 2-3 Digit w & w/o Regrouping
- ✓ 2-Digit Multiplied by 2 Digit w/o Regrouping
- ✓ 2-Digit Multiplied by 2 Digit w/Regrouping
- ✓ Div 1-digit into 2-3 digits w/o Rems
- ✓ Divide 1-Digit into 1-2 Digit with Remainders
- ● **Divide 2-Digit into 3-4 Digit w/Remainders**
- ○ Create Equivalent Multiplication Problems w/Common Factors

Classwide Intervention | Screening | Students | Growth

Classwide Intervention

	Intervention Progress	Intervention Consistency	Average Weeks per Skill	Calculations as of Date
1 Mathematics	Intervention Skill 5 of 10	57% 8 of 14 weeks with scores	2.8	Start of interventions

Eligible for Individual Intervention

The following students would benefit from individual interventions. If you have additional capacity, you may choose to begin interventions with some of these students. Intervention takes 10-15 minutes a day per student, so we recommend selecting 1 or 2 students to work with.

Amanda

	Score	Target
Measure 1	28	13
Measure 2	41	20
Measure 3	18	20
Measure 4	18	20

Paul

	Score	Target
Measure 1	31	13
Measure 2	26	20
Measure 3	11	20
Measure 4	24	20

Vicki

	Score	Target
Measure 1	31	13
Measure 2	49	20
Measure 3	18	20
Measure 4	15	20

How to For Small-group & Individual intervention

Classwide Intervention | Individual Interventions | Screening | Students | Growth

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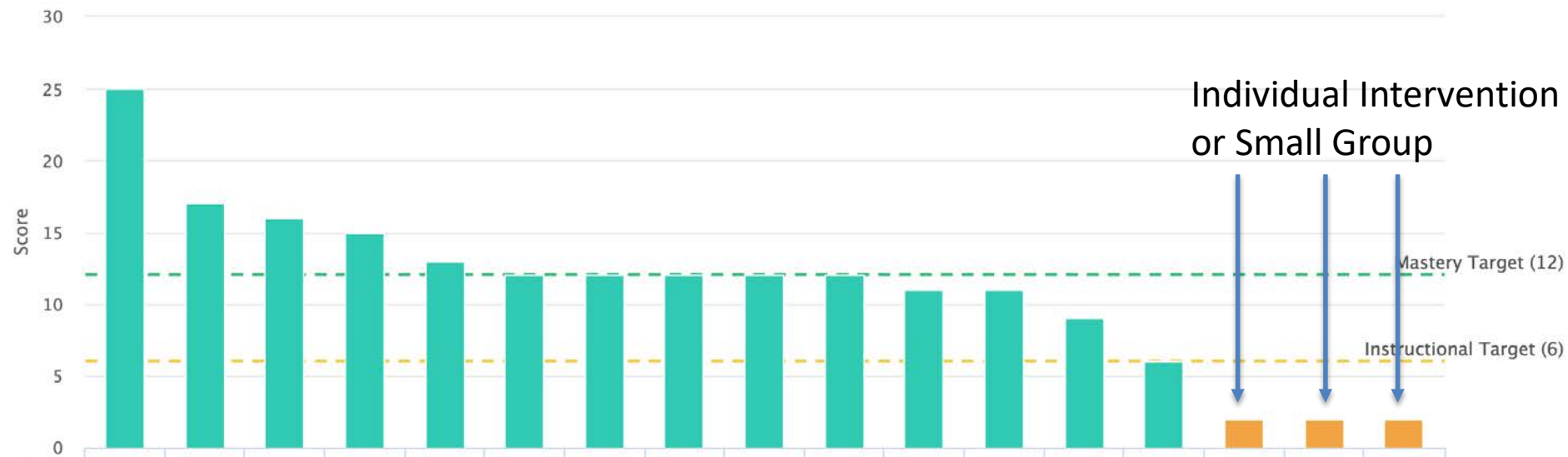
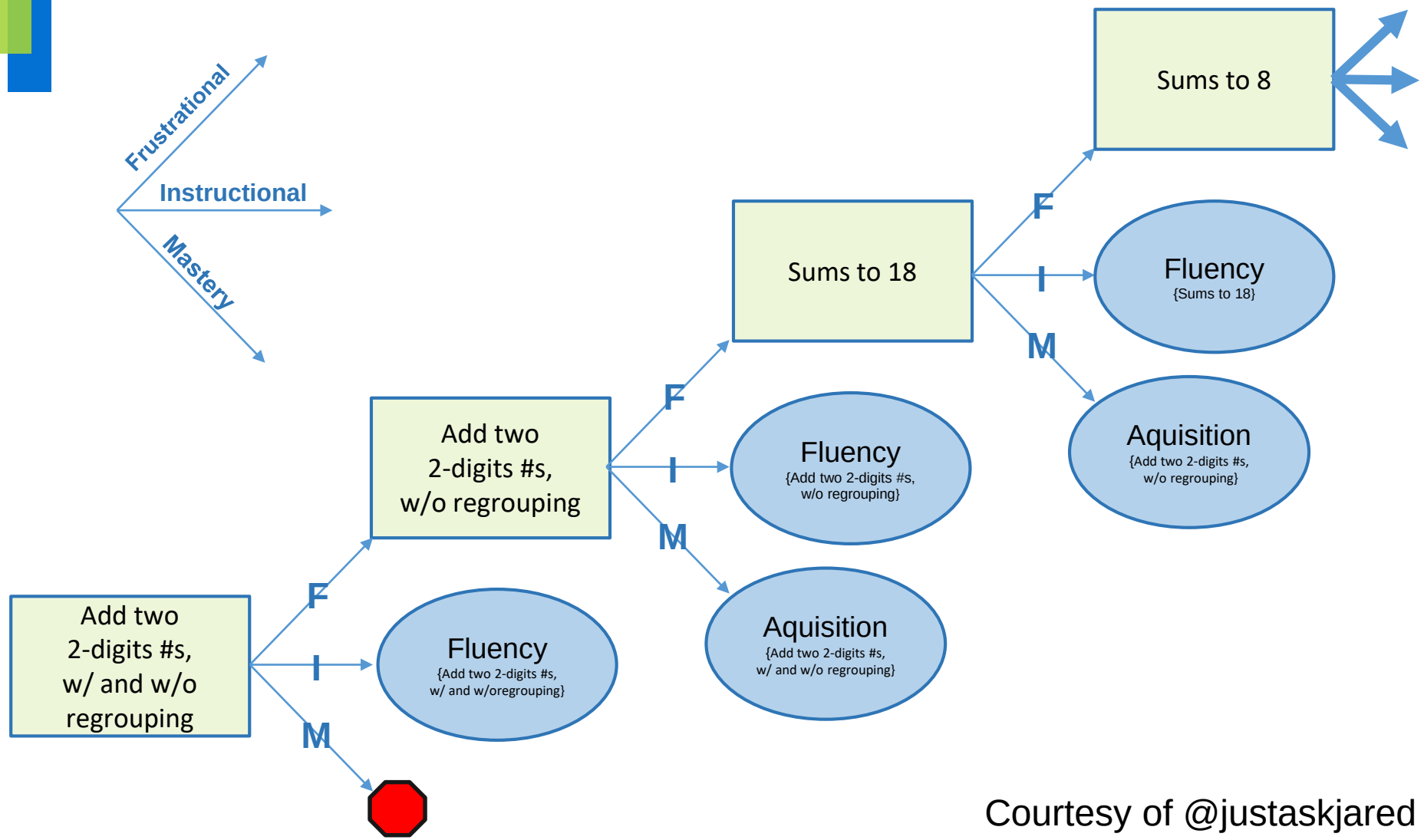


You will Need a Range of Interventions & Data to Connect them to the Student

Procedural & Conceptual Understanding for Middle School Math						
Fluency-Building →			Acquisition →			
Classwide Math Intervention	Timed Trial	Response Cards	Cover Copy Compare	Guided Practice	Incremental Rehearsal	Bingo

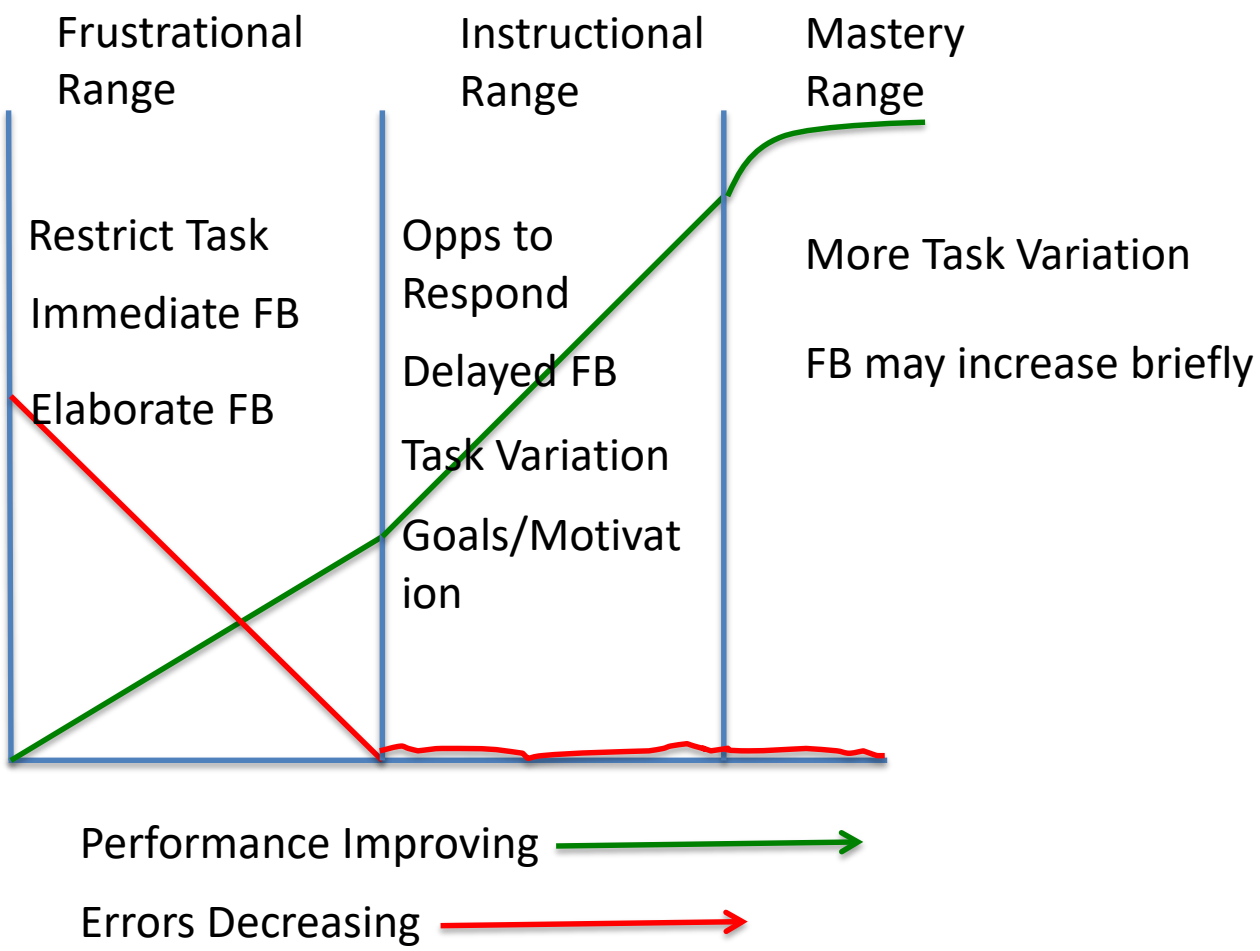
Assessment-Intervention Match

Not a real tree!

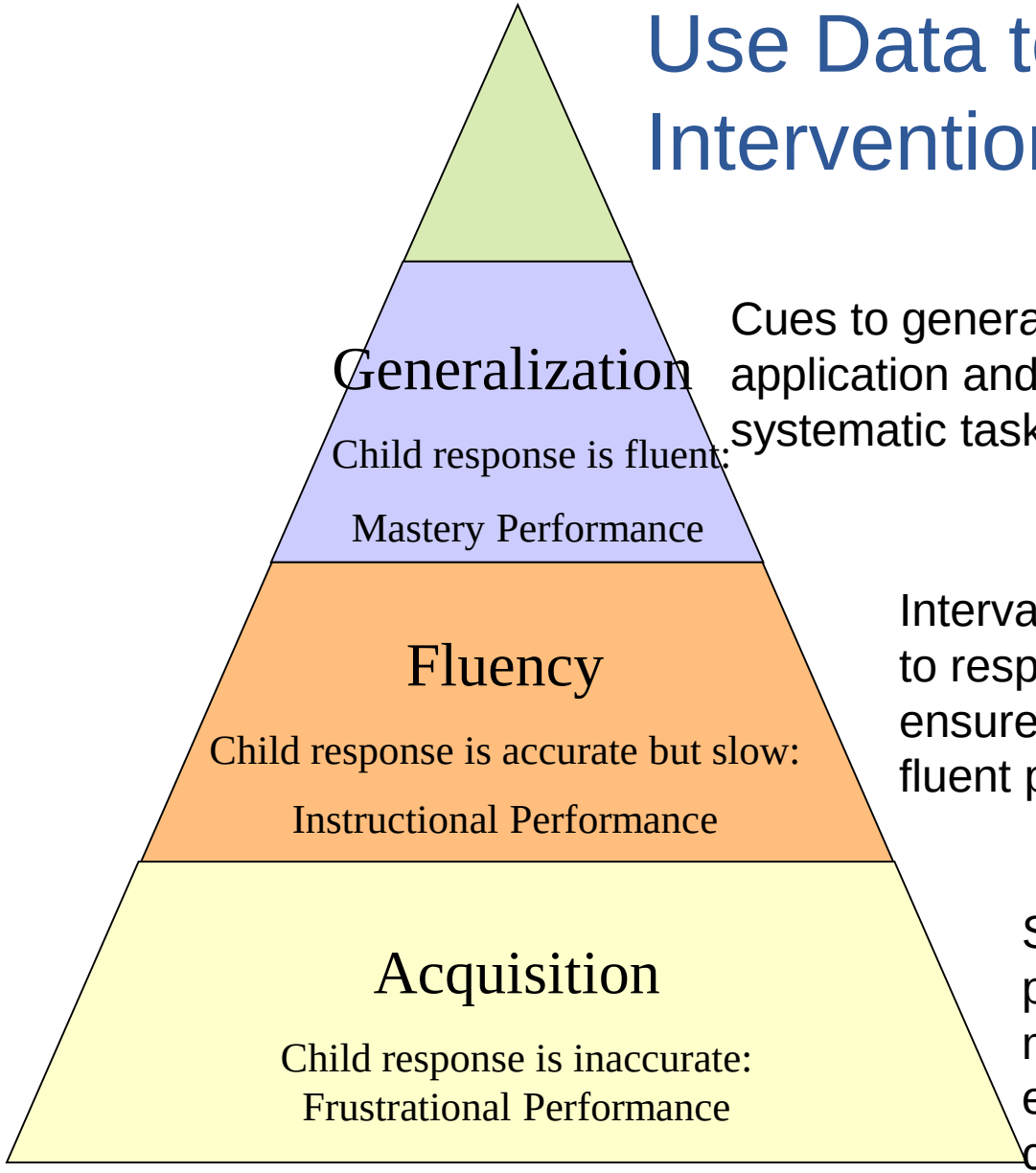


Courtesy of @justaskjared
Jared Campbell, PaTTAN

The Instructional Hierarchy



Use Data to Drive Individual Intervention



Cues to generalize, corrective feedback for application and problem-solving, systematic task variation, fading of support.

Intervals of practice, opportunities to respond, delayed feedback, ensure reinforcement for more fluent performance.

Salient cues, frequent & high-level prompting, immediate feedback, more elaborate feedback, sufficient exemplars of correct/incorrect, controlled task presentation.

When we convert improper fractions to mixed numbers, we will take a whole number quantity out of the fraction. When we do this, the numerator will be less than the denominator because the remaining fractional value will be less than 1.

To convert the improper fraction to a mixed number, we:

Divide the numerator by the denominator, asking how many times the denominator can be divided into the numerator, and identify any remainder

Write the remainder as the new numerator

Copy the denominator from the original fraction.

Day 1

Acquisition Convert Improper Fractions to Mixed Numbers Student: _____

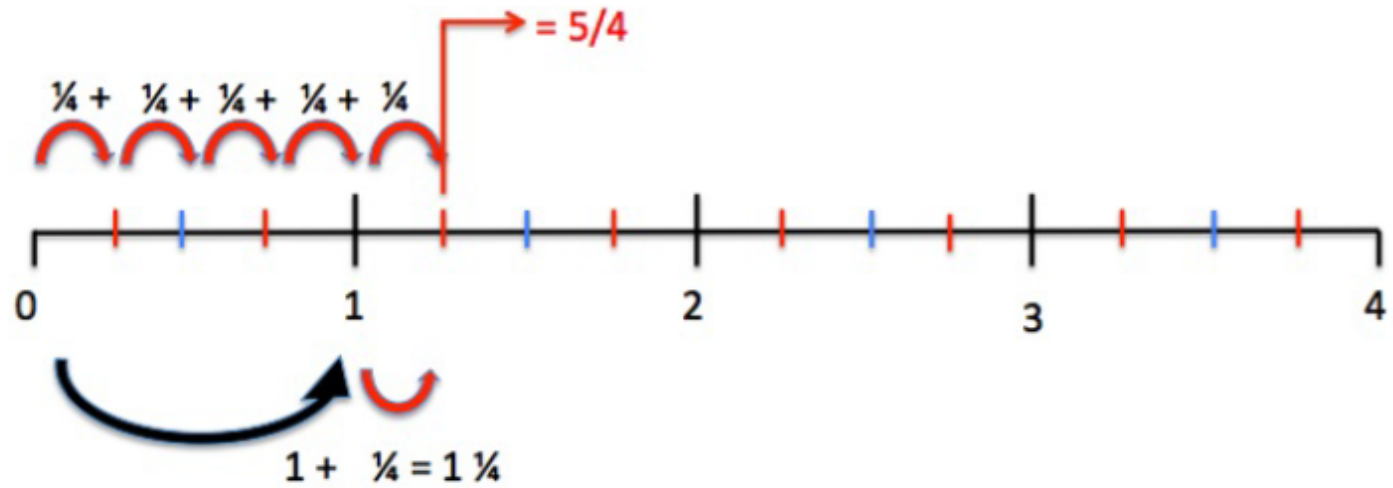
Work Problem	Check Answer	Match?	Work Problem	Check Answer	Match?
$\frac{75}{7} =$	$\frac{75}{7} = 10\frac{5}{7}$		$\frac{95}{9} =$	$\frac{95}{9} = 10\frac{5}{9}$	
$\frac{25}{4} =$	$\frac{25}{4} = 6\frac{1}{4}$		$\frac{109}{10} =$	$\frac{109}{10} = 10\frac{9}{10}$	
$\frac{35}{4} =$	$\frac{35}{4} = 8\frac{3}{4}$		$\frac{13}{3} =$	$\frac{13}{3} = 4\frac{1}{3}$	

Build Conceptual Understanding

Complete several of these each day with the child, encouraging the child to solve each problem aloud:

Play War: Make 20 cards with mixed numbers (2 copies of each for a total of 40 playing cards). Each player turns over a card and the player with the greater quantity wins both cards. If the values are tied, then each player places three cards face-down and turns over the fourth card. The player with the higher value card to all the cards. The object of the game is to win all the cards.

Using the day's practice problems, have the student draw each mixed number on a number line. Several number lines are provided below the sample problem. Help the student choose the best one.



This one shows 1/4 units.

This one shows 1/3 units.

$$\frac{55}{7} = \underline{7} \times \boxed{\underline{\quad}} = \underline{49}$$

$$\underline{7} \times \boxed{\underline{\quad}} = \underline{56}$$

Answer will be between these two factors

This one is not enough. How much more is needed?

$$\underline{7} \times \underline{7} + \underline{\quad} = \underline{55}$$

This one is too much. How much too much is this one?

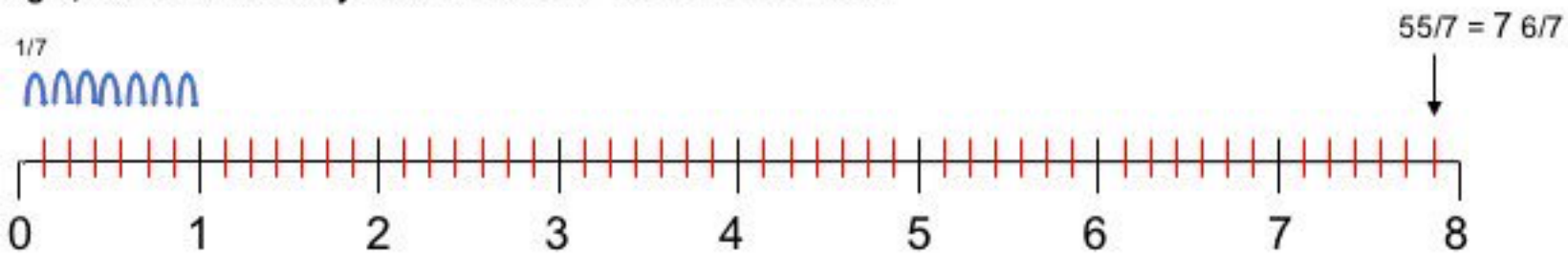
$$\underline{7} \times \underline{8} - \underline{\quad} = \underline{55}$$

Let's find the answer on a number line. We can ask, **How many 1/7 units are in 55/7. There are 7, 1/7th units in each increment of 1. Let's count and check (1/7 + 1/7 + 1/7 + 1/7 + 1/7 + 1/7 + 1/7 = 7/7 or 1).**

So we want to multiply 7 x (7/7) which gives us 49/7. How many more 1/7th units do we need to get to 55? That's right, 6 more 1/7th units will get us to 55/7 or 55 1/7th units. We can count and check if we want.

Can you see another way to get to 55/7 that's easier and faster to find on the number line (hint, look above)?

Right, 8 x 7/7 is 56/7 so just one more 1/7th unit than we need.



Let's practice converting whole numbers into fraction base unit quantities. We've just learned how to convert 7 into 1/7 units. We multiplied 7/1 x 7/7 to get 49/7. This makes sense because we know, 49 ÷ 7 = 7.

Let's try some more. Write the equation and then solve.

Change 5 into 1/4 units: _____ x _____ = _____

Change 3 into 1/6 units: _____ x _____ = _____

Change 4 into 1/8 units: _____ x _____ = _____

Change 2 into 1/10 units: _____ x _____ = _____

Change 8 into 1/5 units: _____ x _____ = _____

Change 3 into 1/7 units: _____ x _____ = _____

Let's think more about improper fraction quantities. A few moments ago, we looked at 55/7 on the number line. We can see that 55/7 is between 7 and 8 on the number line. 55/7 is more than 7 but less than 8. Let's complete the following statements to make them true. There are several answers that can be correct for these questions, but for today, I want you to choose the closest whole number on either side of the improper fraction quantity. If you want, you can draw a number line next to each statement to prove your conclusion.

10/8 is more than _____ but less than _____.

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14/5 is more than _____ but less than _____.

10/3 is more than _____ but less than _____.

17/5 is more than _____ but less than _____.

19/4 is more than _____ but less than _____.

26/5 is more than _____ but less than _____.

Fill in the missing number to solve. Try to solve these by thinking of each quantity on a number line.

44/9 + _____ = 5

14/5 + _____ = 3

19/5 + _____ = 4

9/5 + _____ = 2

13/7 + _____ = 2

10/8 - _____ = 1

14/3 - _____ = 4

16/5 - _____ = 3

Why is the numerator larger than the denominator when a mixed number is converted to a fraction? Is the numerator always greater than the denominator when a mixed number is converted to a fraction?

Can the numerator ever be greater than the denominator if the fraction is in its simplest form?

Using problems from the day's practice materials, ask the student to check to see that an improper fraction was correctly converted to a mixed number by asking the student to convert the improper fraction back to a mixed number.

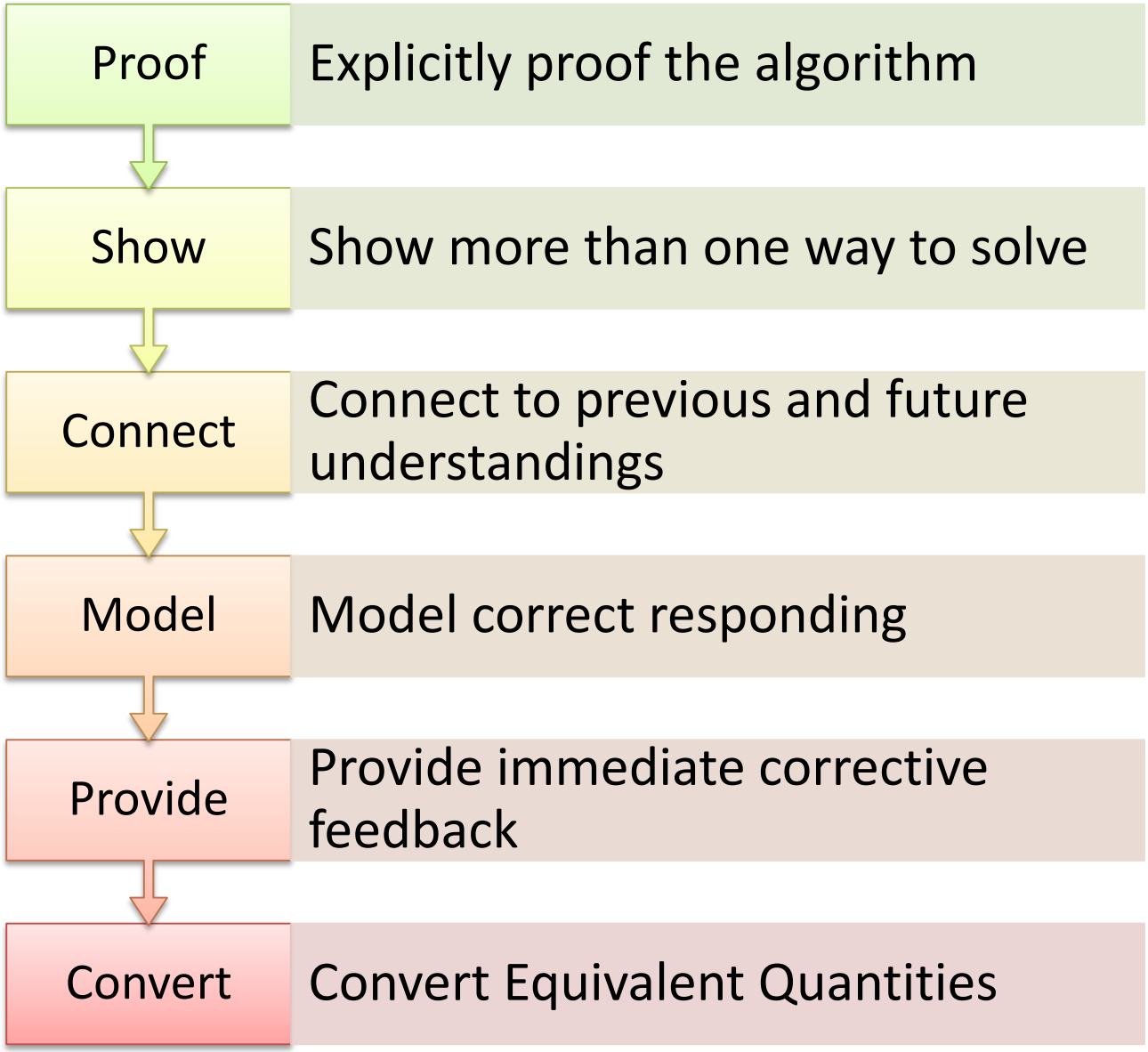
Ask, **Why is it useful to convert an improper fraction to a mixed number?** (Hint: easier to understand quantity).

What Active Ingredients Do You See?

Oo Pp Qqq Rr Ss Tt Uu Vv

What Active Ingredients Do You See?

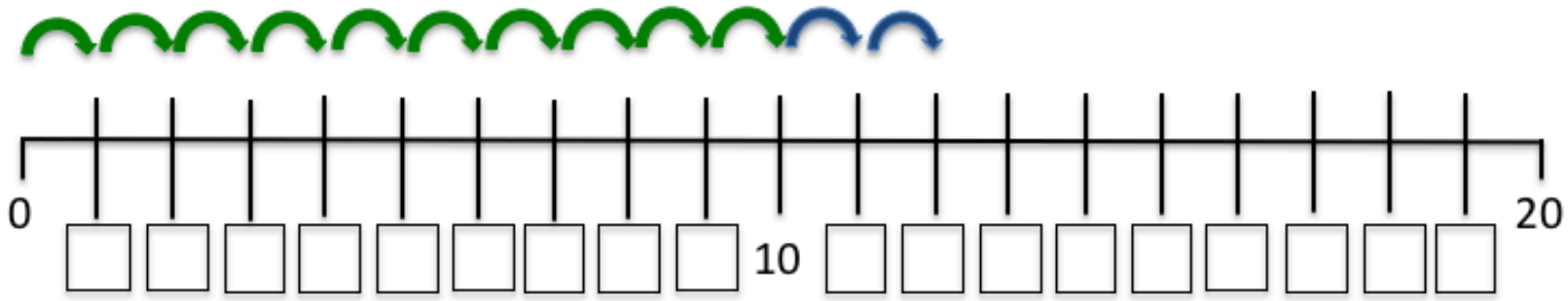
Look for Interventions that



Show the child a number line and say, **Let's find 10 + 2.** Say, **This number line goes from zero to 20. Ten is here** (point to the 10). **Let's count how many copies of "1" 10 is.** Guide the child to count the units to 10. Show the child that 10 can be written as 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1. **Let's fill in the boxes for the units on the number line.** Guide the child to fill in the missing number for each unlabled unit on the number line.

Can you find another way to write 10? If the child cannot answer, prompt, **Here is the 5. How many must we add to 5 to get 10? Let's count and check. Can you find another way?**

Now let's solve 10 + 2. Let's find the 10 on the number line. If we count up 2 units from 10, what is the sum? Show the child how to count from zero to 12. Then show the child how to start with 10 and count up 2 units.



Explicitly proof the algorithm

Show More than One Way to Solve

Let's find the "doubles" inside these problems.

6 = _____ + _____

8 = _____ + _____

12 = _____ + _____

16 = _____ + _____

20 = _____ + _____

Now we are warmed up. Fill in the blanks for each problem below. You must include a double.

5 = 2 + _____ + _____

9 = 4 + _____ + _____

17 = 8 + _____ + _____

3 = 1 + _____ + _____

7 = 3 + _____ + _____

11 = 5 + _____ + _____

15 = 1 + _____ + _____

19 = 3 + _____ + _____

19 = 1 + _____ + _____

Now let's find 10's inside these problems to find the sums. Fill in the missing number and remember, you must make a 10.

---

12 = _____ + _____

14 = _____ + _____

13 = _____ + _____

8 + 8 + 2 = 10 + _____

5 + 5 + 8 = 10 + _____

4 + 4 + 6 = 10 + _____

13 + 3 = _____ + _____ + _____

14 + 4 = _____ + _____ + _____

Start with a set of counters. Say, **We are going to add objects. Here are 20** (count out 20). **Let's make 20 twenty different ways.** Guide the child to divide the counters into two sets of quantities (e.g., 10 + 10, 19 + 1, 15 + 5) and count to find 20.

Combine the full set of 20 counters into a single set. Pull out 1 counter and ask the child to see how many we must add to 1 counter to equal 20. After the child responds correctly, remove 10 counters and ask the child to see how many we must add to the set of 10 to equal 20. Do the same for numbers 11-19 in random order.

Use the problems from the day's practice sheet and say, **Draw two ways to solve this problem.** Guide the child to write as hashmarks, to solve on a number line, or to write as an equivalent equation.

Show the child a number line and say, **Let's find 10 + 2.** Say, **This number line goes from zero to 20. Ten is here** (point to the 10). **Let's count how many copies of "1" 10 is.** Guide the child to count the units to 10. Show the child that 10 can be written as 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1. **Let's fill in the boxes for the units on the number line.** Guide the child to fill in the missing number for each unlabled unit on the number line.

Can you find another way to write 10? If the child cannot answer, prompt, **Here is the 5. How many must we add to 5 to get 10? Let's count and check. Can you find another way?**

Connection to Previous Understanding

Now let's find 10's inside these problems to find the sums. Fill in the missing number and remember, you must make a 10.

12 = _____ + _____

14 = _____ + _____

13 = _____ + _____

8 + 8 + 2 = 10 + _____

5 + 5 + 8 = 10 + _____

4 + 4 + 6 = 10 + _____

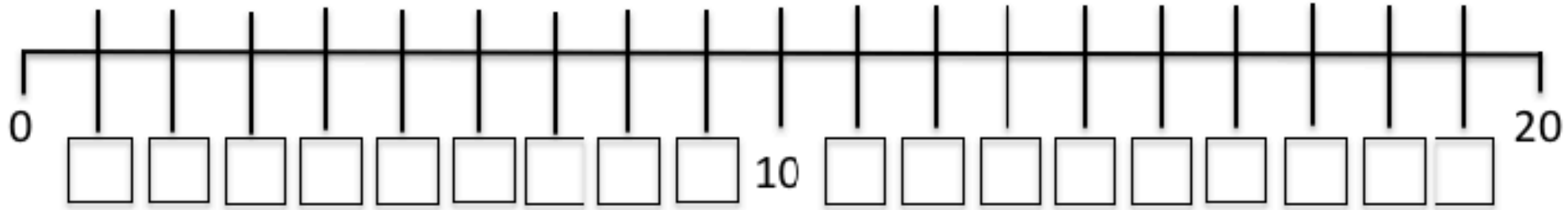
13 + 3 = _____ + _____ + _____

14 + 4 = _____ + _____ + _____

Connection to Future Understanding

Say, **Show me three ways to make 15.** Help the child show that 15 can be represented as 1 + 14, 15 + 0, 7 + 8, 10 + 5, adding 1's only,

and so on. Use the number lines below to find the answers as needed.



Convert Quantities

☐ Say, **We are going to practice adding numbers. Let's do the first one together. What number is this?**

Draw hash marks next to the top number in the problem and say the number name aloud.

Then say, **That's right. What number is this?** while pointing to the bottom number. Draw that number of hash marks for the child.

Say, **Let's add the numbers together.** Guide the child to count the hash marks aloud then say,**Write the answer here** (point to box).

Slide down the card covering the answer column to show the correct answer and ask the child,**Is the number the same? Yes, you got it right!**

Show the child how to make a check mark in the box for a correct match.

Once the child can independently draw and count hash marks, show the child how to identify the larger number and count up from that number to get the answer (so given 3 + 2, the child will say "3" and then count up two places using his or her fingers if needed saying aloud "4, 5" to get the answer).

Some children may start counting up from 1 regardless of the size of the first number and there is no need to interrupt their use of this strategy.

Once the child is responding accurately and confidently, simply show the child that he or she can start with the larger number in his head and begin counting up from that number.

Explicit Modeling

- ☐ Ensure that the child answers each problem correctly. Ensure that the child writes the number in the box without peeking at the answer box. Ensure that the child lifts the cover to check his or her answer.
- ☐ Ensure that the child makes a check mark in the "Match" box for correct answers.
- ☐ If there is not a match (the child's response was incorrect), guide the student to count again and assist as needed to ensure correct counting/adding.

Troubleshoot

Children should be able to fluently read numbers, be able to count fluently from 1-20, be able to count sets of objects and specify the number of objects, and understand that counting up from 0 to 20 indicates greater quantities to benefit maximally from this intervention.

Once the child can fluently draw and count both sets of hash marks to obtain the sum, guide the child to identify the larger number and count up.

If the child cannot readily identify the larger number, have the child circle the larger number in the problems on the practice page.

If the child continues to struggle to identify the greater number in the set, then consider adding the "Establish Quantity Discrimination" intervention to this intervention.

The purpose of timing the intervention period is to contain the intervention to a focused and productive 10-minute period.

This intervention requires direct assistance from the teacher. The teacher should sit beside the child and actively monitor each response to ensure the student is completing each problem accurately.

If a mistake is made, the teacher should guide the student to "try again" and provide prompts as needed to ensure correct responding.

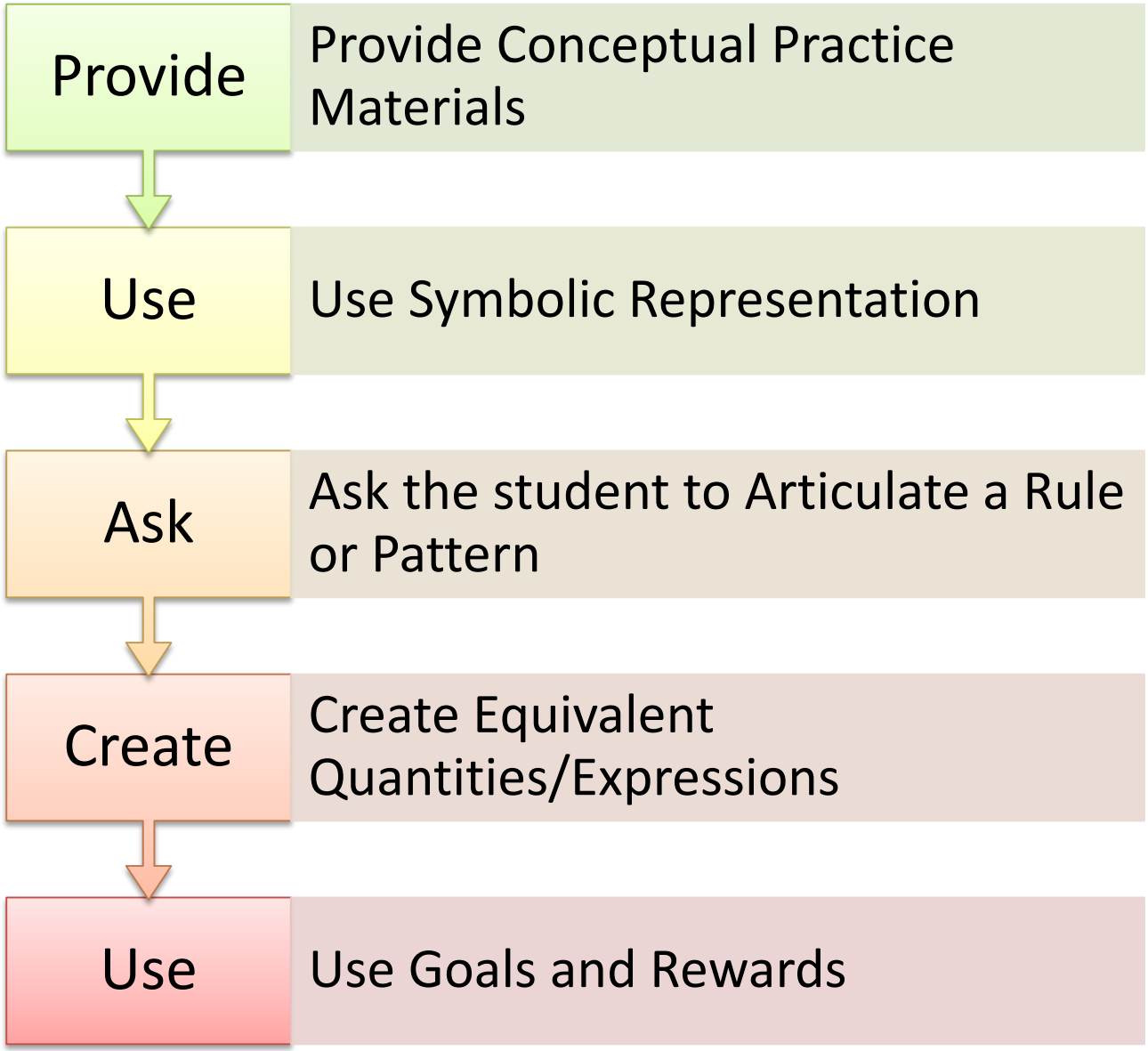
For example, the teacher might say, **Stop. 12 + 7 does not equal 18, let's try again.**

If the child does not respond correctly, the teacher might say, **Which number is larger? 12, that's right. So let's count seven up from 12.**

If the child does not respond correctly the teacher might model, saying, "12" then holding one finger up at a time, **13, 14, 15, 16, 17, 18, 19. So what is 12 + 7? 19, that's right. Let's do the next one.**

Immediate Corrective Feedback

Look for Interventions that



Day 1
Acquisition Sums to 20

Student: _____

Work Problem	Check Answer	Match?	Work Problem	Check Answer	Match?
14 + 3 =	14 + 3 = 17		3 + 1 =	3 + 1 = 4	
15 + 0 =	15 + 0 = 15		1 + 17 =	1 + 17 = 18	
16 +	16		19 +	19	

Symbolic Representation

Ask the child, **When we add two numbers that are greater than zero, will the answer be greater than or less than this number**(point to the top number)?

Will the answer be greater than or less than this number(point to the bottom number)**?**

When we add zero to another number, what will the answer be? Can you explain why?

Write an addition problem with a sum of 10, using the greatest number of addends possible(Answer: 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1).

Write an addition problem with a sum of 10, using the greatest number possible as one of the two numbers you are adding(Answer 10 + 0)

Find two doubles in the problem 6 + 1 (Answer: 2 + 2 + 3 and 3 + 3 + 1).

Write an addition problem to show 10, using only the number 2.

Asks Student to Articulate Rule or Pattern

Create Equivalent Quantities

Let's find the "doubles" inside these problems.

6 = _____ + _____

8 = _____ + _____

12 = _____ + _____

16 = _____ + _____

20 = _____ + _____

Now we are warmed up. Fill in the blanks for each problem below. You must include a double.

5 = 2 + _____ + _____

9 = 4 + _____ + _____

17 = 8 + _____ + _____

3 = 1 + _____ + _____

7 = 3 + _____ + _____

11 = 5 + _____ + _____

15 = 1 + _____ + _____

19 = 3 + _____ + _____

19 = 1 + _____ + _____

Now let's find 10's inside these problems to find the sums. Fill in the missing number and remember, you must make a 10.

---

12 = _____ + _____

14 = _____ + _____

13 = _____ + _____

8 + 8 + 2 = 10 + _____

5 + 5 + 8 = 10 + _____

4 + 4 + 6 = 10 + _____

13 + 3 = _____ + _____ + _____

14 + 4 = _____ + _____ + _____

- ☐ Count the number of correctly completed problems. Write this number on the Progress Monitoring Chart.
- ☐ Allow the child to select a small reward from the treasure chest for beating his or her last best score.

Monitor Progress
Establish Sums to 20
6/10/2018

Monitoring Student Progress

CHART FOR _____

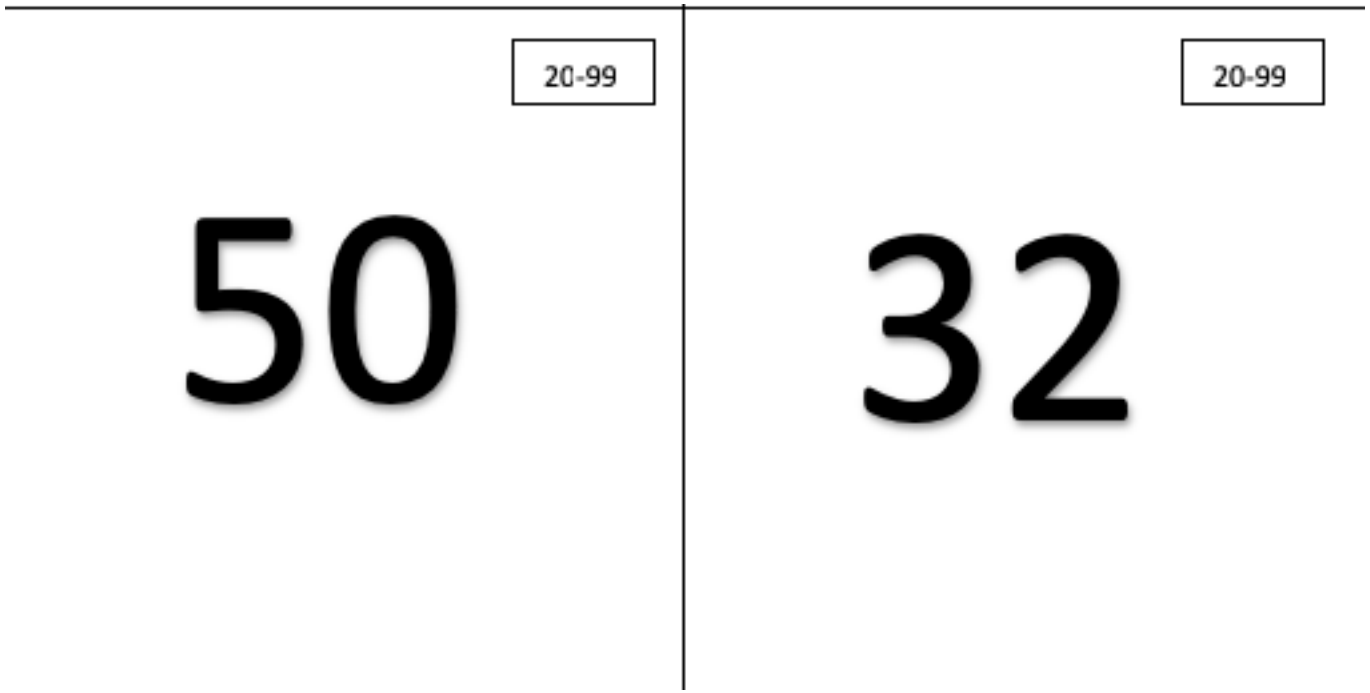
Weekly Goal: _____

DAY 1	My best score is:	_____
	My score on the timed test is:	_____
	Did I beat my score?	_____

Use of Goals and Rewards

Use Games to Build Fluency!

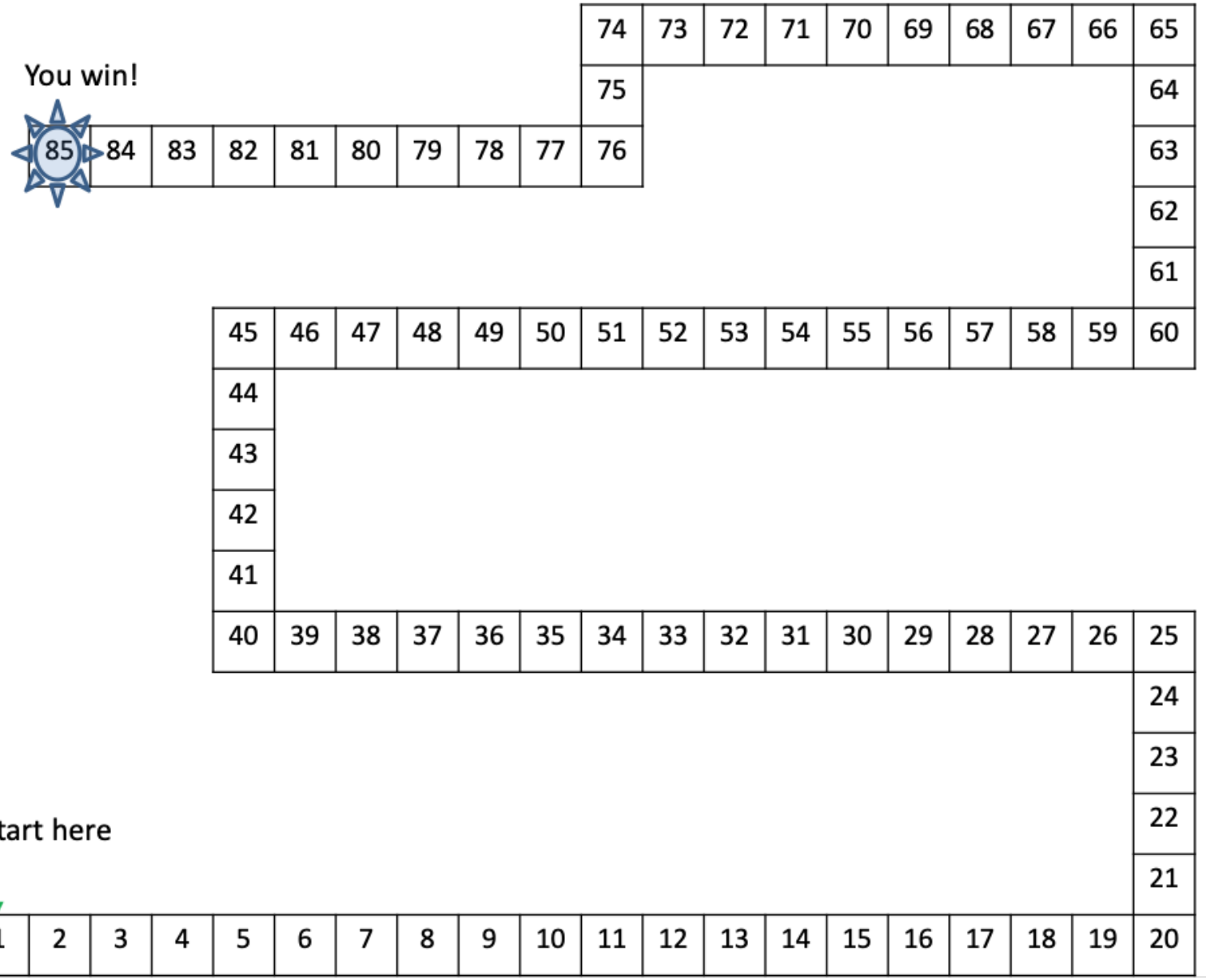
Play War: Make a stack of cards with 20 randomly selected numbers between 20 and 99 (2 of each) and play "war." Each player turns over a card and the player with the higher-value number wins both cards. If the values are tied, then each player places three cards face-down and turns over the fourth card. The player with the higher value card takes all the cards. The object of the game is to win all the cards.



Play 3-in-a-row bingo: Here is another game that can be played as a single player or with multiple players. Each player needs a number grid (see below). Using the day's practice problems and answer key (don't show the student the answer key), just call out a problem and the student will try to answer verbally and make an X over the number on their grid. The object is to get three in a row in any direction to win the game. If needed, the student can write the problem to solve it. If the student makes an error solving the problem, then the he or she may not place an X on the grid for that turn.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96	97	98
99	100	101	102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178	179	180	181	182
183	184	185	186	187	188	189	190	191	192	193	194	195	196

Play Add & Take ten: Make a stack of 8 cards. Write, Add 10, Add 20, Add 30, Add 40 on the first four cards. Then write Add 10, Add 20, Add 30, Add 40 on the next four cards. Shuffle the cards. If you are playing single player, then pull a card and have the student start moving on the path to get to the winning space. If you draw a take card early in the game and there are not enough spaces to go back, just return to the start position of 1. This game is fun to play with two players. If you play with two players, print two copies of the board and take turns drawing cards to see who can get to the winning position first.



Translate Verbal Expressions into Math Equations Matching Game

Directions: This game can be played with 2-4 players. Each of the numerical expression cards below has a matching verbal expression card. To play the game:

- Cut out the cards below.
- Shuffle all the numerical and verbal expression cards together.
- Deal each player a hand of 7 cards.
- When it is their turn the player draws one card.
- If the player has two cards that match (numerical and verbal expressions) they place the pair face up on the table.
- The first player to lay down all of their cards wins the game.

6 greater than a number is twice the number.

$x + 6 = 2x$

Tactics to Look for

Use manipulatives with K & 1

Use expanded notation

Convert to equivalent quantities

Solve for missing value/unknown

Graphics- number lines, area models, graphs

Find & Fix problems

True or False. Change to make true.

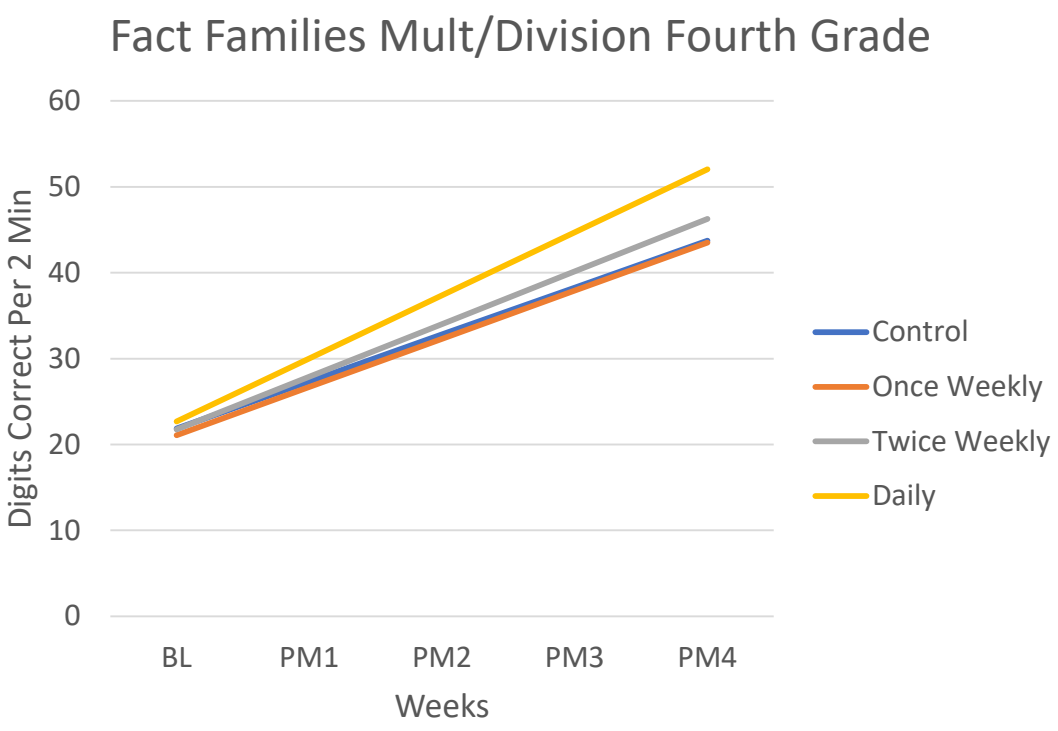
Solve word problems.

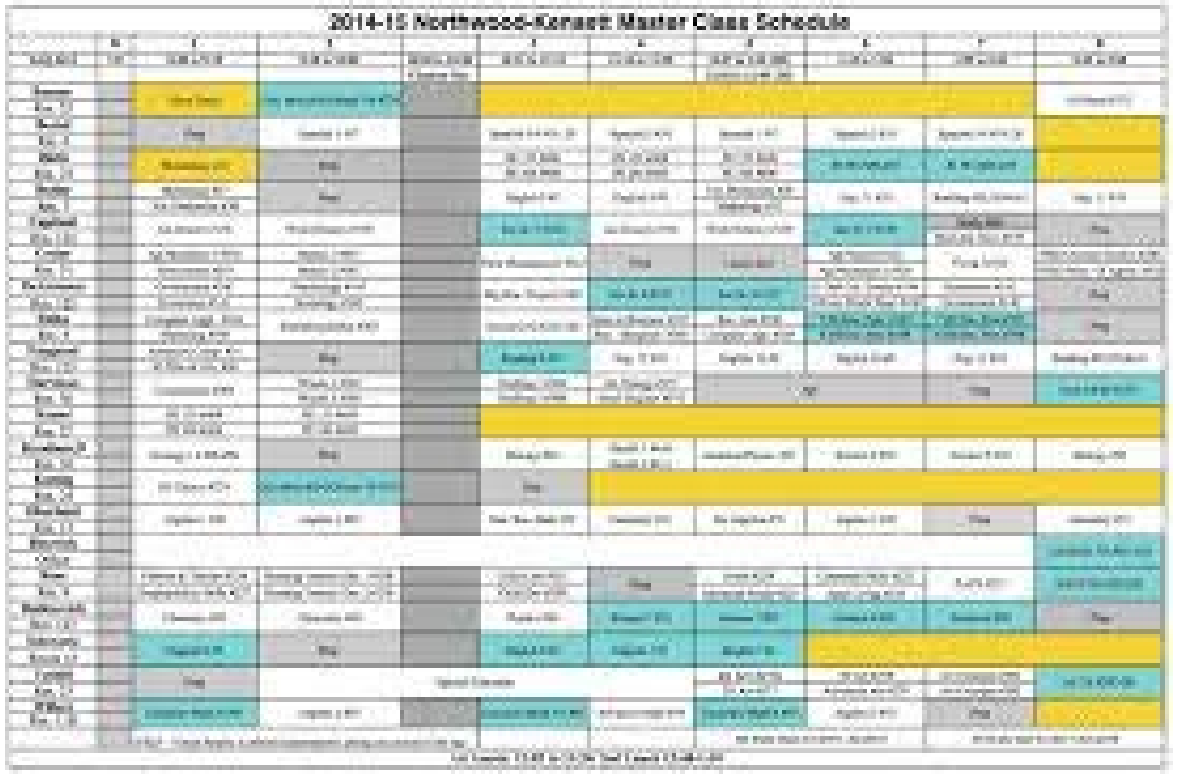
Solve a more challenging problem type.

Games for fluency building.

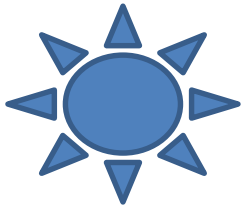
Emphasis on High-Quality Implementation

Dose What is Needed, Not What Fits Schedule





Codding, R., VanDerHeyden, Martin, R. J., & Perrault, L. (2016). Manipulating Treatment Dose: Evaluating the Frequency of a Small Group Intervention Targeting Whole Number Operations. *Learning Disabilities Research & Practice, 31*, 208-220.



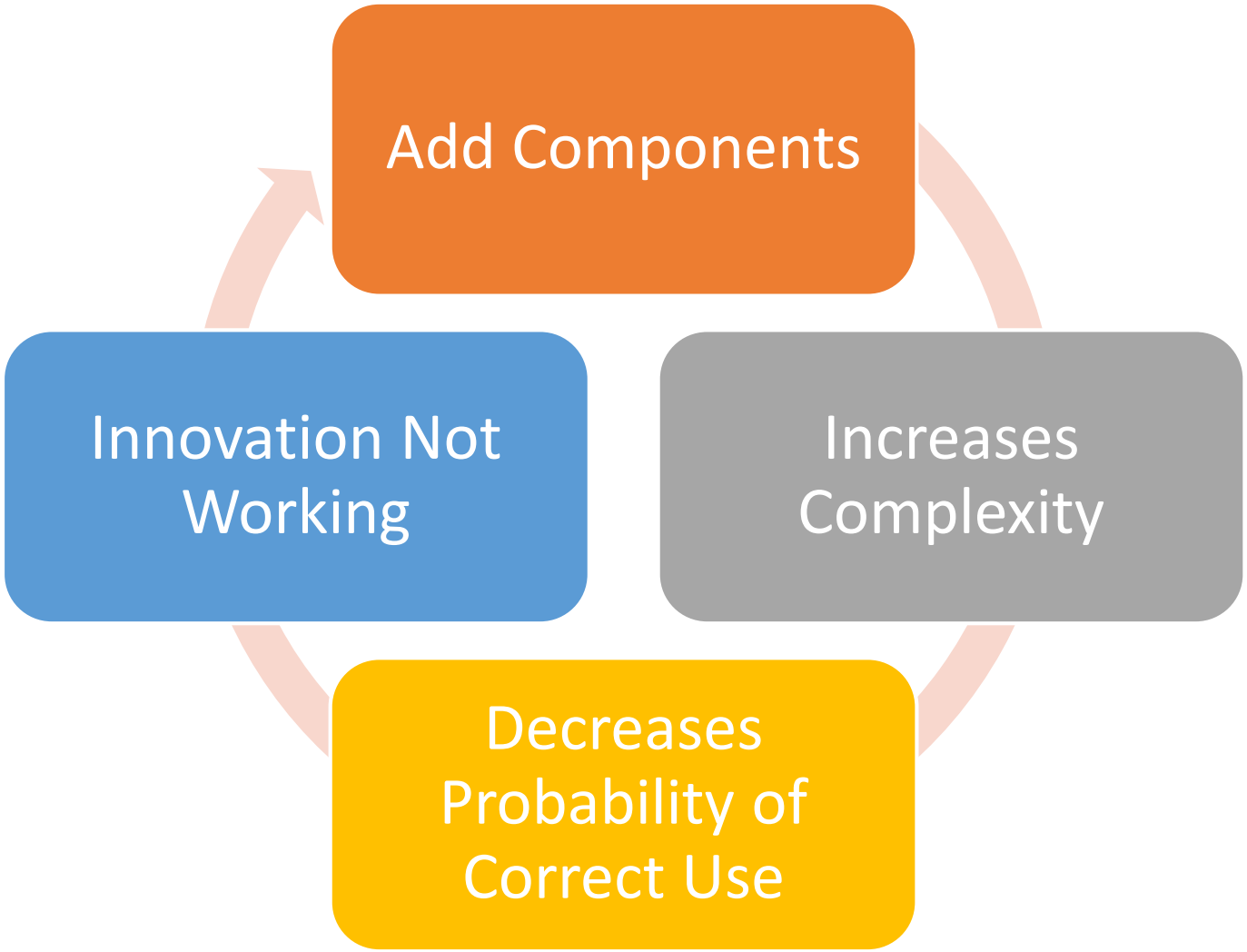
Signs of an Effective Intervention

- Scores available for each week.
- Median increases each week within instructional groupings.
- Most students grow week over week.
- Very few students remain in the frustrational range.
- Few students require more intensive intervention.

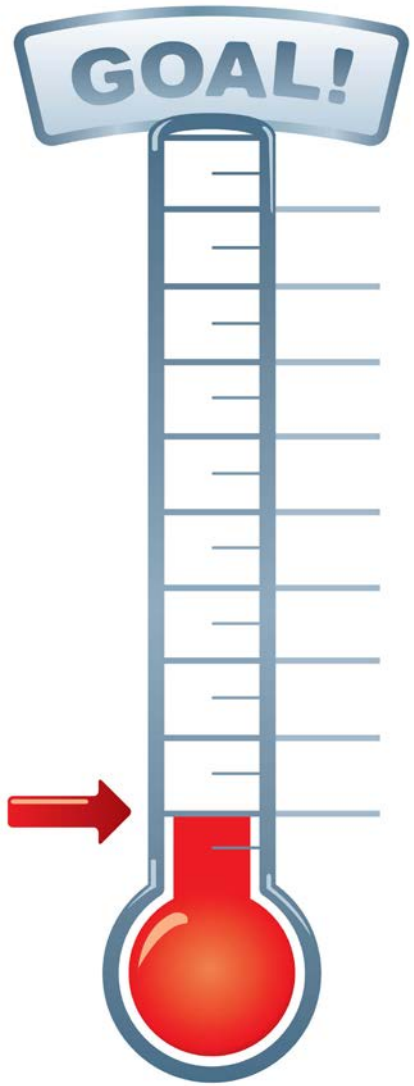
Activity: NCII DBI Implementation Rubric

https://intensiveintervention.org/resource/dbi-implementation-rubric-and-interview

Don’t Do This


Add Components
Increases Complexity
Decreases Probability of Correct Use
Innovation Not Working

Antecedent Supports



A

- Minimize Steps
- Minimize Adults
- Make Easy to Use
- In-Class Training
- Acceptable to Teacher

B

- Intervention Use (quality, consistency)
- Child Response

C

- ?

With Consequent Supports

A

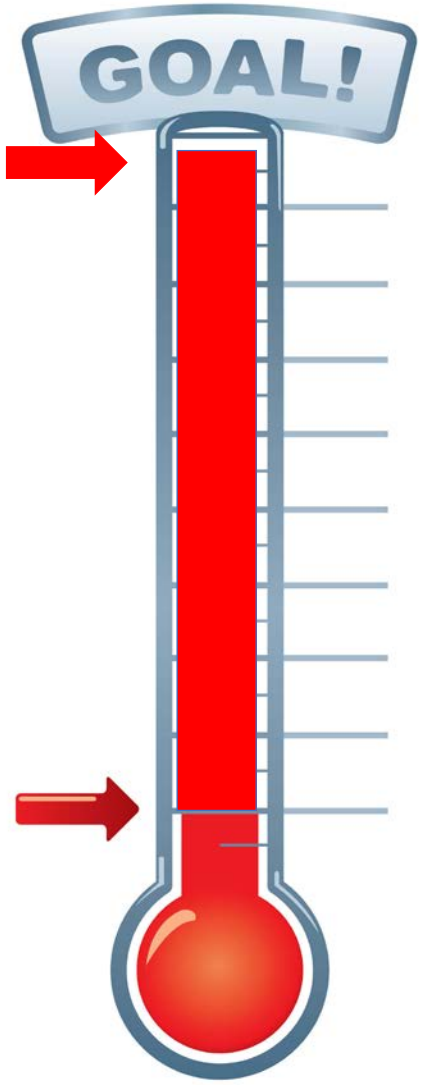
- Minimize Steps
- Minimize Adults
- Make Easy to Use
- In-Class Training
- Acceptable to Teacher

B

- Intervention Use (quality, consistency)
- Child Response

C

- Performance Feedback
  - Graphed
  - Tied to child improvement
  - Weekly

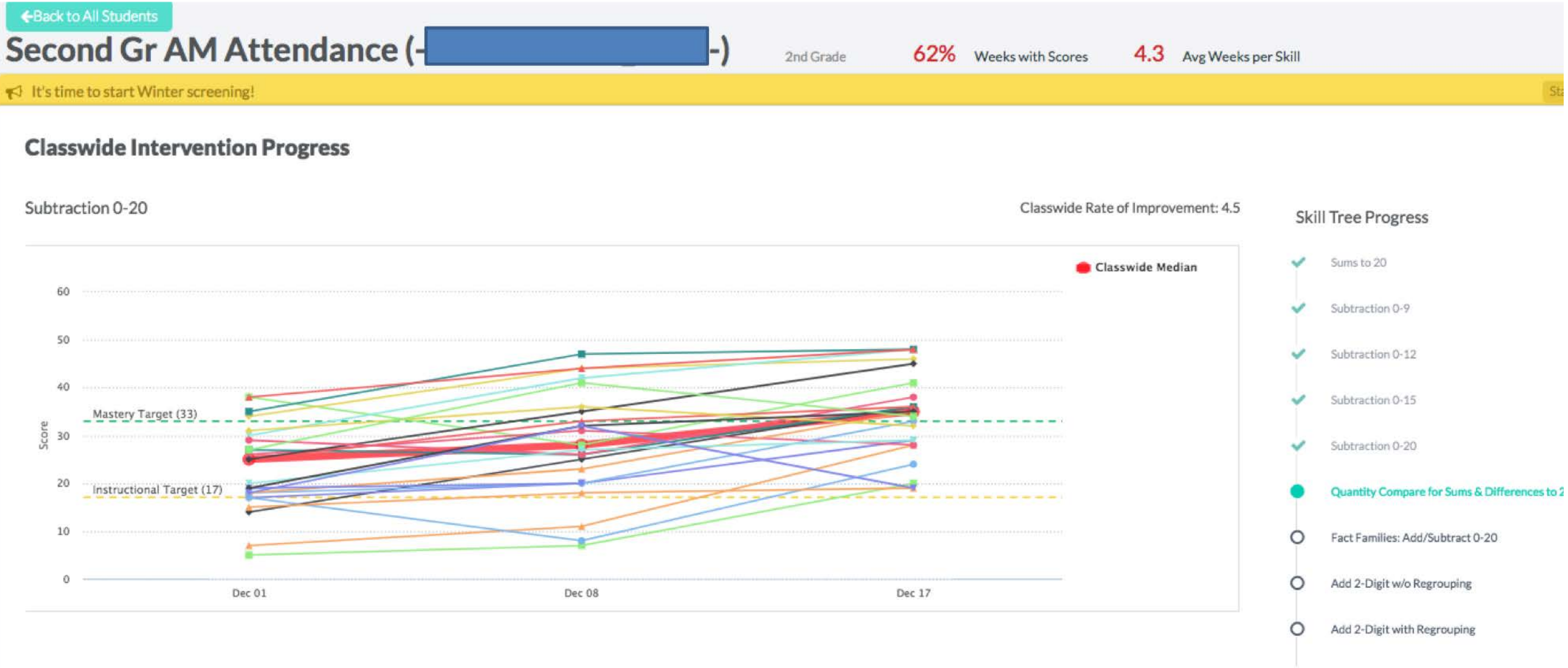


100%

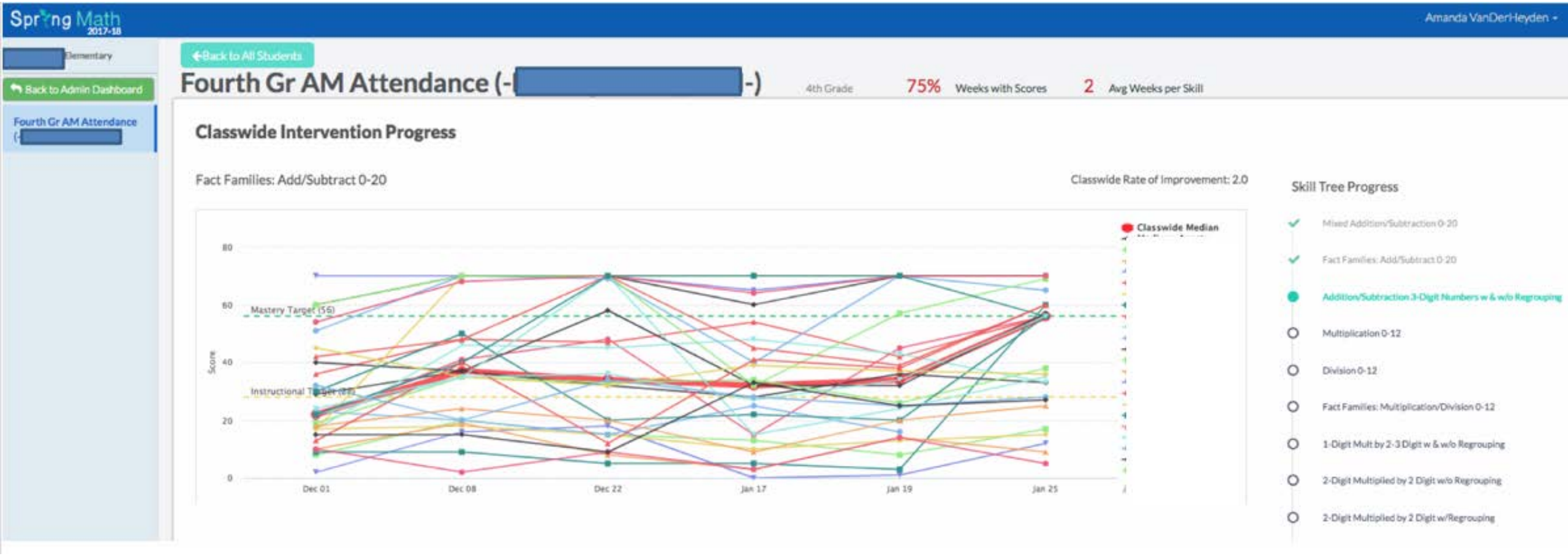
Use Implementation Science

- Plan to be present when intervention is started.
- Track intervention effects weekly.
- When growth is weak, check-in with teacher by watching intervention being implemented.
- Help troubleshoot any barriers and say that you will check in again next week.
- Wash, Rinse, Repeat.

This is a High-Integrity Intervention



This Growth Indicates a Problem



It's time to start Winter screening!

Classwide Intervention Progress

Sums to 6

Classwide Rate of Improvement: 1.8

Skill Tree Progress

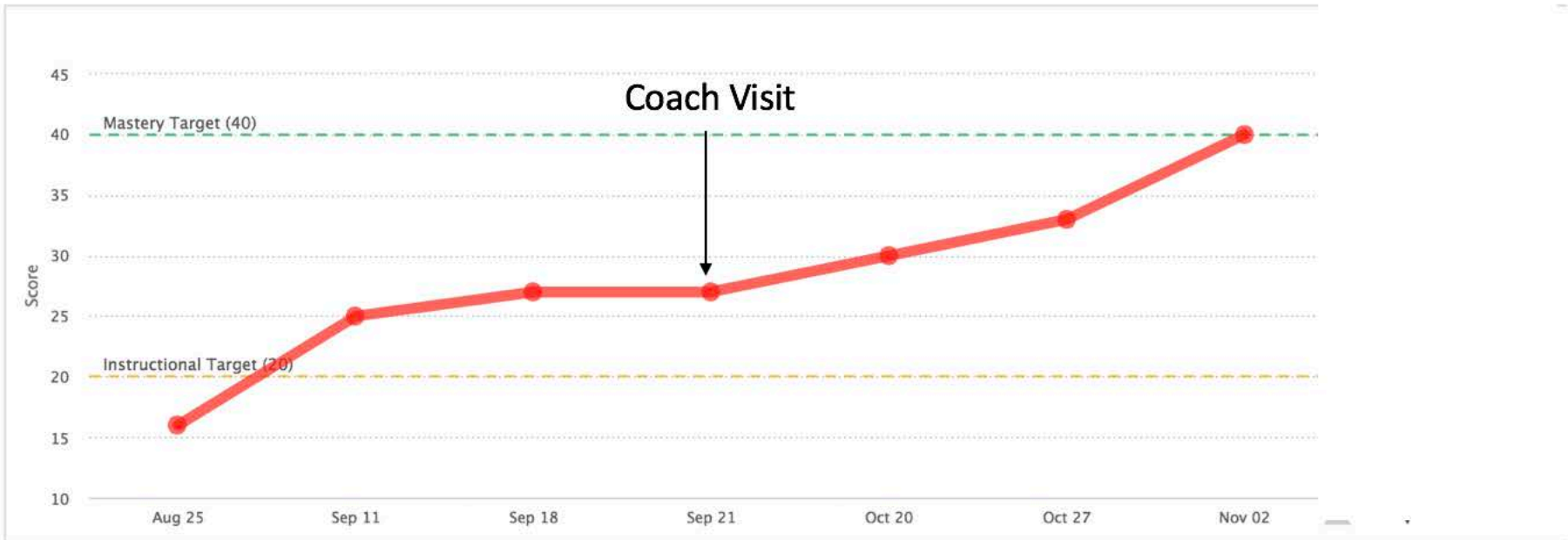
- Sums to 6
- Sums to 12
- Subtraction 0-5
- Sums to 20
- Subtraction 0-9
- Fact Families: Add/Subtract 0-9
- Subtraction 0-12
- Subtraction 0-15
- Subtraction 0-20

It's time to start Winter screening! Start Sc

Classwide Intervention Progress

Sums to 6

Classwide Rate of Improvement: 1.8



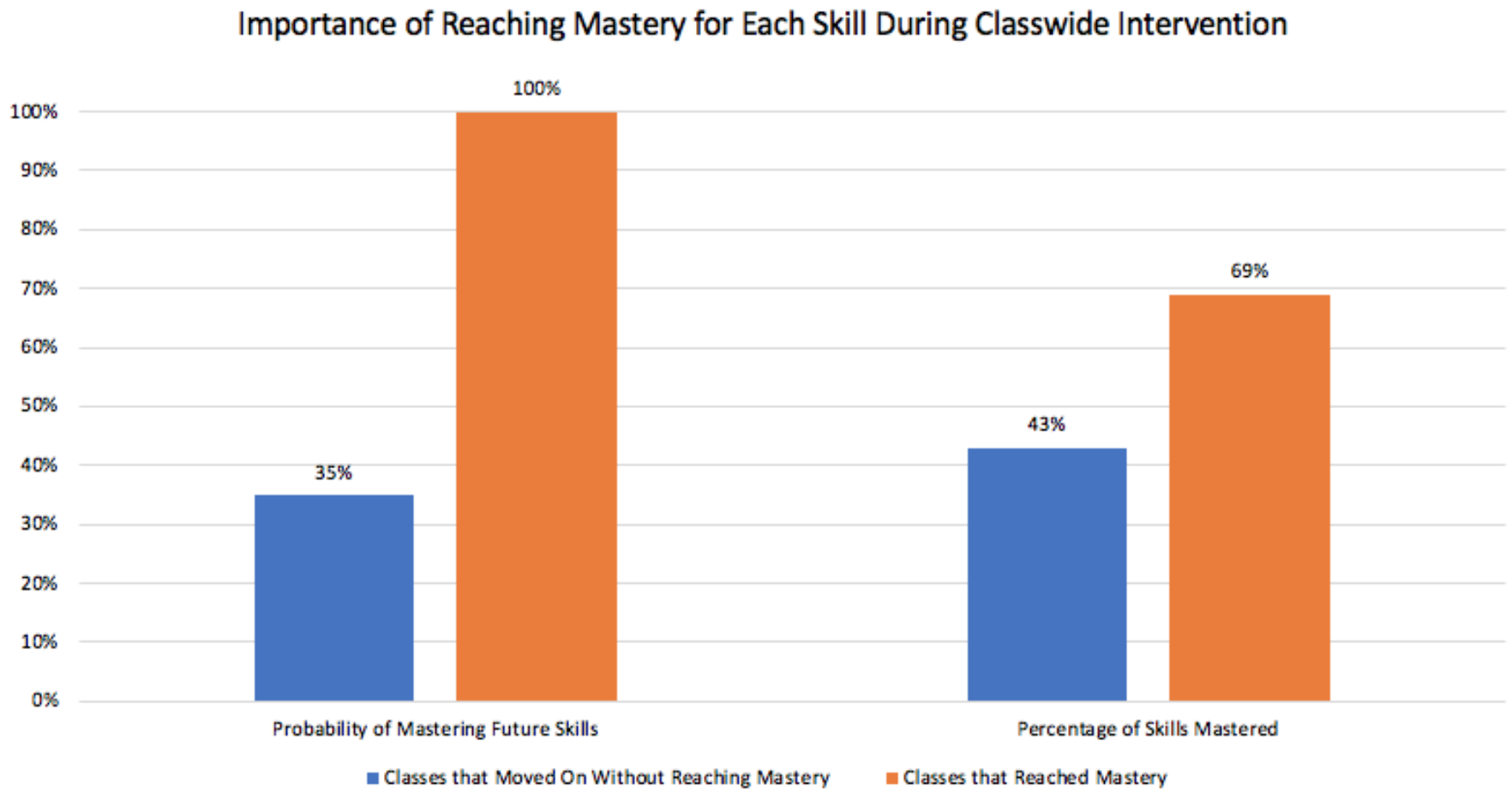
Skill Tree Progress

- Sums to 6
- Sums to 12
- Subtraction 0-5
- Sums to 20
- Subtraction 0-9
- Fact Families: Add/Subtract 0-9
- Subtraction 0-12
- Subtraction 0-15
- Subtraction 0-20

Not doing the intervention.	Make intervention use fail-proof: Make sure you have materials. Make sure you know HOW to implement. Make sure there is a scheduled time for intervention.
Students do not know how to follow the classwide intervention routine.	Re-train the students. Show the students how to get into working pairs, how to use the materials, how to provide high-quality feedback, and how to be engaged.
Teacher is not completing all steps of the intervention.	Review missed steps and understand rationale. Papers must be scored during the intervention because that provides feedback to the student, provides the error correction opportunity, and provides goal attainment opportunity. The error correction component is important because it improves student accuracy for the next session.
Children seem bored with the intervention.	Include rewards to motivate students. Display the median graph on dashboard for the class to see their growth. Be sure to set daily goals with the students!

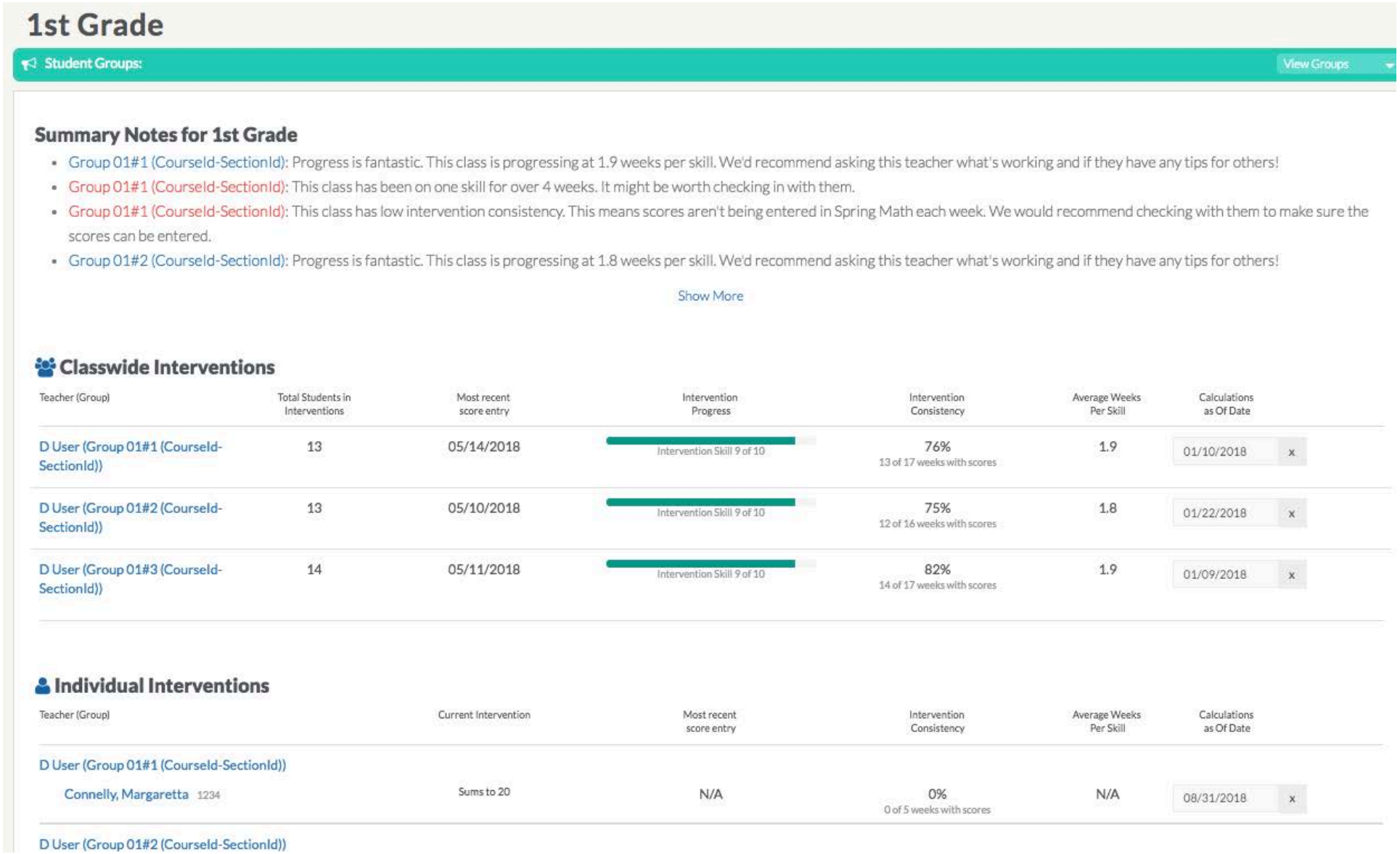
Even Veteran Districts will Drift

My students can't meet the mastery criterion, can we just move on?



What Must Leaders Know?

- What actions are underway?
- What are the results right now?
- Where is support needed?
- Are proximal indicators headed in the right direction?
- What are the barriers we can troubleshoot?



1st Grade

Student Groups: View Groups

Summary Notes for 1st Grade

- Group 01#1 (CourseId-SectionId): Progress is fantastic. This class is progressing at 1.9 weeks per skill. We'd recommend asking this teacher what's working and if they have any tips for others!
- Group 01#1 (CourseId-SectionId): This class has been on one skill for over 4 weeks. It might be worth checking in with them.
- Group 01#1 (CourseId-SectionId): This class has low intervention consistency. This means scores aren't being entered in Spring Math each week. We would recommend checking with them to make sure the scores can be entered.
- Group 01#2 (CourseId-SectionId): Progress is fantastic. This class is progressing at 1.8 weeks per skill. We'd recommend asking this teacher what's working and if they have any tips for others!

Show More

Classwide Interventions

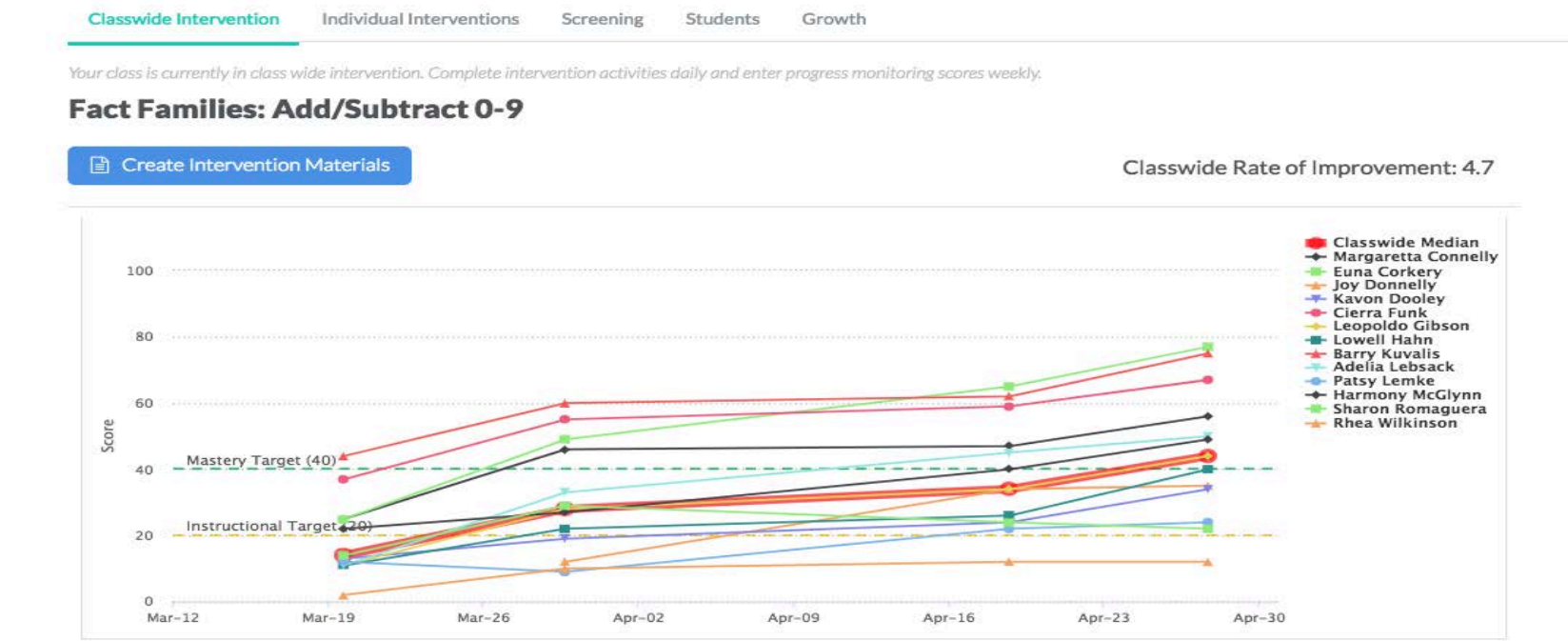
Teacher (Group)	Total Students in Interventions	Most recent score entry	Intervention Progress	Intervention Consistency	Average Weeks Per Skill	Calculations as Of Date
D User (Group 01#1 (CourseId-SectionId))	13	05/14/2018	Intervention Skill 9 of 10	76% 13 of 17 weeks with scores	1.9	01/10/2018 x
D User (Group 01#2 (CourseId-SectionId))	13	05/10/2018	Intervention Skill 9 of 10	75% 12 of 16 weeks with scores	1.8	01/22/2018 x
D User (Group 01#3 (CourseId-SectionId))	14	05/11/2018	Intervention Skill 9 of 10	82% 14 of 17 weeks with scores	1.9	01/09/2018 x

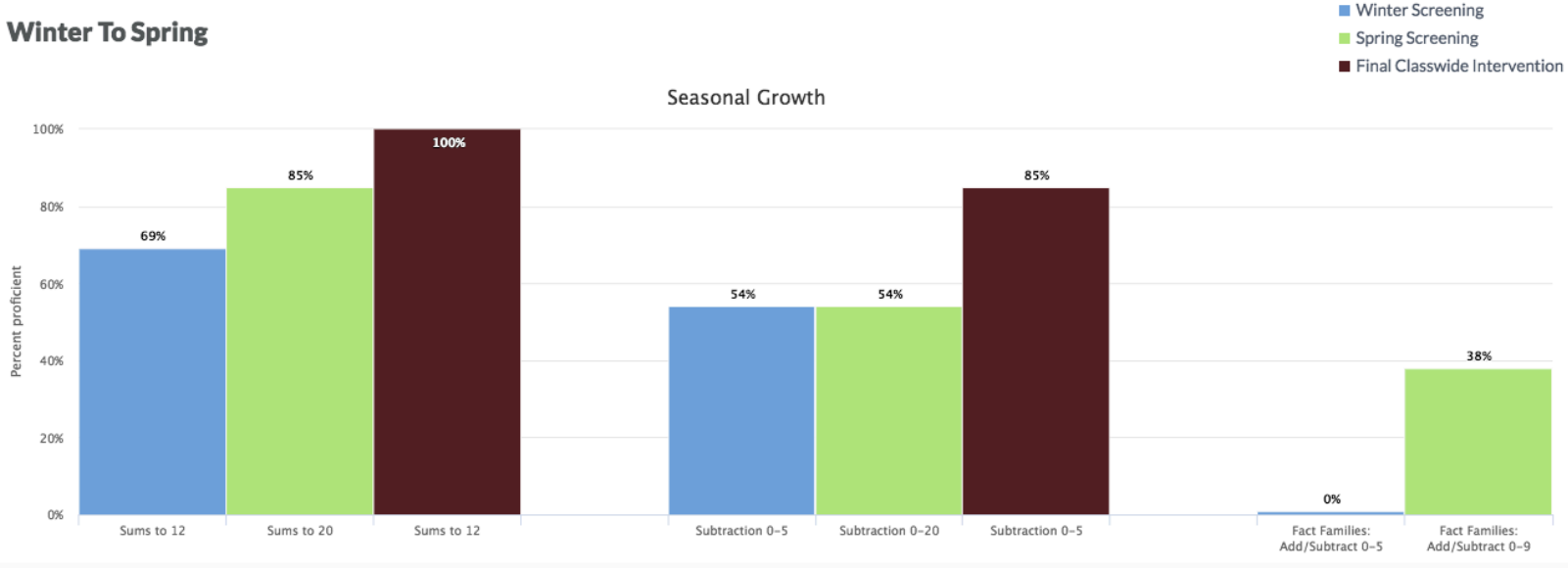
Individual Interventions

Teacher (Group)	Current Intervention	Most recent score entry	Intervention Consistency	Average Weeks Per Skill	Calculations as Of Date
D User (Group 01#1 (CourseId-SectionId))					
Connelly, Margaretta 1234	Sums to 20	N/A	0% 0 of 5 weeks with scores	N/A	08/31/2018 x
D User (Group 01#2 (CourseId-SectionId))					

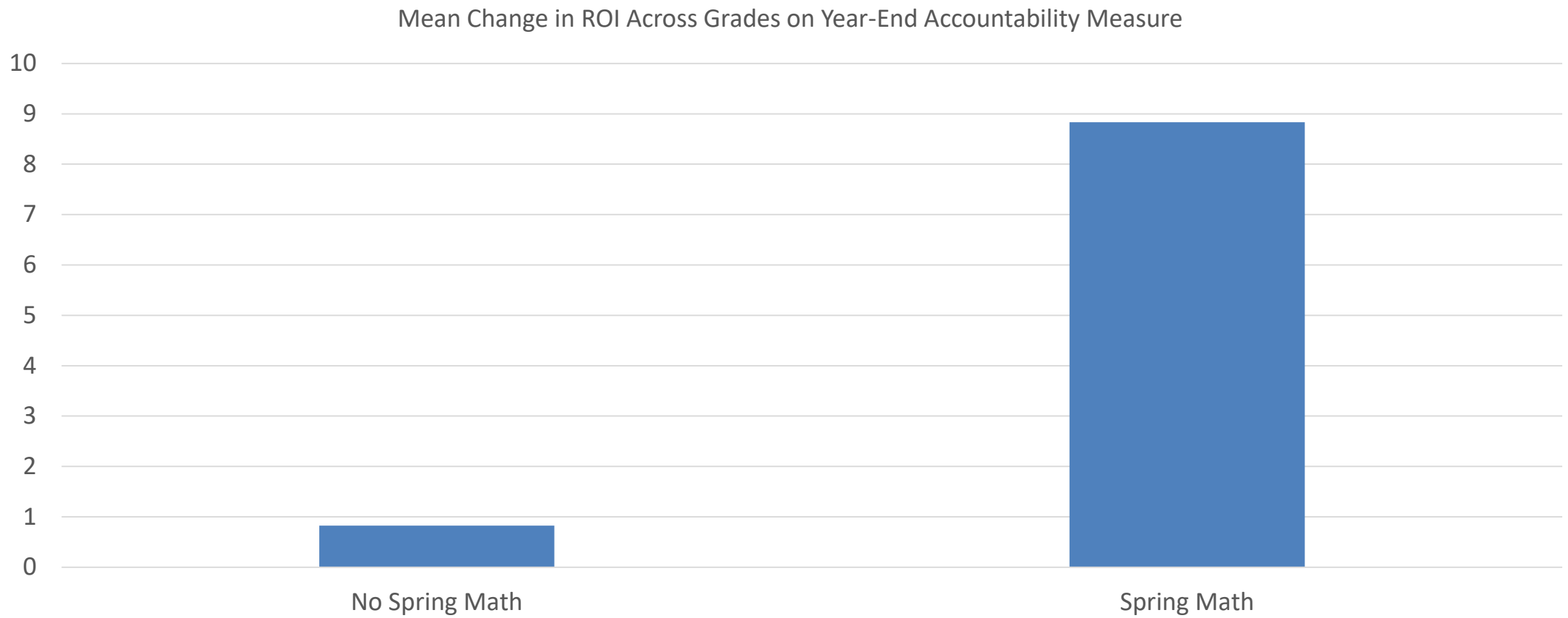
Teacher: Are Students Growing?

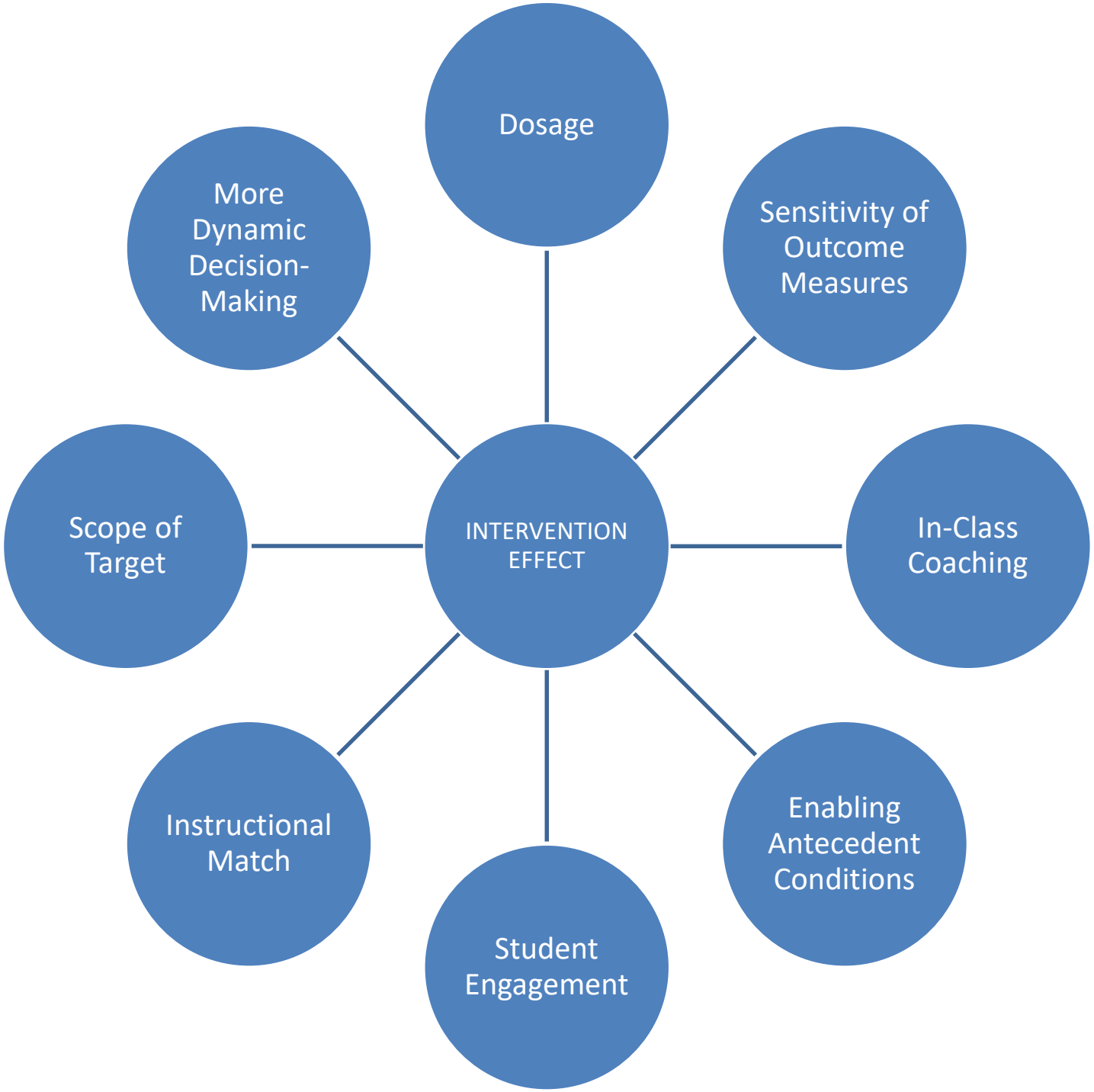
Teacher: Does Growth Transfer?





If You Move the Baby Indicators, You will Move the Big Indicators. It's really not rocket science.





Professional Development

Content Knowledge

Teacher: Student Ratio

Most Typical Intervention “Fixes”

- ✓ Watch the intervention session.
- ✓ Pay attention to dosage.
- ✓ Tighten up rewards.
- ✓ Make sure error correction occurs with high quality everyday.
- ✓ If students are making errors, use pre-teach protocol in support.
- ✓ Integrate review of prerequisite skills and current skills into games and practice opportunities during the school day.
- ✓ Know that some skills take TIME!

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#DoWhatWorks