Data Driven Instruction: Define MASTERY

Reagan Elementary
PBVUSD

Reagan Mission Statement:

To create, inspire and provide excellence in our educational community.

Goals & Agenda

Goals:
- Define why the planning process starts with using interim and summative assessments to *DEFINE MASTERY*.
- Learn and practice a process for *DEFINING MASTERY* based on interim and summative assessments.
- Prepare to continue the work of *DEFINING MASTERY* in your schools.

Agenda:
- Why *DEFINE MASTERY?*
- How to *DEFINE MASTERY*
- Use *DEFINED MASTERY* to analyze student work to find the error & misconception
- Reflection with school team
- Planning for implementation

You are going on a trip.

Make a list of all the things you will need to bring.

Check your neighbor's list. Are they bringing everything they need for a successful trip? Are they missing anything from their list?

[Ski Trip Packing List](#)

Did you make sure your partner would have a successful trip?

Debrief:

Why was it difficult for you to be successful in this activity?

What would you have needed in order to be successful?

WHY do we need to define MASTERY of a standard?

Standard 6.RP.A.3: Students will be able to understand and use percent of a number in a variety of real-world situations.

1. 50% of 20:
2. 67% of 81:
3. Shawn got 7 correct answers out of 10 possible answers on his science test. What percent did he get correct?
4. J.J. Redick was on pace to set an NCAA record in career free throw percentage. Leading into the NCAA tournament in 2004, he made 97 out of 104 free throw attempts. What percent of free throws did he make?
5. J.J. Redick was on pace to set an NCAA record in career free throw percentage. Leading into the NCAA tournament in 2004, he made 97 out of 104 free throw attempts. In the first tournament game, Redick missed his first five free throws. How far did his percentage drop from before the tournament game to right after missing those free throws?
6. J.J Redick and Chris Paul were competing for the best free throw shooting percentage. Redick made 94% of this first 103 shots, while Paul made 47 out of 51 shots.
   - Which one had a better shooting percentage?
   - In the next game, Redick made only 2 of 10 shots while Paul made 7 of 10. What are their new overall shooting percentages? Who is a better shooter?
   - Jason argued that if Paul and J.J. each made the next ten shots, their shooting percentages would go up the same amount. Is this true? Why or why not?

Assessment Reflection

- Which of these questions is most rigorous? Why?

- What are the differences between these six questions of the same standard?

- What is the impact if there are three teachers teaching the same standard but they all use different questions from the list to assess mastery?

CORE IDEA

Standards and objectives are meaningless until you <u>define how to assess them</u> & <u>define mastery</u>.

Because of this, assessments are the starting point for instruction, not the end.

Key steps to DEFINE MASTERY

Unpack the standard- What do students need to know, understand, and do to demonstrate mastery?

Use summative & interim assessments - Use the summative and upcoming interim assessments to ensure formative assessments & lessons are aligned

Create formative assessments - Align formative assessments to the rigor of the summative assessments and upcoming interim assessments

Create exemplars- Define what mastery on the formative assessments looks like

Identify potential errors & misconceptions - Predict where students will struggle & how to respond
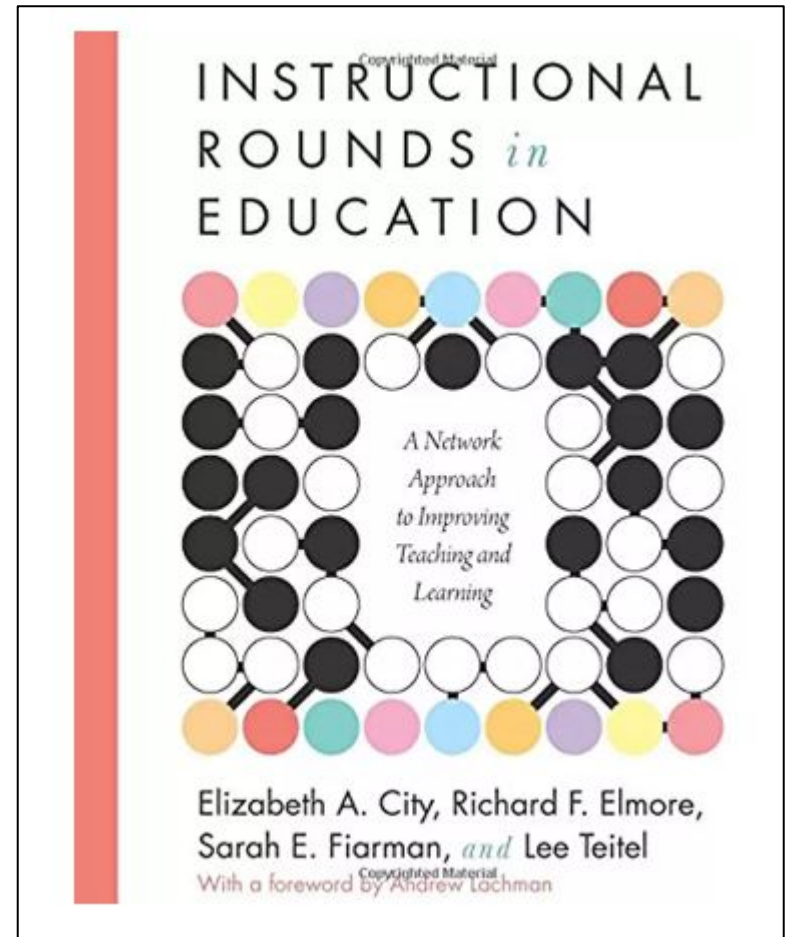
CORE IDEA

Defining <u>mastery</u> of the standards enables us to <u>set the bar</u> for what we expect from students & figure out how to <u>get students to reach and exceed the bar</u>.

HOW do we DEFINE MASTERY of a standard?

We learn the work by doing the work…..

*"We learn the work by doing the work, **not** by telling other people to do the work, **not** by having done the work at some time in the past, and **not** by hiring experts who can act as proxies for our knowledge about how to do the work."*

INSTRUCTIONAL ROUNDS *in* EDUCATION

A Network Approach to Improving Teaching and Learning

Elizabeth A. City, Richard F. Elmore, Sarah E. Fiarman, *and* Lee Teitel

With a foreword by Andrew Lachman

HOW do we **DEFINE MASTERY** of a standard?

- **Unpack the standard**
- **Use summative & interim assessments**
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Unpack the Standard

Focus Standard: 5.NF.A.2

CCSS.MATH.CONTENT.5.NF.A.2

Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

Unpack the focus standard:

What do students need to **know, understand**, or **do** to show mastery of this standard?

Unpack the Standard

5.NF.A.2

What does a student need to know, understand, or do to show MASTERY of this standard?

Achievement LEVEL Descriptors:

RANGE Achievement Level Descriptor (Range ALD) Target E: Use equivalent fractions as a strategy to add and subtract fractions.	**Level 1** Students should be able to add two fractions and mixed numbers with unlike denominators and subtract two fractions with unlike denominators when one denominator is a factor of the other in mathematical problems (denominators < 12). They should be able to use benchmark fractions (1/4s and 1/2s) and number sense with fractions to estimate mentally and assess the reasonableness of answers.
	Level 2 Students should be able to add fractions and mixed numbers with unlike denominators (denominators ≤12) in mathematical problems, subtract a mixed number from a whole number (denominators up to 4), and use benchmark fractions to estimate mentally and assess the reasonableness of answers (denominators ≤12).
	Level 3 Students should be able to add and subtract fractions and mixed numbers with unlike denominators in word problems and use number sense of fractions to estimate mentally and assess the reasonableness of answers.
	Level 4 No Descriptor
Evidence Required:	1. The student adds or subtracts fractions with unlike denominators (including mixed numbers) by using visual fraction models or equations to represent the problem. 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).

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Use Summative & Interim Assessments

- Answer the questions on the upcoming interim assessments and end of year summative assessments aligned to this standard.
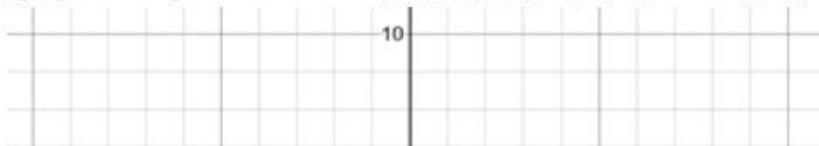- Based on these assessments, what else does a student need to know, understand or do to show MASTERY of this standard?

5.NF.A.2 INTERIM ASSESSMENT ITEMS

8.G.A.3 INTERIM ASSESSMENT ITEMS

Similarity Task - Dilation on the Plane

1. On the graph below, graph rectangle ABCD with A(3, 4), B(-1, 4), C(-1, -2), and D(3, -2).

2. On the same graph in a different color, use the origin as the center to dilate ABCD by a scale factor of 2 and create A'B'C'D'. Label the new coordinates.
3. On the same graph in a different color, translate A'B'C'D' down 5 units and left 3 units to create A"B"C"D". Label the new coordinates.

4. Calculate the length, width, perimeter, and area of each rectangle.

	Length	Width	Perimeter	Area
ABCD				
A'B'C'D'				
A"B"C"D"				

5. What did you notice from your table? Make a conjecture about your data and try to determine whether it is always true.

Kim's class voted on a location for their field trip.
- ¾ of the class voted for the museum
- ⅛ of the class voted for the zoo

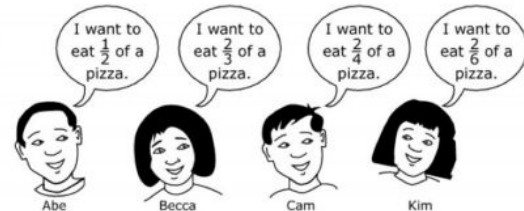The rest of the class voted for the nature park.

What fraction of the class voted for the nature park?

A) ⅛
B) ½
C) ⅝
D) ⅞

Logan ran $3\frac{5}{12}$ miles on Friday and $2\frac{3}{8}$ miles on Saturday. He rode his bike $9\frac{5}{6}$ miles on Sunday. How much farther did he ride his bike than run?

Four students plan to share the cost for ordering pizza. Each student says how much of a whole pizza they want to eat, as shown.

I want to eat $\frac{1}{2}$ of a pizza.   Abe

I want to eat $\frac{2}{3}$ of a pizza.   Becca

I want to eat $\frac{2}{4}$ of a pizza.   Cam

I want to eat $\frac{2}{6}$ of a pizza.   Kim

TM2
Stimulus: Transformations will include rotation, reflection, dilation, and/or translation.

Example Stem: Consider this figure.
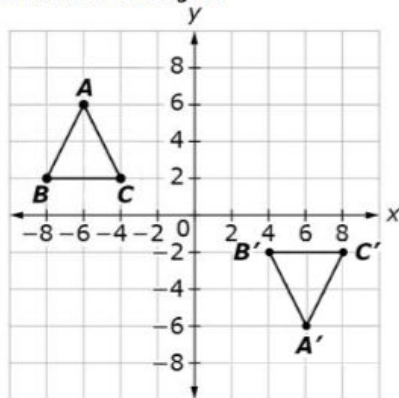
Consider the statements in the table shown. Select True or False for each statement about the sequences of transformations that can verify that triangle *ABC* is congruent to triangle *A'B'C'*.

Statement	True	False
Triangle *ABC* is translated 12 units to the right, followed by a reflection across the *x*–axis.		
Triangle *ABC* is a reflected across the *y*–axis, followed by a translation 12 units down.		
Triangle *ABC* is reflected across the *x*–axis, followed by a translation 12 units to the right.		

Rubric: (1 point) The student selects True or False for the correct sequence of transformations for the figure (e.g., T, F, T).

TM2c
Stimulus: The student is presented with a real-world subtraction problem involving fractions with unlike denominators.

Example Stem: Sara has $1\frac{3}{4}$ feet of cloth. She used $\frac{1}{3}$ foot to make a bow. Which expression could be used to correctly determine the amount of cloth, in feet, that remains?

A. $1 - \frac{3}{12} - \frac{1}{12}$

B. $1 - \frac{9}{12} - \frac{4}{12}$

C. $1 + \frac{3}{12} - \frac{1}{12}$

D. $1 + \frac{9}{12} - \frac{4}{12}$

Rubric: (1 point) The student selects the correct equivalent expression (e.g., D; D).

Add to your chart:
Based on the interim and summative assessment items, is there anything else a student would need to know, understand or do to show mastery?

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Create the Formative Assessment

- What items will we use to formatively assess students to determine if they have mastered this standard? (exit ticket, quiz, task, etc.)
- Use interim & summative assessments as a guide for finding and/or writing formative assessments.
- We should have NextGen Math as a resource in the new year. (Also available now if you sign up for a trial)

Aligned Formative Items?

5.NF.2

i.
$$6 \frac{1}{2}$$
$$+ \ 4 \frac{3}{16}$$

j.
$$7 \frac{1}{6}$$
$$+ \ 2 \frac{1}{3}$$

1. **Write a fraction for shaded parts of every pair of images. Are both fractions in the pair like or unlike?**
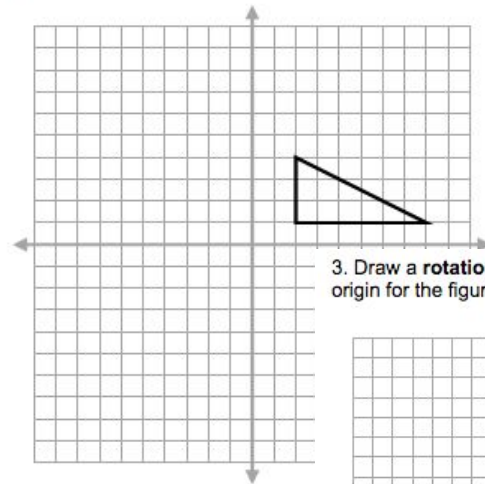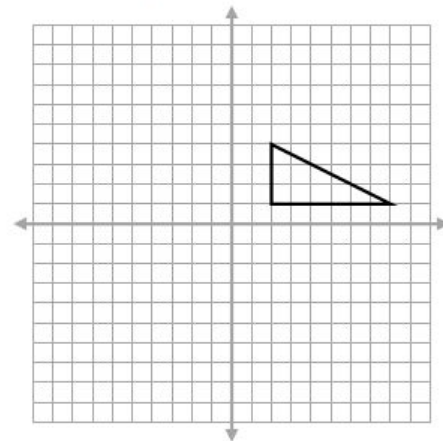
a.

b.

8.G.3

1. Draw a **reflection** of the figure shown over the x-axis.

3. Draw a **rotation** of 90° clockwise about the origin for the figure shown.

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Create the Exemplar

- What is the ideal answer we would want to see from students to demonstrate MASTERY of this standard?
- Is there more than one way a student can demonstrate mastery?

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Identify Potential Misconceptions

- Based on the exemplar and your knowledge of your students, what errors or misconceptions do you anticipate from students?
- How will you address them?

Reflection & Discussion:

How will the work we just did to DEFINE MASTERY make both teaching the standard & analyzing data/student work easier?

How will it ensure depth & quality in both our lessons and data discussions?

Errors & Misconceptions

Start with the exemplary student work
- What are students doing to get these right? What are the keys to an ideal answer? (Is this different than your teacher exemplar?)

Looking at the partial mastery/almost mastery student work
- What are the gaps between the partial mastery student work and the exemplary student work/ teacher exemplar?
- Analyze process and content: What do you see students doing that led to this error?

Name the error and conceptual misunderstanding
- What is the conceptual misunderstanding that is evident from the student error?
- State both the error and the misunderstanding
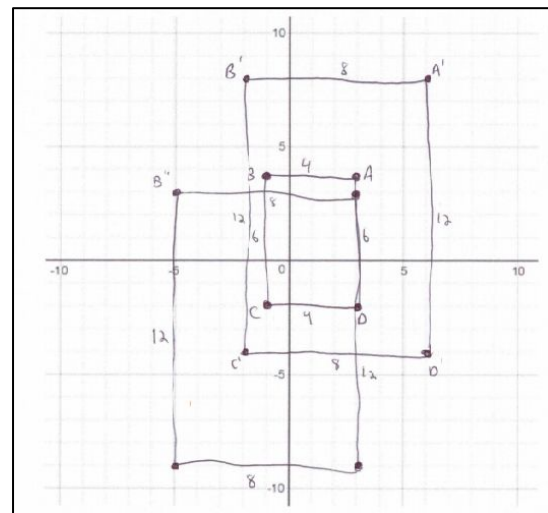
Team Reflection:

- Why is DEFINING MASTERY before teaching important?
- What impact does it have on instruction?
- What impact does it have on how we respond to assessment data?
- How will we implement this process in our school?

Planning & Practice:

Go through the process of DEFINING MASTERY for one of your focus standards.

Pick a standard from your Mathematics Interim 3 assessment which is a key standard, appears often in the assessment or repeats across the Interims, or may have been frequently missed on Interim 2.

- Unpack the Standard
- Work the representative problem(s) on the Interim 3 assessment
- Create an exemplar
- Identifiy potential errors and misconceptions
- Review curriculum to ensure it is aligned with standard and exemplar

Planning for implementation:

Define your grade level team moves:

- What will you need to do in the next few days or weeks to continue this work?
- What will you need to do to ensure continuous improvement in this work over time?