

**Measure What Matters:  
Building an Assessment System for Everyone's Learning**

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# NCTM stuff

- [www.nctm.org/confapp](http://www.nctm.org/confapp)
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# Why Assessment?

## **Improve student learning**

Assessment to inform instruction

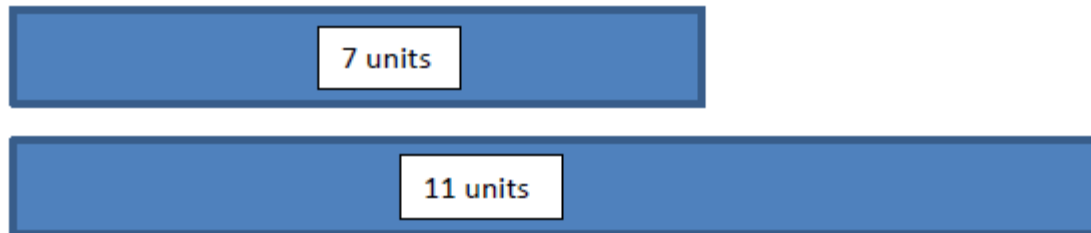
- We have to start with what the student knows.
- We need to understand how students learn.

To guide and support students’ construction of meaning for specific mathematical topics, we must understand how students construct meaning for these topics.”

Michael Battista - NCTM 2013

“The top rectangle here is 7 units long. The rectangle on the bottom is 11 units. How much longer is the bottom rectangle than the top rectangle?”

Another possible phrasing: “What is the difference in the length of the top rectangle and the bottom one?”



3

Student recognizes the problem as a comparison problem and uses the measurements to make a numeric comparison.

2

Student needs a rephrasing of the problem in order to conceptualize that this is a comparison problem.

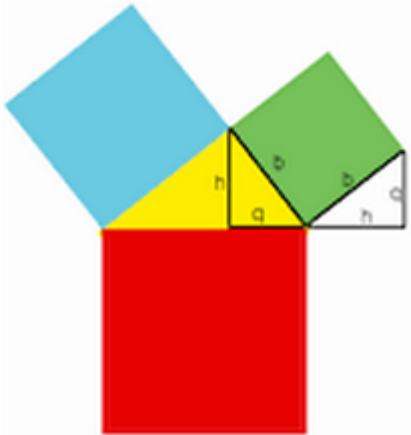
Or

The student compares but does not use the measurements provided to compare the two bars.

1

Student is unable to conceptualize the idea of the comparison. The might answer something like “11.”

# Assessment to better understand standards.

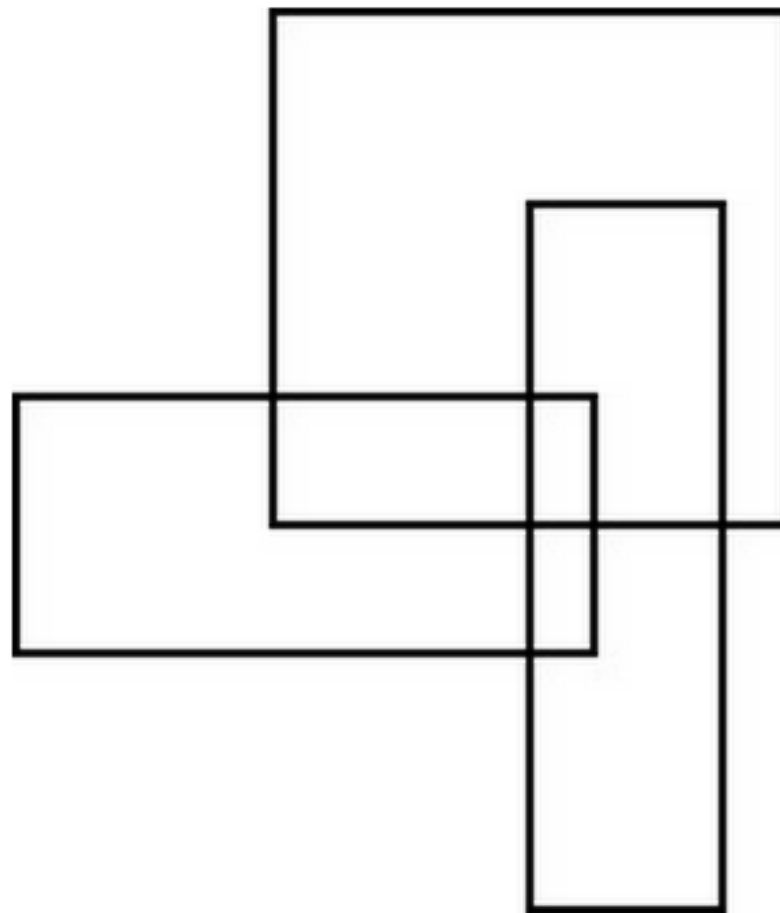


[IllustrativeMathematics.org](http://IllustrativeMathematics.org)

CCSS.Math.Content.1.G.A.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.



How many rectangles are in this picture?



# Assessment to Define the Standards

## CCSS.Math.Content.1.NBT.A.1

Count to 120, starting at any number less than 120.

Forward: **“Start counting from 96 and I will tell you when to stop.”** (Stop at 120)

If student is unsuccessful counting to 120, say, **“Start counting from 84.”** (Stop at 100)

Backward:

**“Now we are going to count backward, like 3, 2, 1. Start counting back from 100 and I will tell you when to stop.”**  
(Stop at 87)

**“Keep counting down now from 32.”** (Stop at 10)

## CCSS.Math.Content.5.NBT.B.7

Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

# Assessment to define progress toward standards.

## **Kindergarten Counting**

- 1<sup>st</sup> Trimester – Fluently and accurately to 20
- 2<sup>nd</sup> Trimester -Fluently and accurately to 30  
and count by 10s.
- End of Year– Fluently and accurately to 100.

**Or**

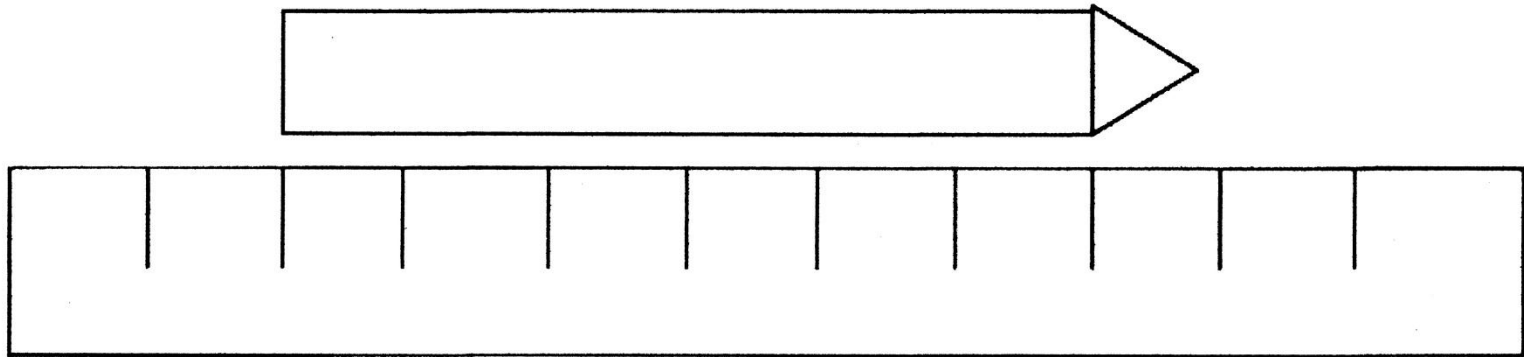
- 1<sup>st</sup> Trimester- Fluently and accurately to 30
- 2<sup>nd</sup> Trimester – Fluently and accurately to 60
- 3<sup>rd</sup> Trimester – Fluently and accurately to 100  
and count by 10s

# Emphasis and Sequence

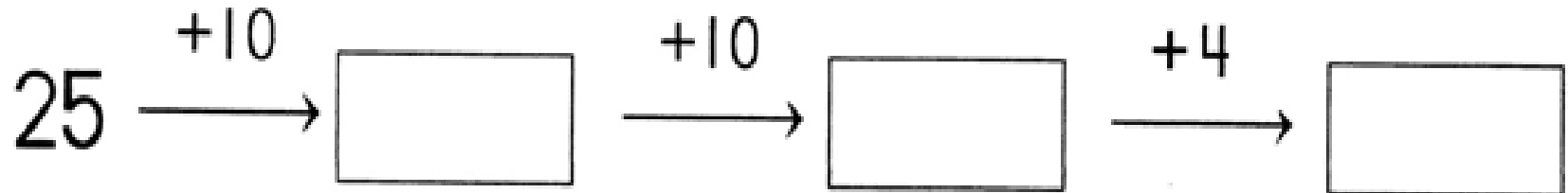
## **Number Sense Proficiencies**

- Verbal number sequences
- Magnitude comparisons
- Strategic counting
- Word problems
- Fact fluency
- Number line and the conceptualization of successive iterations of equal size regardless of where they are on the number line.

Assessment to better  
understand mathematics.



# Arrow Language



~~$25 + 10 = 35 + 10 = 45 + 4 = 49$~~

Tarik used arrow language to solve  $37 + 26$ .  
Finish his solution by filling in the boxes.

$$37 \xrightarrow{+3} 40 \xrightarrow{\boxed{\phantom{00}}} 60 \xrightarrow{\boxed{\phantom{00}}} \boxed{\phantom{0000}}$$

Use arrow language to show the steps that you could use to solve  
 $84 - 25$



# Assessment to communicate

- To teachers  
(as a way to get it out to everyone)
- With one another
- To students
- To parents
- To administration
- To the community (and the politicians)

# Communicating Values



Student:

Teacher:

Date:

**1**

$$\begin{array}{r} 2 \\ + 3 \\ \hline \end{array}$$

**2**

$$\begin{array}{r} 12 \\ + 6 \\ \hline \end{array}$$

**3**

$$\begin{array}{r} 3 \\ - 1 \\ \hline \end{array}$$

**4**

$$14 + 5 =$$

\_\_\_\_\_

**5**

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

**6**

$$12 - 2 =$$

\_\_\_\_\_

**7**

$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

**8**

$$\begin{array}{r} 17 \\ + 10 \\ \hline \end{array}$$

**9**

$$\begin{array}{r} 18 \\ + 15 \\ \hline \end{array}$$

**10**

$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$$

**11**

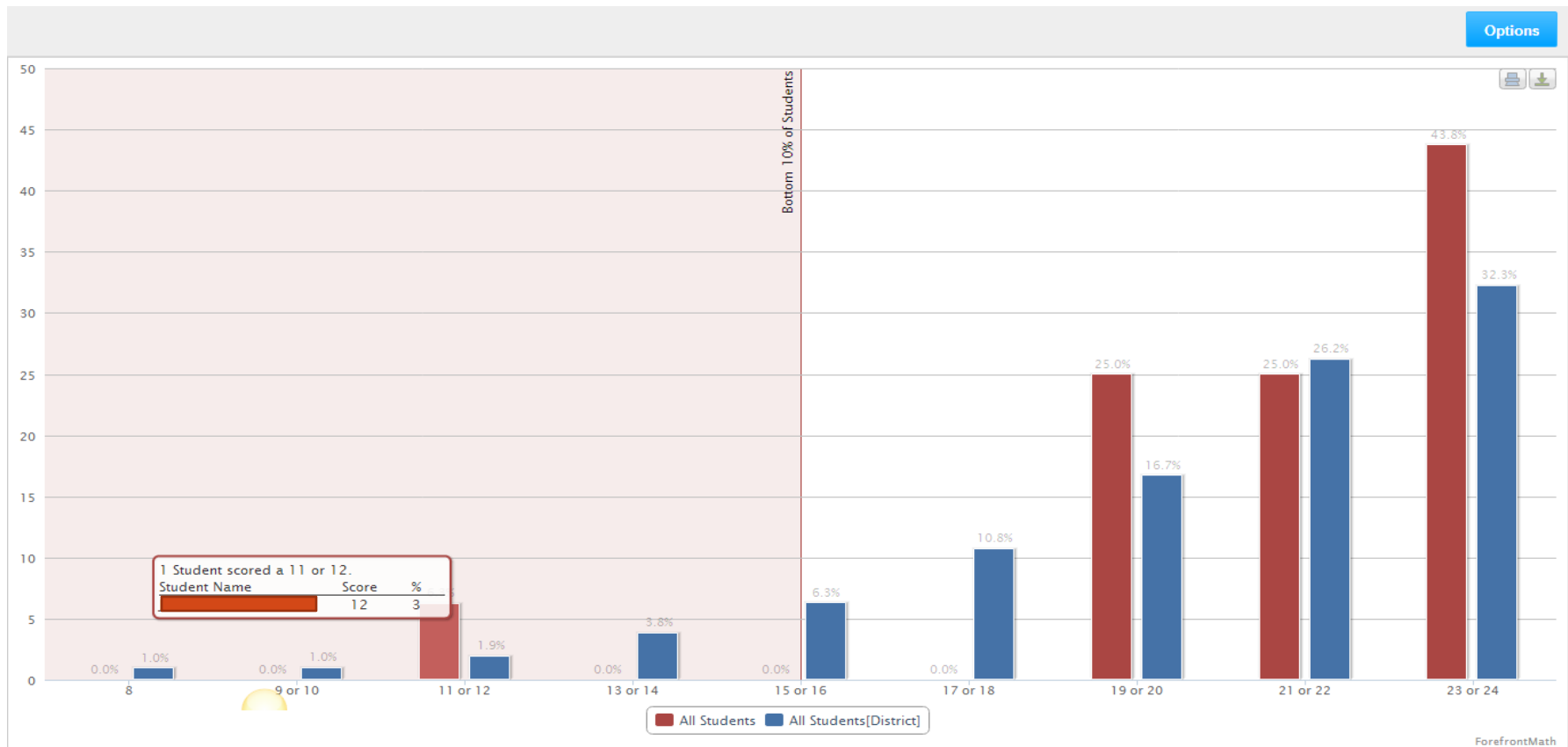
$$\begin{array}{r} 12 \\ - 5 \\ \hline \end{array}$$

**12**

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

SAMPLE  
DAGE

# Assessment to gain perspective and make sometimes hugely important decisions

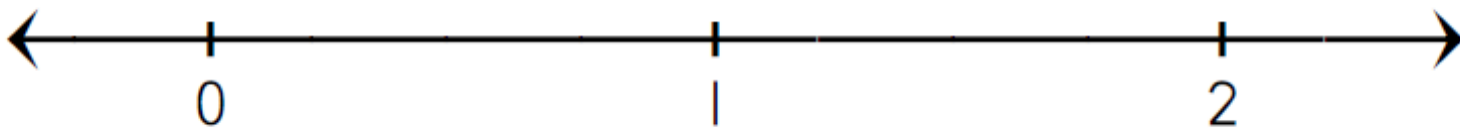


Place these numbers on the number line.

1.5

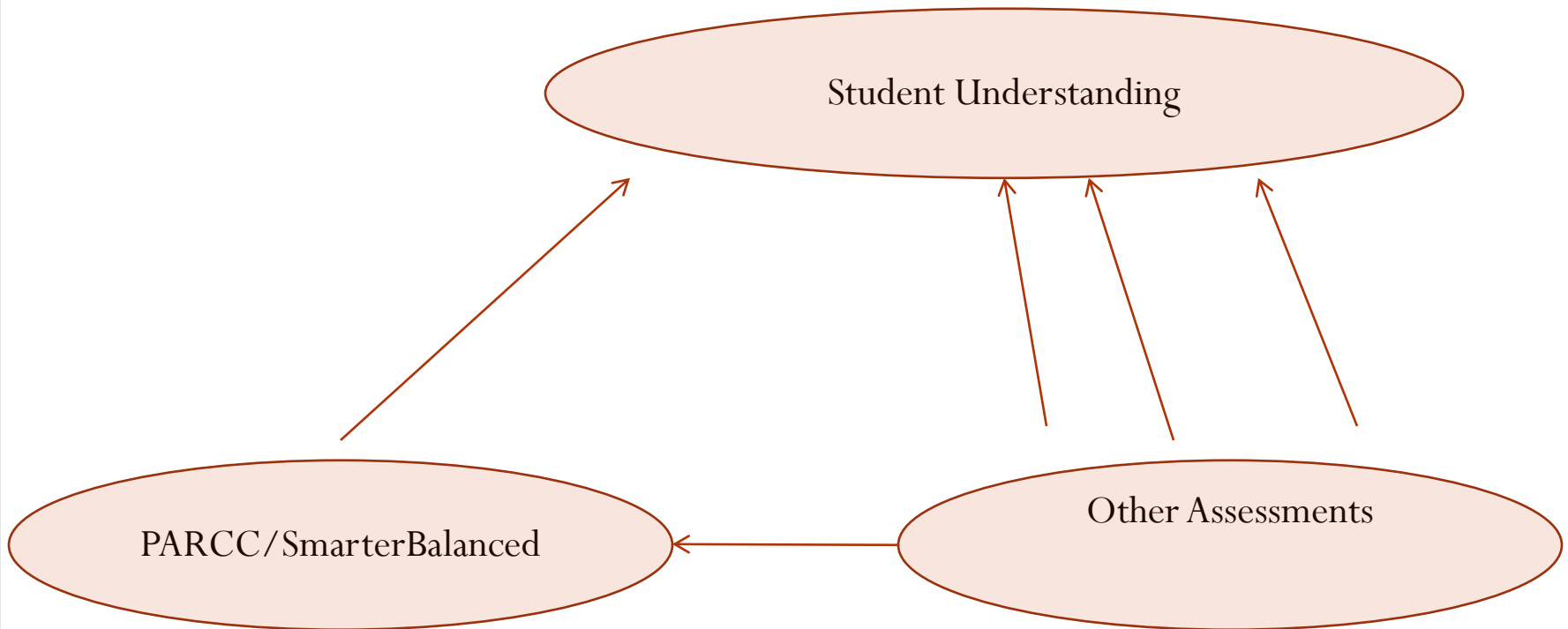
$1\frac{3}{4}$

$\frac{2}{3}$





Assessment to triangulate and understand other assessments, and understand student growth.



Why Assessment?

To improve student learning.



Simple solutions to  
complex problems in  
education are not  
solutions at all.

“When teachers work together to create assessments for all students in the same course or grade, the results can be astounding.”

Grant Stiggins Rick Defour, 2009

# Testing vs. Assessment

Testing without assessment.

Assessment without testing.

# Let's Take Control!

Our students

Our systems

Our assessments

**Empower teachers to empower themselves.**

As professionals we must be proactive in response to legislation related to teacher effectiveness.

# The History

- The Colorado Department of Education Closing the Achievement Gap Grants
- Mary Pittman
  - With an eye on creating systems and delivering high quality professional development
- Jonathan Brendefer
  - With an eye on increasing teacher content knowledge

# The Founding of Forefront Math

ForeFront Math

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# UNITY

A powerful suite of cloud based tools designed to make it easy for you to create assessments, collect data, and generate reports on your students progress

# Some lessons that we have learned (so far)

- Rubrics
- Answer keys
- Scoring guides

CAS 1.1.1.c.iii

4	3	2	1
<p>Student can mentally add and subtract 10s from any number, crossing decade and century numbers up to 1000 and can explain their mental strategies.</p>	<p>Student can mentally add or subtract 10 more or 10 less to any two-digit number up to 100 without counting by ones and explains strategy used.</p>	<p>Student can add 10 more or 10 less to any two-digit number with the help of materials.</p>	<p>Student is unable to add 10 more or 10 less to any number using materials.</p>



# The System

## **The Assessment Builder**

Item bank organized around standards

- Rubrics
  - Tasks
  - Interview
- Assorted files
  - Scoring guides
  - Work samples
  - Video

# The Assessment Builder continued

- Create custom assessments
- Create common assessments for teams and for districts.

# The Grade Book/Reporting System

- Collect aggregate data
- Establish local norms
- View data by class, school, or district
- Track data over time

# The Screeners

- The BVSD screeners
- Fall K- 5 will be aligned with Common Core State Standards.
- K-2 trimester screeners.

# Where We are Heading

- Multi-dimensional assessment
  - Multiple media
    - Interview
    - Paper and pencil
    - Observational
    - Kid on computer
      - Short answer
      - Multiple choice
      - Game based

# Measure what matters....

- Smart systems for smart teachers
- Intelligent decisions to support intelligent systems.
- It will take time
- Assessment should be completely integrated with teacher improvement.
- Test less – assess more.
- Teachers need to take charge of the future of education. Controlling what we assess is how we will control the conversation.