



Math Solutions<sup>®</sup>

FOUNDED BY MARILYN BURNS

Approaches to Help Students Build  
Mental Math and Computation  
Strategies  
Session 110

Carolyn Felux

Model Schools Conference---Nashville, TN

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# 8 Standards for Mathematical Practice

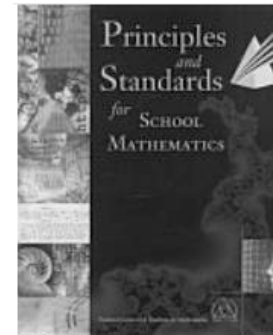
- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

# Standards for Mathematical Practice

## Standards build on:

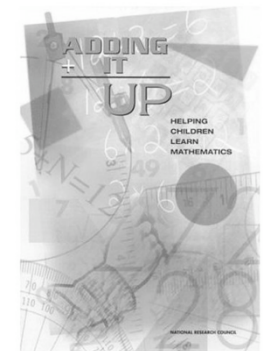
- NCTM process standards

Problem Solving, Reasoning and Proof,  
Communication, Representations, and Connections



- National Research Council standards of mathematical proficiency

*Adding It Up* strands include: adaptive reasoning,  
strategic competence, conceptual understanding,  
procedural fluency, productive disposition



*“All young Americans must learn to think mathematically, and they must think mathematically to learn.”*

National Research Council. 2001. *Adding It Up: Helping Children Learn Mathematics*. J. Kilpatrick, J. Swafford, and B. Findell, eds., p. 1.

Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

# What we will do in this session

- Compare and contrast a selected current state standard with a related standard from the Common Core.
- Experience an activity to gain greater understanding of content standards from Number and Operations in Base Ten.
- Observe students engaged in a classroom routine and reflect on how that routine supports student learning of content and development of mathematical practices.

# Comparing Standards

## **New York- Grade 3**

Use a variety of strategies to add and subtract three-digit numbers (with and without regrouping).

## **CCSS Grade 3**

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction

# Standards include...

- Apply properties of operations: Commutative Property; Associative Property; Distributive Property.
- Apply the relationship between addition and subtraction; multiplication and division.
- Use place value understanding in solving problems.
- Use strategies and algorithms based on place value, properties of operations, and /or relationships between addition and subtraction or multiplication and division.

True or False?



True or False?  
And how do you know?

$$60 = (30 \times 2) + 30$$

$$42 + 56 = 40 + 58$$

# True or False

In pairs:

1. Turn one card over, determine if it is true or false.
2. State what makes it true or what makes it false.  
Record your thinking.
3. How did you use what you know about properties, place value, or how operations relate to each other to determine if the statement was true or false?

# How does this activity prompt us to think about how:

- Properties can help us to solve problems;
- Understanding place value can help us solve problems;
- Relationships between operations can help us solve problems?

# Number Talks

A 5 to 15 minute  
classroom conversation around  
purposefully crafted computation  
problems that are solved  
mentally.

Before we go to the classroom . . .

$$38 + 37$$

# Shades Crest Elementary

## Hoover, AL

- More than 715 students
- Asian (8%), African American (20%), Hispanic (4%), Caucasian (68%)
- 18% free and reduced lunch
- Early October 2009
- School-wide use of number talks routine

# Focus for Viewing Video

What evidence do you find that the teacher offers instructional support to students in developing:

- fluency in adding using strategies based on place value, properties of operations, and/or
- the relationship between addition and subtraction?





# Focus for Discussing Content

What evidence did you find that the teacher provided instructional support to students in developing:

- fluency in adding using strategies based on place value, properties of operations, and/or
- the relationship between addition and subtraction?

# From the Classroom

:

$$496 \div 8$$

# Video Clip

## Grade 5 Number Talk: $496 \div 8$

What evidence did you find that the teacher provided instructional support to students in:

- Using relationships among numbers and operations to solve a problem?
- Using properties to solve a problem?



# Video Clip

## Grade 5 Number Talk: $496 \div 8$

What evidence did you find that the teacher provided instructional support to students in:

- Using relationships among numbers and operations to solve a problem?
- Using properties to solve a problem?

# String of Problems

- $160 \div 8$
- $16 \div 8$
- $400 \div 8$
- $80 \div 8$
- $496 \div 8$

# How do Number Talks support development of the Mathematical Practices?

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
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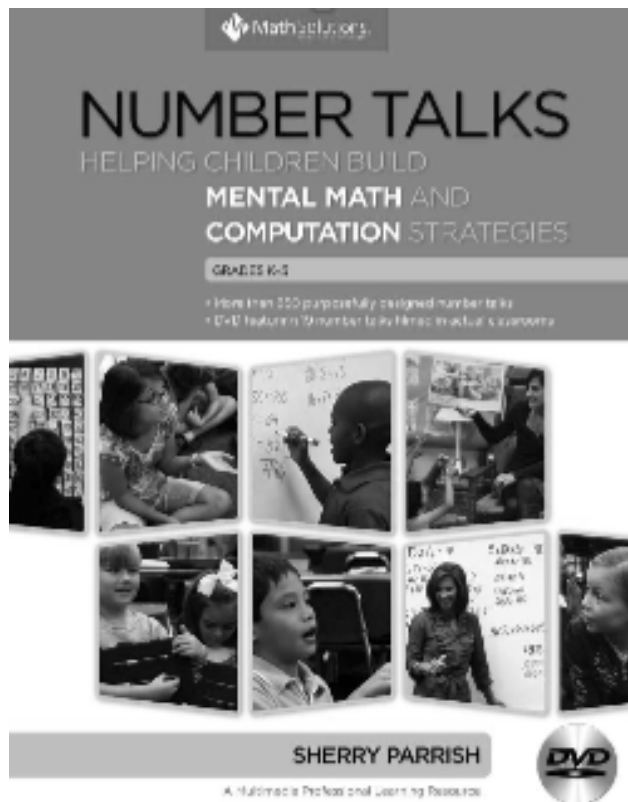
# Reflection

What is the most important insight you've had during this session regarding instructional support for building

- understanding and competency with Standards for Number and Operations in Base Ten
- Proficiency with the Mathematical Practices



# Resource to Support Procedural Fluency



*Number Talks Helping Children Build Mental Math and Computation Strategies—A Multimedia Professional Learning Resource,*  
Math Solutions 2009

Sherry Parrish, author



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[mathsolutions.com](http://mathsolutions.com)

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[info@mathsolutions.com](mailto:info@mathsolutions.com)

[mathsolutions.com/presentations](http://mathsolutions.com/presentations)



## True or False Number Sentences

<b>a.</b> $3 \times 7 = 7 + 7 + 7$	<b>b.</b> $6 \times 4 = 4 + 4 + 4 + 4$
<b>c.</b> $7 \times 8 = (2 \times 8) + (5 \times 8)$	<b>d.</b> $8 \times 6 = 8 \times 5 + 6$
<b>e.</b> $9 \times 7 = 10 \times 7 - 7$	<b>f.</b> $9 + 6 = 10 + 5$
<b>g.</b> $37 + 56 = 39 + 54$	<b>h.</b> $33 - 27 = 34 - 26$
<b>i.</b> $93 = 9 + 30$	<b>j.</b> $94 = 80 + 14$