Let's Number Talk!

15 x 18

Number Talks Overview

https://www.youtube.com/watch?v=xXOG6G4hQ3M
Number Talks Overview

- Daily, 5-15 minutes
- Mental math problems posed
- Students are given think time and indicate a solution and multiple strategies
- Students share solutions and explain their thinking
- Encourages students to communicate about math
- The teacher acts as a facilitator and his/her primary function is to question students and record thinking.

Number Talks: Helping Children Build Mental Math and Computation Strategies, by Sherry Parrish

Why Number Talks?

“The power in the number talks comes from inspiring each child to think and make sense of the mathematics they are presented. They are never trying to figure out what the teacher wants. Rather, they are totally engaged in their own sense making process...a number talk is an opportunity for children to learn that they can figure things out for themselves in the way that makes sense to them. This is the true meaning of life-long learner.”

-Kathy Richardson

8 Mathematical Practices

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning
Subitizing

Subitizing: The ability to glance at a group of objects and quickly see how many there are without counting them one by one.

- Perceptual Subitizing
- Conceptual Subitizing

Ten Frames-Kindergarten

Tenths and fifths

What is the relationship between the number ten and fractions?

- Explain your reasoning and critique the reasoning of your partner.

If students can see ones in a ten, then they can see tenths in a one.
One is 1...or is it?

Notice and Wonder

If a serving is 1/2 cup of juice, how many students will I be able to serve?

Consider the various ways we can think of the quantity:
- Two whole cups
- Two and one half whole cups
- Five half cup servings
- $2 + \frac{1}{2}$
- $\frac{5}{2} = 5 \times \frac{1}{2}$
Tell Me What You See

How do you see ____?

“Why Americans Stink At Math”

A&W made a ½ pounder that tasted better than McDonalds ¼ pounder and was cheaper...

Why do you suppose the public didn’t buy the A&W burger?

### Decomposing with Whole Number

<table>
<thead>
<tr>
<th>7</th>
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<tbody>
<tr>
<td>2+5</td>
</tr>
<tr>
<td>3+4</td>
</tr>
<tr>
<td>1+6</td>
</tr>
<tr>
<td>7+0</td>
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<tr>
<td>1+1+1+1+1+1+1+1</td>
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<tr>
<td>1+1+5</td>
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</table>

### Compose/Decompose

- 7/10 “7 tenths” is composed of:
  - 2/10 “2 tenths” + 5/10 “5 tenths”
  - 3/10+4/10
  - 1/10+6/10
  - 7/10+0/10
  - 1/10+1/10+1/10+1/10+1/10+1/10+1/10+1/10+1/10+5/10

### Composing to Solve

- ¼ + 1/16 + 1/8 + 1/16 + ½
- ½ + 1/12 + 1/6 + 1/6+ 1/12
- ¼ + ½ + 1/16 + 1/16
- ¼ + ½ - 1/16 - 1/16
Group Chant

- Fractions = Numbers
- “Fractions are Numbers”
- “Fractions are the same as Numbers”

Guiding Questions

- How did you think about that?
- How did you figure it out?
- What did you do next?
- Why did you do that? Tell me more.
- Who would like to share their thinking?
- Did someone solve it a different way?
- Who else used this strategy to solve the problem?
- What strategies do you see being used?
- Which strategies seem to be efficient, quick, and simple?
Number Talks

35 \times \frac{1}{5} =

35 \times \frac{3}{5} =

35 \times \frac{7}{5} =

Number Talks

About what is the sum of \frac{7}{8} and \frac{12}{13}?

a. 1  
   (25%)

b. 2  
   (25%)

c. 19 
   (25%)

d. Don't know 
   (25%)

National Center for Education Statistics
http://nces.ed.gov/nationsreportcard/
Multiplication Number Talk

Let's Try It!

\[ \frac{1}{4} \times \frac{1}{2} \]

Models

- Set
- Area
- Linear
  - Number Line
  - Tape Diagram
Let’s Fractions Talk

* 2 x 1 ½ x 1 ⅓ x 1 ¼ x 1 ⅕ x ... 1/99

Do you see...How do you see it?

Can you see...How do you see it?
Try some mental math

- $3 \frac{1}{2} - \frac{5}{8}$
- $3.6 - 1.95$

NAEP

Estimate $3.04 \times 5.3$

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<thead>
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<th>Option</th>
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<th>17 years</th>
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<tbody>
<tr>
<td>A) 1.6</td>
<td>28%</td>
<td>21%</td>
</tr>
<tr>
<td>B) 16</td>
<td>21%</td>
<td>39%</td>
</tr>
<tr>
<td>C) 160</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>D) 1600</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>E) I don't know</td>
<td>9%</td>
<td>12%</td>
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National Assessment of Educational Progress

“...you can’t really do mental math without doing algebra. This is algebraic reasoning at its purest level.”
- Phil Daro, 2010
### Introduction of Fraction Concepts

**3rd Grade**
- Equivalence
- Unitizing
- Compare
  - Same Denominator
  - Same Numerator

**5th Grade**
- Adding/Subtracting
  - Uncommon Denominators
- Multiplying
  - Fraction by a Fraction
- Dividing
  - Whole number by a fraction
  - Fraction by a whole number

**4th Grade**
- Compare
  - Different Numerator and Denominators
- Adding/Subtracting
  - Common Denominators
- Multiplying
  - Fraction by a whole number
- Decimal Fractions
  - Tenths and Hundredths

**6th Grade**
- Division
  - Fraction by a fraction
- Ratios

### Number Talks-Fractions: Emphasis

- Procedural Fluency with Fractions
- Estimation
- Fraction as a Distinct Number
- Properties - Reasoning
- Multiple Contexts and Models

### Let’s Reflect

- “I used to think my job was to teach students to see what I see. I no longer believe this. My job is to teach my students to see; and to recognize that no matter what the problem is, we don’t all see things the same way. But when we examine our different ways of seeing, and look for the relationships involved, everyone sees more clearly; everyone understands more deeply.”

  - Ruth Parker
Number Talking with Ruth Parker

Resources

- California Department of Education
  http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp
- Number Talks-Sherry Parrish
- Visible Learning for Teachers – John Hattie
- Ruth Parker, Ph.D – CEO of the Mathematics Education Collaborative

commoncore.tcoe.org/math
<table>
<thead>
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<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tr>
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<td>1</td>
<td>2</td>
<td>3</td>
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Send your text message to this Phone Number: 37607

Poll code for this session: ___________ (1 space)

- Speaker was engaging and an effective presenter (0-3)
- Other comments, suggestions, or feedback (words)
- (1 space)

- Speaker was well-prepared and knowledgeable (0-3)
- Session matched title and description in program book (0-3)

Example: **38102 323** Inspiring, good content

Non-Example: 38102 3 2 3 Inspiring, good content
Non-Example: 38102 3-2-3 Inspiring, good content