SESSION DESCRIPTION

Fractions are often difficult for students.

This session will focus on number talks and routines that support students in communicating their thinking and deepening their understanding of fractions and fraction operations.

Participants will learn key types of fraction number talks and routines that support the development of student visualization and reasoning.
Mathematically proficient students...

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

**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
NAEP RESULTS

When eighth-grade students estimate the sum of 7/8 and 12/13?

a. 1 (7%)
b. 2 (24%)
c. 19 (28%)
d. 21 (27%)
e. Don’t know (14%)

National Assessment of Educational Progress (NAEP)

BUILDING AN EQUITABLE MATH EXPERIENCE FOR ALL

- Fractions are a pivotal point at which students often decide they are not “good at math.” What can we as teachers do to turn these students around with regard to understanding fractions?
NUMBER TALKS

- Counting by Fractions
- Number Talks to Build Fraction Reasoning
- Number of the Day
- Number Talks for Fraction Operations

RESOURCES
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

HOW DO YOU SEE \( \frac{1}{8} \)?

[Diagram of a 2x2 grid with one piece shaded]
“Students should come to think of counting fractional parts in much the same way as they might count apples or any other objects.”

Example: “…tell students what type of piece is being shown and simply count them together: “one-fourth, two-fourths, three-fourths, four-fourths, five-fourths.” Ask, “If we have five-fourths, is that more than one whole, less than one whole, or the same as one whole?”

Teaching Student-Centered Mathematics: Grades 5-8
Van de Walle and Lovin, page 67
ROUTINE: COUNTING BY FRACTIONS

- Count by fourths
- Count by fourths and clap when we say a whole number
- Count by thirds
- …

REPRESENTING COUNTING BY FRACTIONS

Charting and looking for patterns

Looking for patterns

https://www.teachingonemoore.org/gallerynew/

NUMBER TALKS - To Build Fractional Reasoning
MODELS

- Set (not 3rd grade)
- Area
- Linear
  - Number Line
  - Tape Diagram

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HOW DO YOU SEE ____?
Which of these models represent $\frac{1}{4}$ of the whole? How do you know?

A.  

B.  

C.  

Number Talks: Fractions, Decimals and Percentages Parrish and Dominik pg. 78

NUMBER LINE

Place the following numbers on the number line?
How do you know where they go?

$\frac{1}{2} \quad \frac{2}{4} \quad \frac{1}{4} \quad \frac{3}{4}$

0  | 1
**NUMBER LINE**

Where should $\frac{5}{8}$ be placed on the number line?

How do you know?


- 0  - 1  - 4

**COMPARISON**

Which is less? How do you know?

Do not use common denominators or cross-multiplication

\[
\frac{7}{11} \text{ or } \frac{7}{9} \quad \frac{3}{7} \text{ or } \frac{5}{9} \quad \frac{8}{9} \text{ or } \frac{7}{8}
\]
NUMBER OF THE DAY

DECOMPOSING A WHOLE NUMBER

7
2 + 5
3 + 4
1 + 6
1 + 1 + 1 + 1 + 1 + 1
1 + 1 + 5
NUMBER TALK

\[
\frac{5}{8}
\]

OPERATIONS WITH FRACTIONS
ESTIMATE THE SUM

\[
\frac{9}{10} + 2\frac{7}{8} =
\]

Explain your reasoning.

USING VISUALS

How can you solve ___ + ____?

Number Talks: Fractions, Decimals and Percentages Parrish and Dominik pg. 151
WHAT IS THE SUM?

\[
\frac{1}{2} + \frac{7}{8} =
\]

NUMBER STRINGS

\[
\frac{1}{2} + \frac{1}{2} =
\]

\[
\frac{1}{2} + \frac{3}{4} =
\]

\[
\frac{1}{2} + \frac{7}{8} =
\]
**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?

Ruth Parker, Central Valley Mathematics Network, 2014
APPROXIMATING SUMS AND DIFFERENCES

- \( \frac{88}{91} + \frac{5}{6} \)  
  About \( \frac{1}{2} \)  
  About 1  
  About 2

- \( \frac{1}{7} + \frac{5}{16} \)  
  About \( \frac{1}{2} \)  
  About 1  
  About 2

- \( 5 \frac{3}{4} - 2 \frac{1}{5} \)  
  Less than 3  
  Greater than 3

Making Number Talks Matter – Humphreys and Parker

NUMBER STRING

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

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

\[ 35 \times \frac{7}{5} = \]
LET’S TRY IT!

\[
\frac{1}{4} \times \frac{1}{3} =
\]
CONNECTIONS TO WHOLE NUMBERS

\[ 35 \div 7 = \]

\[ \frac{35}{7} = \]

\[ \frac{35}{7} \]

[Green blocks with numbers]

WHAT ARE YOU VISUALIZING?

\[ 1 \div \frac{1}{3} = \]

\[ 2 \div \frac{1}{3} = \]

\[ 2 \div \frac{2}{3} = \]
LET’S REFLECT

“\textquote{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

RESOURCES

- Number Talks: Helping Children Build Mental Math and Computation Strategies by Sherry Parrish
- Number Talks: Fractions, Decimals, and Percentages by Sherry Parrish and Ann Dominick
- Making Number Talks Matter by Cathy Humphreys and Ruth Parker
- Website: Downey Unified – Fraction Number Talks
  - http://www.dusd.net/cgi/files/2012/12/fraction-number-talks.pdf
When talking about my session on social media, please use the CMC hashtag, #cmcmath, and if tweeting tag us @CAMathCouncil.
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