Who's with us today?

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<tr>
<th>Pre-Service Teacher</th>
<th>K – 2 Teacher</th>
<th>3 – 6 Teacher</th>
<th>Admin</th>
<th>Learning Coach</th>
<th>Other</th>
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Equality Vocabulary

2 + 3 = 5

What is the name of this symbol
What does the symbol mean
Can it mean anything else?
How might students respond to:
“What does the equal sign mean?”

Webinar Goals

• Big Idea: Equality as a Relationship
• Strategies for Common Misunderstandings
• Planning Suggestions
• Where to go for more information
Equality as a Relationship

14 = __ + __ + __
14 = 5 + 2 + 4 + 3
14 = 3 + 4 + 4 + 3

Image from: www.iconshut.com

Div 1

Make a set that has as many as mine

Div 2

3 = 3
Insight into Equality
Elementary Mathematics Professional Learning

Div 1

2 + \Box = 3 + 2

Div 1

2 + 2 = 3 - 1

Div 1

2 + \Box = 3 + 2

Div 1

2 + \Box = 3 + 2
Elementary Mathematics Professional Learning

Misconception

Insight into Equality

Div 1

Elementary Mathematics Professional Learning

Div 1
3 + 3 = 6

4 + 2 = 3 + 3
Elementary Mathematics Professional Learning

Div 1

True or False?
How do you know?

3 + 2 = 5 + 1

Try this with your class...

Grade 2 Student
The student wrote:

\[3 + 2 = 5 + 1 = 6\]
Insight into Equality
Elementary Mathematics Professional Learning
Try this with your class...

\[ 3 + 2 = 5 + 1 = 6 \]

---

Student Work

Try this with your class...

\[ 3 + 2 = 5 + 1 \]

False, because 3 + 2 = 5 + 1

is 11

---

Student Work

Try this with your class...

\[ 3 + 2 = 5 + 1 \]

False, because 3 + 2 = 5 + 1

is 11

---
In grade 4 to 6 you might follow up with this one:
True or false, and how do you know?

7 + 5 = 8 + 4

or this one

24 + 36 = 25 + ?

Are they equal?

9 ≠ 8
How can you make them equal?

9 ≠ 8

9 - 1 = 8

9 = 8 + 1
Would this also work? Demonstrate with a diagram.

9 + 2 = 8 + 3

Div 2 Challenge

How many ways are there to balance the equation?

By grade 6 students should be ready to generalize.
**How do you explain the pattern?**

- $9 + 2 = 8 + 3$
- $9 + 3 = 8 + 4$
- $9 + 4 = 8 + 5$
- $9 + 12 = 8 + 7$
- $9 + 27 = 8 + 8$

- $9 - 1 = 8$
- $9 - 2 = 8 - 1$
- $9 - 3 = 8 - 2$
- $9 - 4 = 8 - 3$
- $14 - 9 = 13 - 8$
- $17 - 9 = 16 - 8$
- $33 - 9 = 7 - 8$

---

**Preserving Equality**

- $9 + ? = 7 + ?$
- $33 + ? = 35 + ?$

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**Equality as Relational**

Give students frequent opportunities to work with formats like this:

- $4 + 5 = __ + 6$
- $5 \times 14 = __ \times 7$
Webinar Goals

- Big Idea: Equality as a Relationship
- Strategies for Common Misunderstandings
  
  \[
  \begin{align*}
  3 \times 3 &= 24 \times 24 \\
  7 \times 4 + 3 &= 24 \times 6 \times 4 \\
  2 + 3 = 3 + 2 \quad (\text{or } 2 + 3 = 1 + 4) &= 2 \times 12 = 6 \times 4
  \end{align*}
  \]

- Planning Suggestions
- Where to go for more information
  
  \[http://learning.arpdc.ab.ca/\]
Additive and Multiplicative Thinking webinar

January, 2016