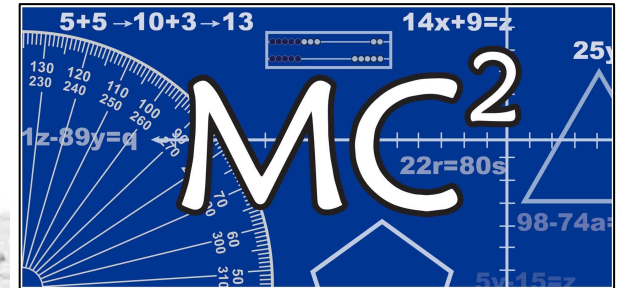


Using Number Talks to Build Math Fluency and Flexibility in the Secondary Classroom



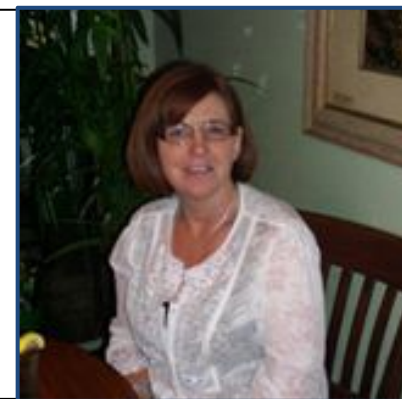
NM STEM Symposium
June 1 - 2, 2017

Introductions



Katherine Kanim is co-Director of Mathematically Connected Communities (MC²).

Regina Watson is a professional development specialist with Mathematically Connected Communities (MC²), where she has worked for 13 years. Before coming to MC², Regina taught middle and high school mathematics for 12 years. Her current work is dedicated to supporting teachers improve math instruction through collaborative learning and Number Talks. Regina has a bachelors of science and a Masters from Eastern New Mexico University.



Zachary Leonard, Ed.D., is a professional development and school improvement specialist with the Los Alamos National Laboratory Math and Science Academy. His work and research interests consist of mathematics and science content and pedagogy, student engagement, professional learning systems, educational leadership, and school professional culture.

Introduce yourself to your shoulder partner



1. Your name
2. Where you teach
3. What you teach
4. One interesting fact that you think people should know about you

Learning Goals

- Develop an understanding of how Number Talks helps to develop students' number fluency and flexible thinking in the classroom.
- Develop an understanding for how Number Talks can help students make mathematical connections across strategies and strengthen student use of academic language.



How Many of you use Number Talks?



Let's do a Number Talk

$$63 - 28$$



What was the teacher's role?

What was the learner's role?

The Research with Jo Boaler

<https://www.youtube.com/watch?v=Jeel4Qjow4s>



How to get prepared for a Number Talk: multiple entry points, connecting mathematical ideas, and academic vocabulary

Theory of Action

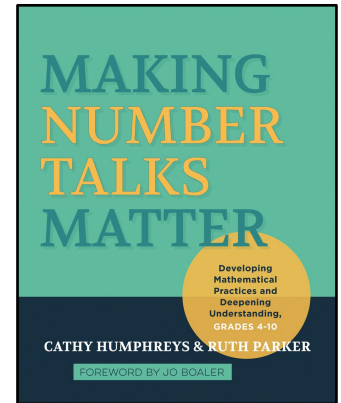
- **If** teachers anticipate student responses, prepare probing questions, and make mathematical connections using academic vocabulary
- **And** think deeply about the mathematics as a learner themselves,
- **Then** they will be more prepared to meet students where they are and help them make mathematical connections.

Solve $54 - 28$ in as many ways as you can

1. Refer to the five strategies shown on pg. 38 - 41 for help.
(10 min.)



2. Anticipate student responses, prepare probing questions, and be prepared to make mathematical connections using academic vocabulary



3. Look for:



- Place value connections
- Use of base ten
- Associative Property
- Commutative Property
- Distributive Property
- Identity Property

Preparing for a Number Talk



1. Multiple entry points (strategies)
2. Mathematical ideas
3. Academic vocabulary



- Place value connections
- Use of base ten
- Associative Property
- Commutative Property
- Distributive Property
- Identity Property

Round Subtrahend to the nearest ten and adjust

$$54 - 28 \xrightarrow{+2} 30$$

Moving closer together which means I need to add back the 2

$$54 - 30 = 24$$

$$24 + 2 = 26$$

Same difference

$$54 - 28 \xrightarrow{+6} 60$$

$$60 - 34 = 26$$

Adjusting up to find the ten

Decompose the Minuend & Subtrahend

$$54 - 28 \text{ Decompose by place value}$$

$$(50 + 4) - (20 + 8) \text{ Identity property}$$

$$50 + 4 - 20 - 8 \text{ Distributive Property}$$

$$50 - 20 + 4 - 8 \text{ Commutative Property}$$

$$30 + 4 - 8 = 26$$

Decompose the Subtrahend by Place value

$$54 - 28 \text{ Decompose by place value base ten}$$

$$54 - (20 + 8) \text{ Distributive property}$$

$$54 - 20 - 8$$

$$(54 - 20) - 8 \text{ Associative Property}$$

$$34 - 8 = 26$$

Minuend - Subtrahend = Difference

Adding up (Number Line)

making jumps to the tens

$$2 + 20 + 4 = 26$$

Traditional Algorithm

$$\begin{array}{r} 54 \\ -28 \\ \hline 26 \end{array}$$

Place Value Base ten

$$40 - 20 = 20$$

$$10 + 4 = 14$$

$$14 - 8 = 6$$

$$20 + 6 = 26$$

Same Difference (Number Line)

shifting both numbers by the same amount to the right

Learning Goals

- Develop an understanding of how Number Talks helps to develop students' number fluency and flexible thinking in the classroom.
- Develop an understanding for how Number Talks can help students make mathematical connections across strategies and strengthen student use of academic language.



Number Talk Resources

Handout

Number Talks in the Secondary Classroom Learning Goals and Resources

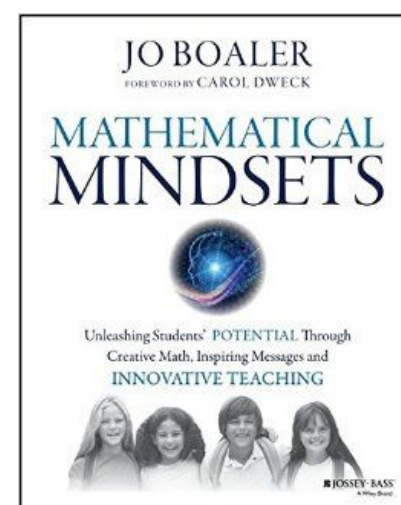
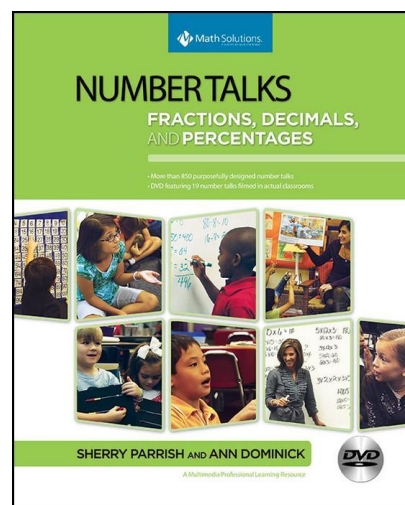
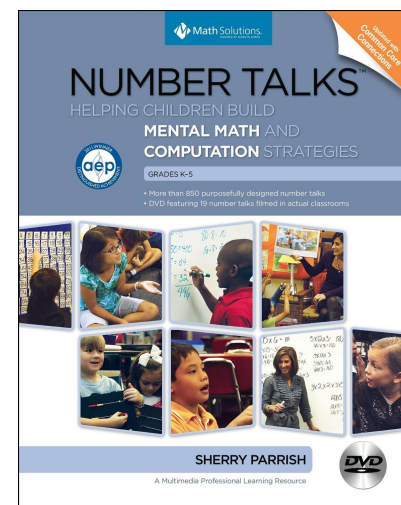
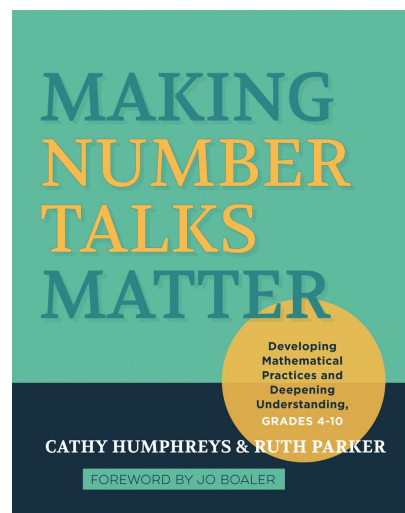
Websites

Articles

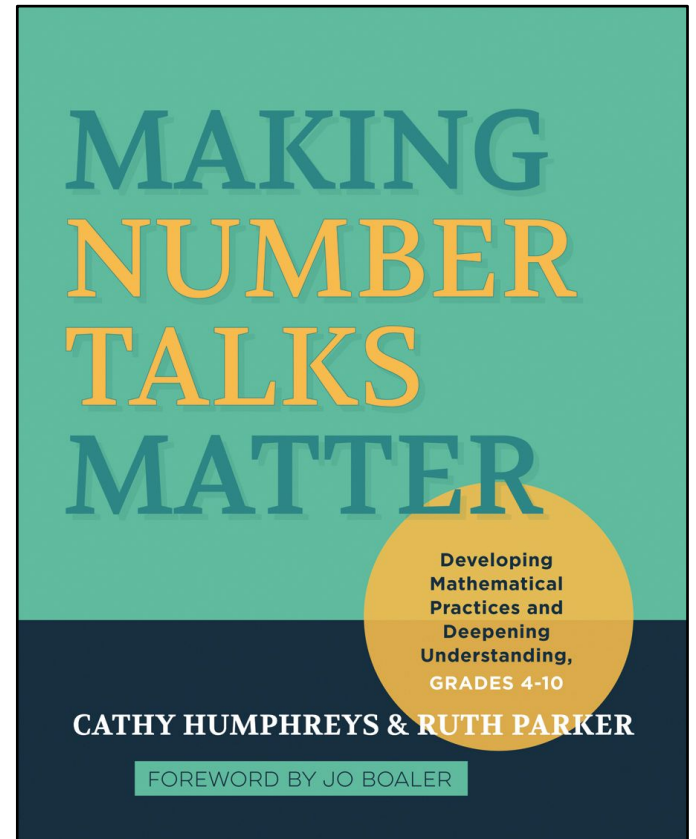
Handouts

Books

Presenter Contact Information



Time for the Raffle



How will you use number talks in your classroom?



Questions

