

Interactive survey

NCSM/NCTM

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## Changing the Math Mindset for Struggling Learners and Their Teachers

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Borough School District  
Fairbanks, Alaska

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We are from Fairbanks Alaska  
 20 miles from North Pole where Santa Claus lives!

Fairbanks North Star Borough School District  
Over 14,000 students  
35 schools – Public, Charter, Magnet, K-6, K-8, 6-8, 7-8, 9-12  
Over 70 languages spoken in our district





The district encompasses an area of 7,361 square miles (19,060 km<sup>2</sup>), which is roughly equal to the size of Rhode Island, Delaware, and Connecticut combined.

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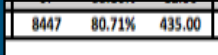
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## Perception of Math in the World We Live









caucuses, winning 73 percent of the vote. He did even better in Alaska, winning 82 percent of the vote, and in Hawaii, he had 71 percent with a few precincts still be counted, according to The Associated Press.

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## Perception of Math of the World We Live In:

### Math as an isolated subject





Multiplication Facts 0-12 Worksheet A  
Item 607-A

Name \_\_\_\_\_ Date \_\_\_\_\_ Score \_\_\_\_\_/100

**Multiplication Facts 0 - 12**  
Five minute timed drill with 100 problems.

4	6	7	0	2	7	5	2	10	9
× 4	× 3	× 4	× 0	× 2	× 1	× 3	× 1	× 7	× 1
8	12	11	10	3	11	5	3	12	10
× 0	× 6	× 5	× 8	× 1	× 9	× 2	× 3	× 4	× 1

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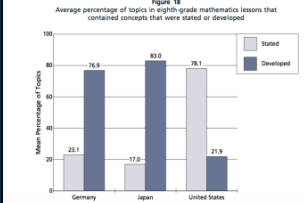
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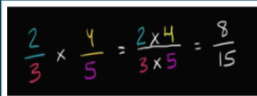
## Perception of Math of the World We Live In:

### Math as procedures

Figure 18  
Average percentage of topics in eighth-grade mathematics lessons that contained concepts that were stated or developed



Country	Stated (%)	Developed (%)
Germany	25.1	75.9
Japan	12.0	88.0
United States	78.1	21.9



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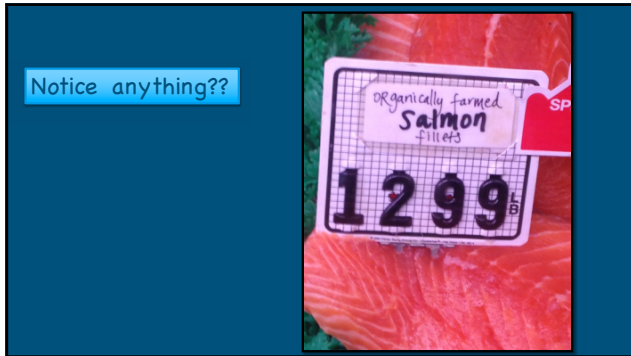
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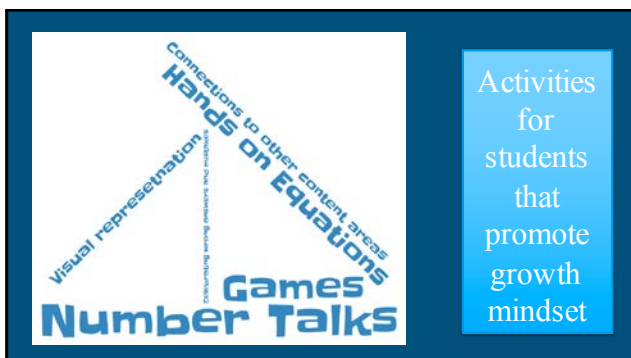
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# Number Talks Video




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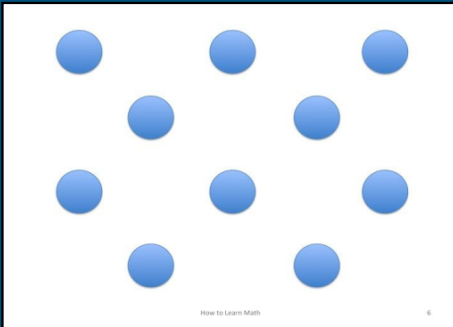
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<p>Ⓓ</p> <p><math>3 + 3 + 3 + 1</math></p>	<p>Ⓔ</p> <p><math>5 + 5</math></p>	<p>Ⓕ</p> <p><math>2 + 2 + 5 + 1</math></p>

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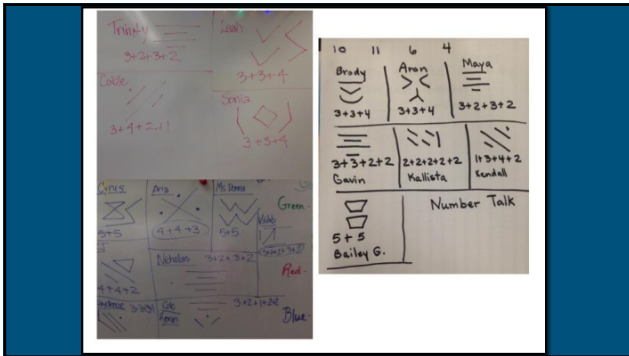
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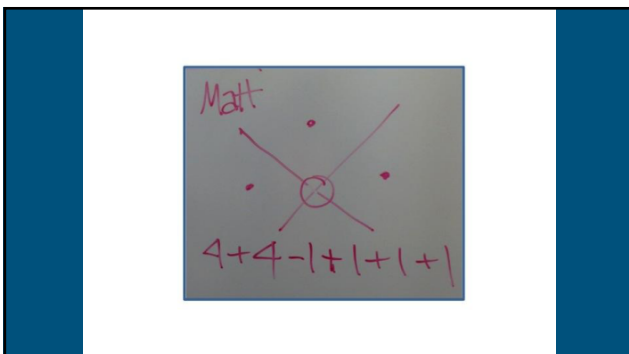
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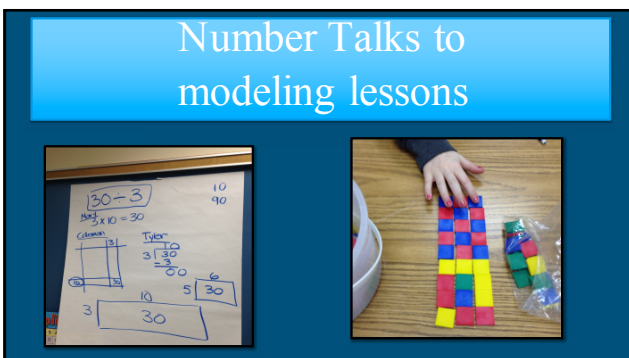
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Teacher Reflection

"I am learning with my students"

"When a student gets it and says that math was fun – it's a teacher's dream"

"More than one way to look at and solve things"

"Okay to make mistakes"

"It's opened my mind on how to teach"

"We are working together – I'm not teaching "at" my students"

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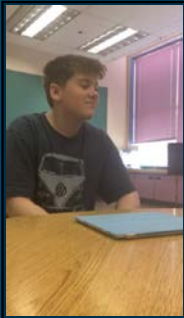
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Student Reflection

"We took a long time to work on one problem!"

I love Math!

"My favorite part was working together"

"I get nervous and excited at the same time"

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Hands On Equations

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## Visual Representation




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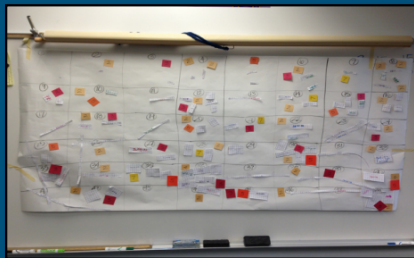
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## Visual Representation of Math




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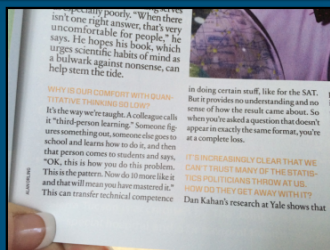
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## Connections to other content

From Psychology Today  
about

Science Teaching

“Why is our comfort with  
Quantitative Thinking so  
low?”




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## Celebrating mistakes




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## Games

**FIND A PLACE**  
(2 Players)

Use 40 cards numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (four of each).

Player A			Score	Score	Player B		
Hundreds	Tens	Units			Hundreds	Tens	Units
			0				
			10				
			50				
			100				

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## 2015-2016 Professional Development for Teachers




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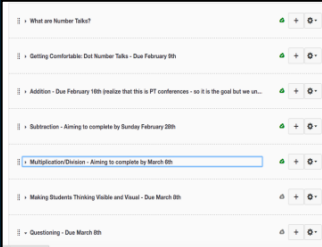


## Blended Learning for Teaching on Number Talks

Two face to face meetings

- Weekly assignments
- A reading & response
- Number Talk with students & sharing how it went

Primary, intermediate, and high school teachers



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## Blended Learning for Teaching on Number Talks

Does that seem right? I realize no one else is teaching to my age group right now, but I'm curious if anyone thinks I should teach my high schoolers about active listening.

I was very proud of one student who can be a bit emotional. He was very comfortable talking about how his answer was wrong and what his mistake was. There were no tears!

That is great! I love how the number talks seem to support the growth mindset by encouraging students to share their strategies without judgement for whether answers are right or wrong. It is really neat when they catch themselves and start discussing and problem solving their own way through what went wrong.

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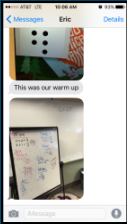
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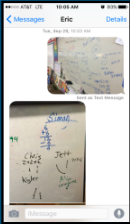
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## Districtwide Inservices for staff on Number Talks



Texting between schools/teachers while having Number talks



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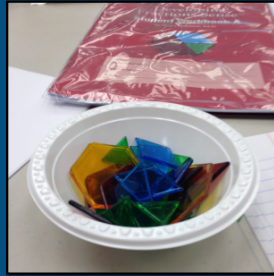
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## Developing Fraction Sense Workshop

Provided professional development for 30 special education teachers around fractions.

Teachers received a fraction kit after the training.




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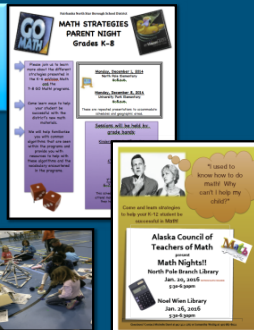
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## Community Connections

Parent nights sponsored by Alaska Council of Teachers of Mathematics  
UAF outreach to preservice teachers




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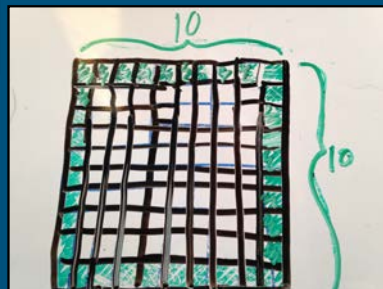
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## Border Problem




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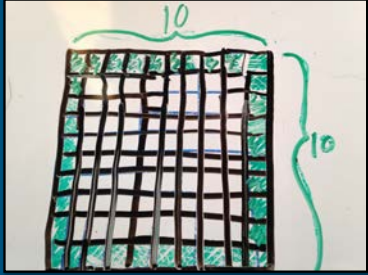
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Border Problem

10 by 10




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$$\begin{aligned}
 &10+10+10+2+10 \\
 &10+9+9+8+10 \\
 &10+10+8+8 \\
 &4(10)-4 \\
 &4+9+9+9 \\
 &(10)(10)-(2)(2) \\
 &100-44=56
 \end{aligned}$$

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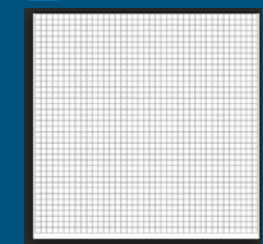
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Border Problem

100 by 100




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Border Problem

N

N

N by N

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The Future:





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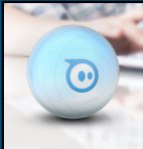
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Summer Math Camp:  
Changing Mindsets by Visualizing Math

Forty 5th grade to 8th grade students from underrepresented populations

Based off of YouCubed's Summer Camp

Three out of the four teachers have taken "How to Learn Math" course

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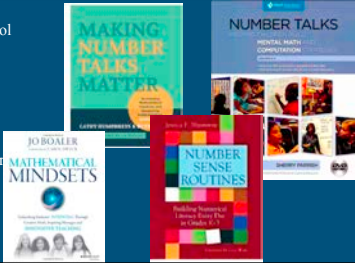
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## Professional Development

Blended learning during the school year

- Number Talks
- Mathematical Mindsets
- Making Number Talks Matter




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## Resources

Bookmarks


Action Plan

Books: [Number Talks](#) by Sherri Parrish

[Classroom Discussions](#) by Math Solutions

Online Resources: [www.youcubed.com](http://www.youcubed.com)

[www.Mindsetkit.org](http://www.Mindsetkit.org)




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