

# We Have to Talk

## Promoting Productive Discourse in 3 – 5 Grade Classrooms

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# Welcome

- Introduce yourself at your table
  - ❖ Name
  - ❖ School/District
  - ❖ Grade
  - ❖ If you were not here today, what would you be doing?

# Learning Targets

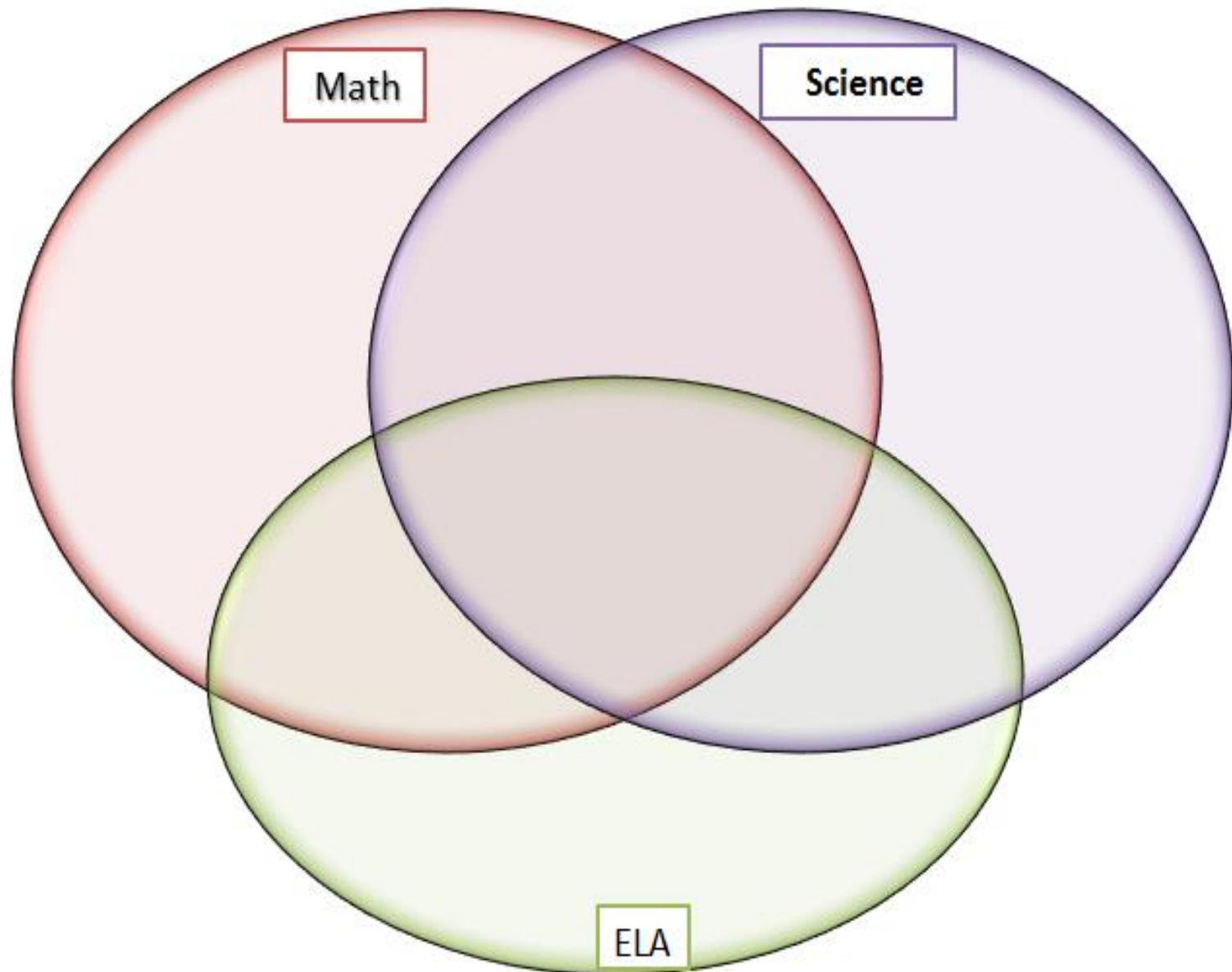
- ❖ Can you explain how the NGSS science and engineering practices, the CCSS ELA capacities, and the CCSS math practices are connected?
- ❖ How can understanding these connections help us develop classroom routines that promote productive discourse?

# What's common?

- All of the standards (math, ELA, and science) require that teachers focus more attention on disciplinary “practices”
  - ❖ Math – CCSS Math Practices
  - ❖ Science – NGSS Science and Engineering Practices
  - ❖ ELA – CCSS Capacities of Literate Individuals (Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, and Language: <http://www.corestandards.org/ELA-Literacy/introduction/students-who-are-college-and-career-ready-in-reading-writing-speaking-listening-language/>)

# Venn Diagram Activity

1. In a baggie on your table you have strips of paper that list different practices for math, English language Arts, and science.
2. Place the strips in the appropriate locations in the Venn diagram to show the connections.



# What did you notice?

- Share out at your tables
- Group Share Out



## Practices in Mathematics, Science, and English Language Arts\*

<b>M1.</b> Make sense of problems and persevere in solving them.	<b>S1.</b> Asking questions (for science) and defining problems (for engineering).	<b>E1.</b> They demonstrate independence.
<b>M2.</b> Reason abstractly and quantitatively.	<b>S2.</b> Developing and using models.	<b>E2.</b> They build strong content knowledge.
<b>M3.</b> Construct viable arguments and critique the reasoning of others.	<b>S3.</b> Planning and carrying out investigations.	<b>E3.</b> They respond to the varying demands of audience, task, purpose, and discipline.
<b>M4.</b> Model with mathematics.	<b>S4.</b> Analyzing and interpreting data.	<b>E4.</b> They comprehend as well as critique.
<b>M5.</b> Use appropriate tools strategically.	<b>S5.</b> Using mathematics, information and computer technology, and computational thinking.	<b>E5.</b> They value evidence.
<b>M6.</b> Attend to precision.	<b>S6.</b> Constructing explanations (for science) and designing solutions (for engineering).	<b>E6.</b> They use technology and digital media strategically and capably.
<b>M7.</b> Look for and make use of structure.	<b>S7.</b> Engaging in argument from evidence.	<b>E7.</b> They come to understanding other perspectives and cultures.
<b>M8.</b> Look for and express regularity in repeated reasoning.	<b>S8.</b> Obtaining, evaluating, and communicating information.	

\*The common Core English Language Arts uses the term “student capacities” rather than the term “practices” used in Common Core Mathematics and the Next Generation Science Standards.



# Sense Making and Discussion

Math	Science	ELA
<ol style="list-style-type: none"><li>1. <b>Make sense</b> of problems and persevere in solving them.</li><li>2. <b>Reason</b> abstractly and quantitatively</li><li>3. <b>Construct viable arguments and critique the reasoning of others.</b></li><li>4. Model with mathematics.</li><li>5. Use appropriate tools strategically.</li><li>6. Attend to precision.</li><li>7. Look for and make use of structure.</li><li>8. Look for and <b>express</b> regularity in repeated reasoning.</li></ol>	<ol style="list-style-type: none"><li>1. <b>Asking questions</b> (for science) and <b>defining problems</b> (for engineering)</li><li>2. Developing and using models</li><li>3. Planning and carrying out investigations</li><li>4. Analyzing and <b>interpreting</b> data</li><li>5. Using mathematics and computational thinking</li><li>6. <b>Constructing explanations</b> (for science) and designing solutions (for engineering)</li><li>7. <b>Engaging in argument from evidence</b></li><li>8. Obtaining, <b>evaluating, and communicating information</b></li></ol>	<ol style="list-style-type: none"><li>1. They demonstrate independence.</li><li>2. They build strong content knowledge.</li><li>3. They respond to the varying demands of audience, task, purpose, and discipline.</li><li>4. They comprehend as well as critique.</li><li>5. They value evidence.</li><li>6. They use technology and digital media strategically and capably.</li><li>7. They come to understand other perspectives and cultures.</li></ol>

# ELA Capacities

... “**construct effective arguments**,” “request clarification,” “ask relevant questions,” “build on others’ ideas,” “articulate their own ideas,” “question assumptions and premises,” “assess the veracity of claims,” “**assess the soundness of reasoning**,” “**cite specific evidence**,” “make their reasoning clear,” “constructively evaluate others’ use of evidence,” “evaluate other points of view critically and constructively,” “express and listen carefully to ideas,” “cite specific textual evidence to support conclusions,” “delineate and evaluate the argument and specific claims in a text including **the validity of the reasoning** as well as the **relevance and sufficiency of the evidence**,” “participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and ~~expressing their own clearly and persuasively.~~”

# Math

# Science

**M1:** Make sense of problems and persevere in solving them

**M2:** Reason abstractly & quantitatively

**M6:** Attend to precision

**M7:** Look for & make use of structure

**M8:** Look for & make use of regularity in repeated reasoning

**M4:** Models with mathematics

**S2:** Develop & use models

**S5:** Use mathematics & computational thinking

**S1:** Ask questions and define problems

**S3:** Plan & carry out investigations

**S4:** Analyze & interpret data

**S6:** Construct explanations & design solutions

**E2:** Build a strong base of knowledge through content rich texts

**E5:** Read, write, and speak grounded in evidence

**M3 & E4:** Construct viable arguments and critique reasoning of others

**S7:** Engage in argument from evidence

**S8:** Obtain, evaluate, & communicate information

**E3:** Obtain, synthesize, and report findings clearly and effectively in response to task and purpose

**E6:** Use technology & digital media strategically & capably

**M5:** Use appropriate tools strategically

**E1:** Demonstrate independence in reading complex texts, and writing and speaking about them

**E7:** Come to understand other perspectives and cultures through reading, listening, and collaborations

**Commonalities  
Among the Practices  
in Science, Mathematics  
and English Language Arts**

# ELA

Based on work  
by Tina Chuek  
[ell.stanford.edu](http://ell.stanford.edu)

# What is at the Core of the Core?

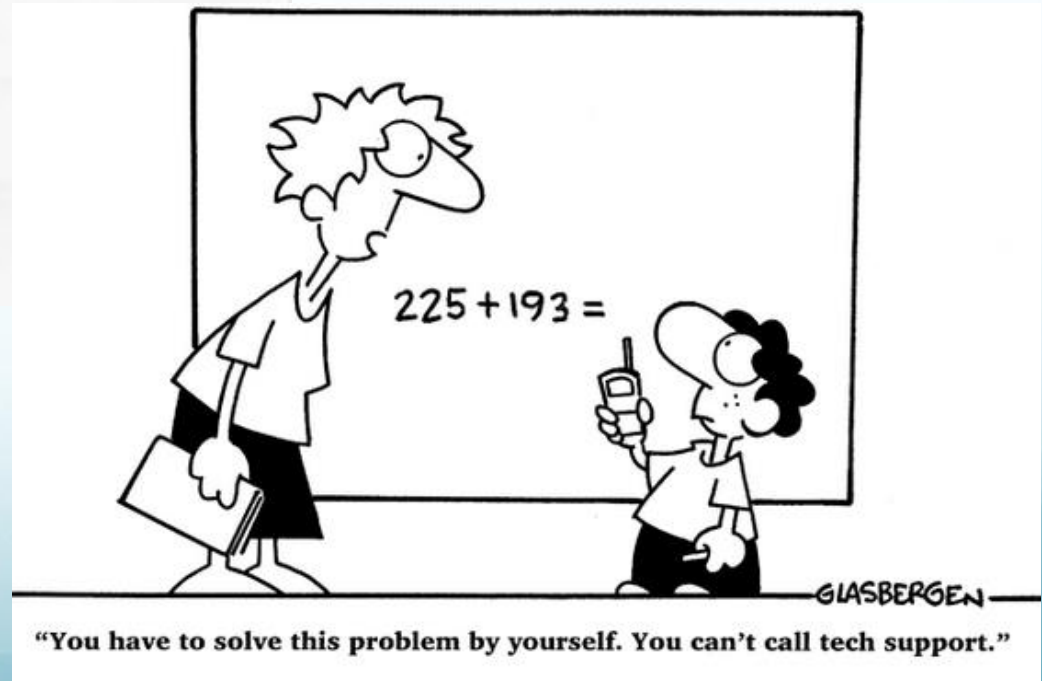
- Reasoning with evidence
- Building arguments and critiquing the arguments of others
- Participating in reasoning-oriented practices with others

# How do we get students using these practices and capacities?

- Students have to participate in these practices with others primarily through:
  - ❖ talk
  - ❖ joint attention
  - ❖ shared activity
- Teachers have to help students:
  - ❖ Externalize their thinking
  - ❖ Listen carefully to one another and take one another seriously
  - ❖ Dig deeper into the data and evidence for their positions
  - ❖ Work with the reasoning of others

# What do kids think?

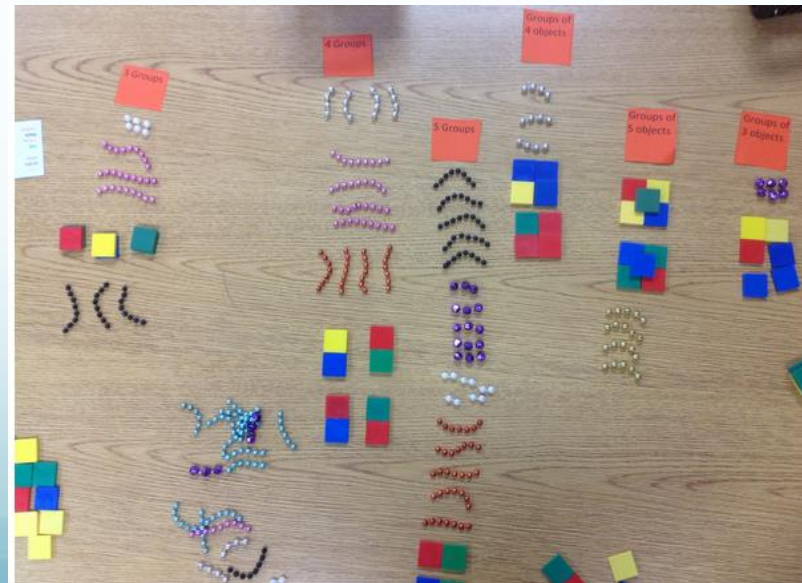
People who are good in math.....





# Routines

- Math Sorts



# Routines

- Games

- Win-Win Math Games (Marilyn Burns)

[https://www.forsyth.k12.ga.us/cms/lib3/GA01000373/.../winwin\\_mathgames.pdf](https://www.forsyth.k12.ga.us/cms/lib3/GA01000373/.../winwin_mathgames.pdf)

- Four Strikes and You're Out
    - 101 and Out

## Four Strikes (and You're Out!)

The teacher (or player) ahead of time thinks of an equation and keeps it a secret.

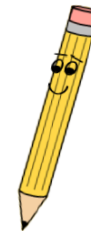
_____ + _____ = _____									
0	1	2	3	4	5	6	7	8	9
_____ + _____ = _____									
0	1	2	3	4	5	6	7	8	9
_____ + _____ = _____									
0	1	2	3	4	5	6	7	8	9

Figure out the number for each blank in the problem.



## 101 and Out

	10s	1s
1		
2		
3		
4		
5		
6		
total		



My total can't go over 100!

	10s	1s
1		
2		
3		
4		
5		
6		
total		



# Routines

- Splat

- ❑ Math Splats (Steve Wyborney)

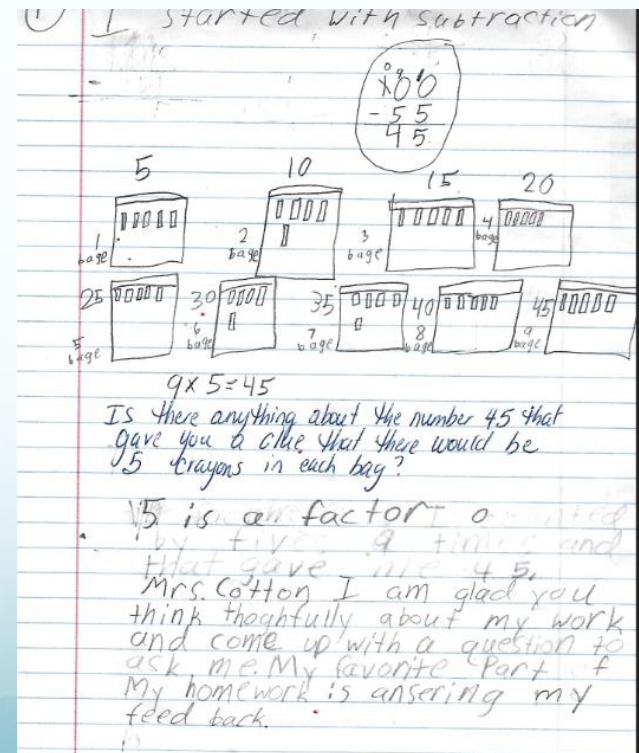
- <http://www.stevewyborney.com/?p=893>

- Splat in Action

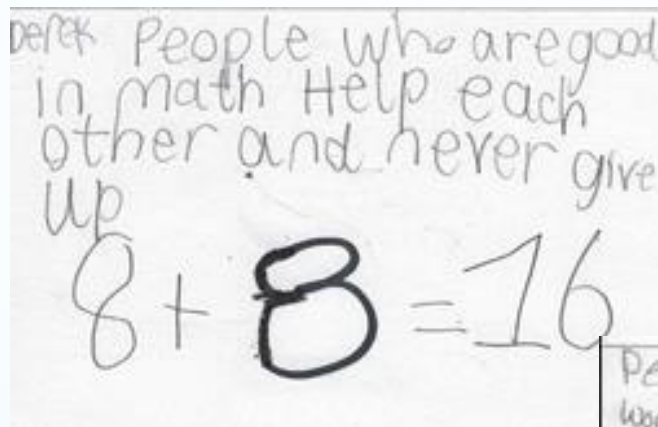
- ❑ <https://www.youtube.com/watch?v=6r6ArbjFS1c>

# Routines

- Feedback
  - What does the Research Say?
    - NCTM Research Brief (Five “Key Strategies” for Effective Formative Assessment)
  - Looking at Student Work



# People Who are Good in Math.....



# Learning Targets

- ❖ Can you explain how the NGSS science and engineering practices, the CCSS ELA capacities, and the CCSS math practices are connected?
- ❖ How can understanding these connections help us develop classroom routines that promote productive discourse?

# Recommended Resources

- <https://www.youtube.com/watch?v=3nbvKicxK9Q>
- [www.nextgenscience.org](http://www.nextgenscience.org)
- [www.nsta.org](http://www.nsta.org)
- [https://www.forsyth.k12.ga.us/cms/lib3/GA01000373/.../winwin\\_mathgames.pdf](https://www.forsyth.k12.ga.us/cms/lib3/GA01000373/.../winwin_mathgames.pdf)
- <http://www.stevewyborney.com/?p=893>

Thank you!