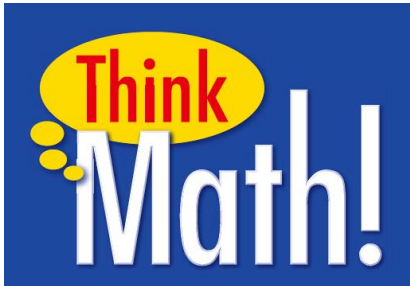# Common Core Standards for Mathematical Practice in the Elementary Classroom

Tracy Manousaridis, Weston Public Schools

Habits of Mind

- CCSS Mathematical Practices have their own distinct section

- Essential "habits of mind" pervade curriculum and pedagogy

- Think Math! naturally develops these mathematical practices through age-appropriate content and methodology

- Think Math! features
  - Cross Number Puzzles & Magic Squares
  - What's My Number Puzzles
 - Multiplication and Division Puzzles
  - Shape Safari
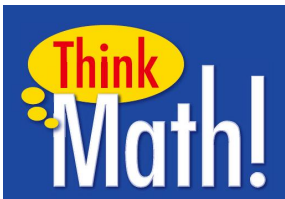
Why puzzles?

- Puzzles give permission not to know the answer or method before starting

- Students build *stamina* and *confidence* for problem solving by playing with puzzles.

- They are genuine problems to solve -- true to real life -- not exercises in following a rule or template.

- They allow high cognitive demand with flexible prerequisite math knowledge.

- They give plentiful skill practice while allowing the mind to engage: drill and thrill, not drill and kill.

- They exercise important habits of mind: experimenting, juggling multiple constraints…

- They engage the intellect. They are fun.

- Puzzles also provide a perfect way to differentiate learning

Think Math!
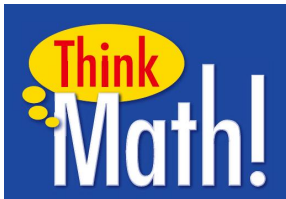
SMP 1   Make sense of problems and persevere in solving them

SMP 6   Attend to precision

"The very idea of doing a … puzzle . . . typically shifts the brain into an open playful state that is itself a pleasing escape, captivating to people . . ."
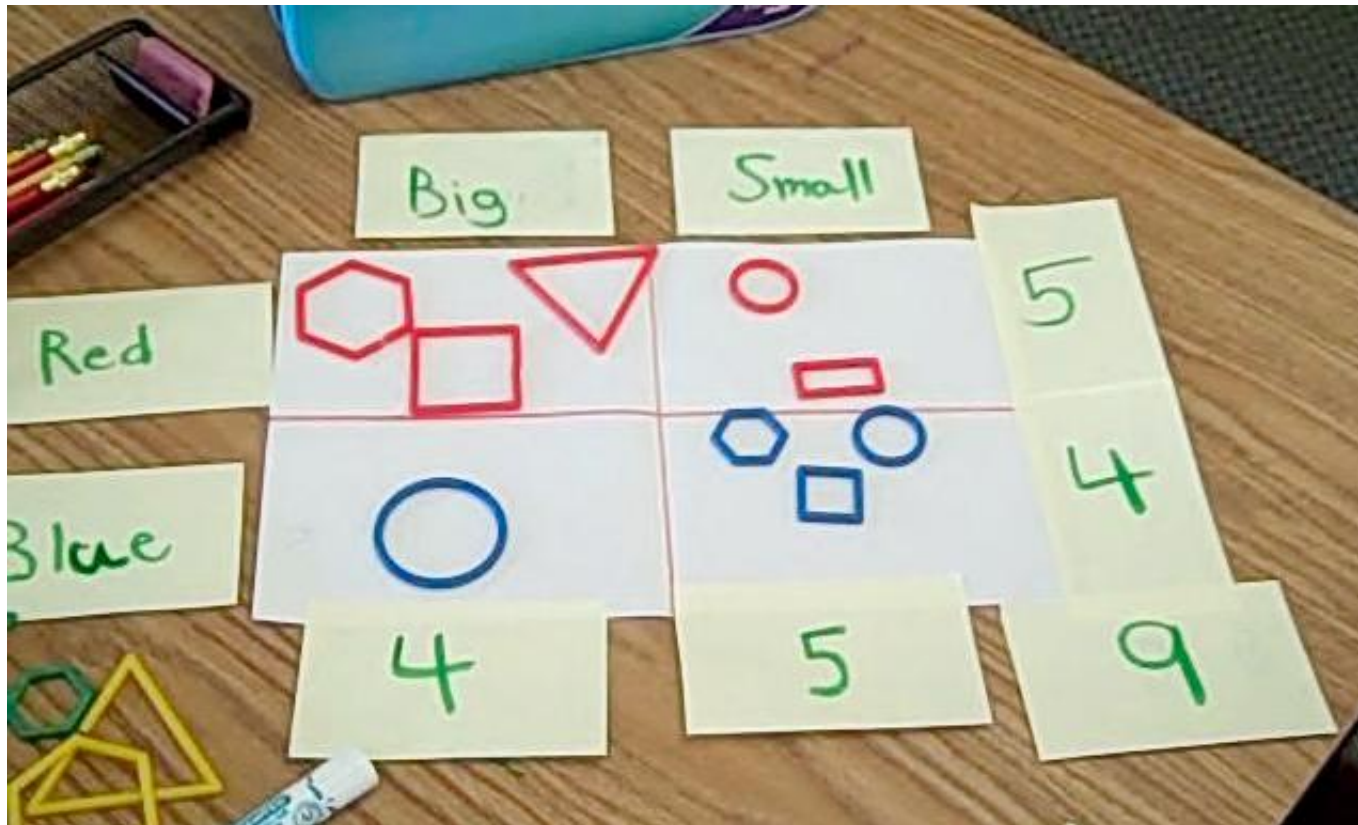
Benedict Carey "Tracing the Spark of Creative Problem Solving" New York Times, 2010

Think Math!

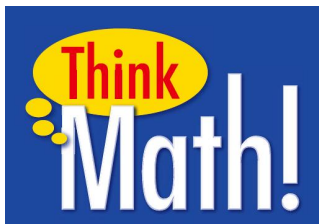# Selected properly and introduced thoughtfully, puzzles can be the real work.
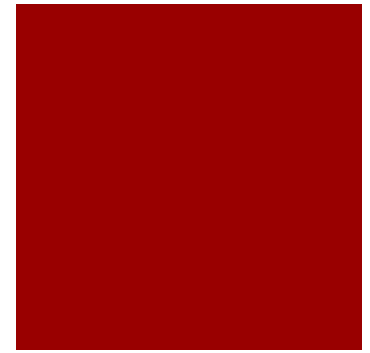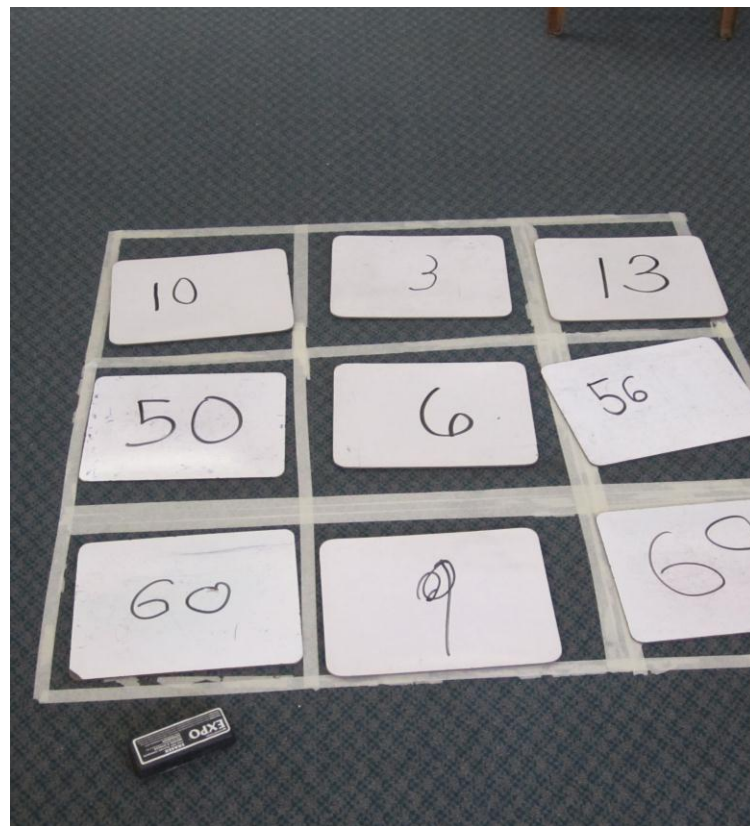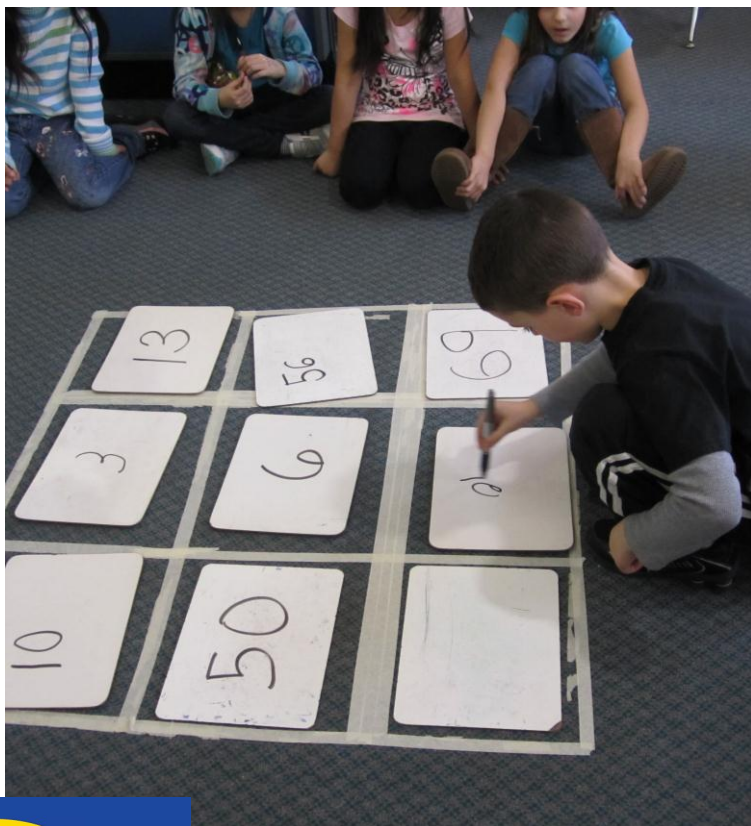
A Cross Number Puzzle

Don't always start with the question!

7	6	13
5	3	8
12	9	21

Think Math!

2nd graders solving a cross number puzzle

Magic Squares

			24
10			24
	8	16	
14			

SMP 1 Make sense of problems and persevere in solving them
SMP 3 Construct viable arguments and critique the reasoning of others
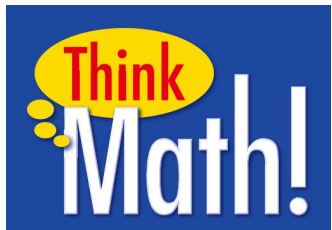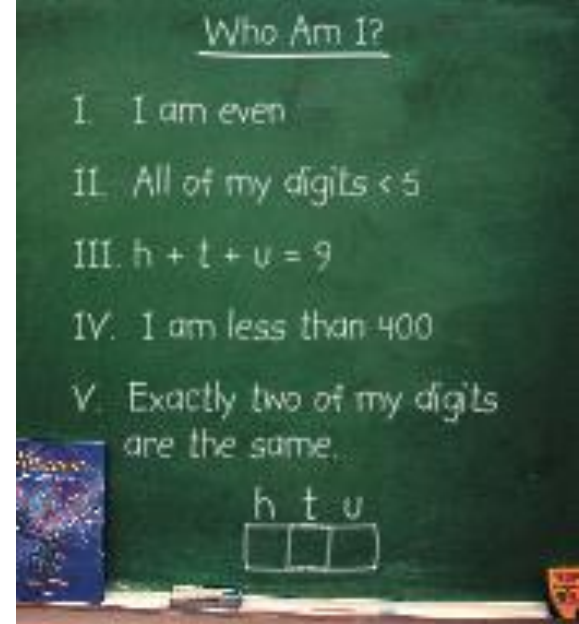SMP 7 Look for and make use of structure
SMP 8 Look for and express regularity in repeated reasoning

Think Math!

What's My Number Puzzles
What can I do?

Who Am I?

I.   I am even
II. All of my digits < 5
III. h + t + u = 9
IV. I am less than 400
V.   Exactly two of my digits are the same.

h t u

I.   I am even.

II.   All of my digits < 5

III. $h + t + u = 9$

IV.   I am less than 400.

V.   Exactly two of my digits are the same.

h	t	u
1	4	4

	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

432

342

234

324

144

414

Think Math!

Who Am I?

I. I am even

II. All of my digits < 5

III. $h + t + u = 9$

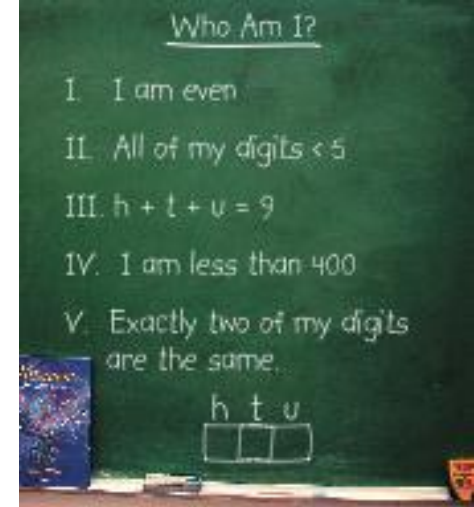IV. I am less than 400

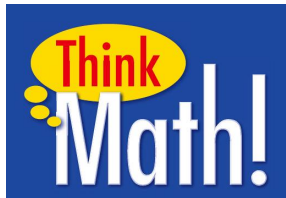V. Exactly two of my digits are the same.

h t u

Create your own!

- Think of a 3-digit number.

- Write 4-5 clues that each match your secret number.

- Share with a neighbor to solve each other's puzzles!

SMP 1 Make sense of problems and persevere in solving them
SMP 3 Construct viable arguments and critique the reasoning of others
SMP 6 Attend to precision
SMP 8 Look for and express regularity in repeated reasoning

4ᵗʰ grade "What's My Number" Puzzles

- I am a 7 digit ODD number between 3 and 4 million.

- My one's digit is 6 more than my millions digit.

- My millions digit, hundred thousands digit, and ten thousands digit are in reverse order.

- My thousands digit is one more than my millions digit.

- The sum of my hundreds digit and my tens digit is 12.

- My hundreds digit and my tens digit are both odd.

- My tens digit is larger than my hundreds digit.

WHO AM I?

- My millions digit is the square root of 25.

- My ones digit is the square root of (40 + 9).

- My thousands digit is even.

- My ten-thousands digit is (100-92).

- My tens digit is (4 x 2).

- My thousands digit is a multiple of three.

- The rest of my digits are zeros.
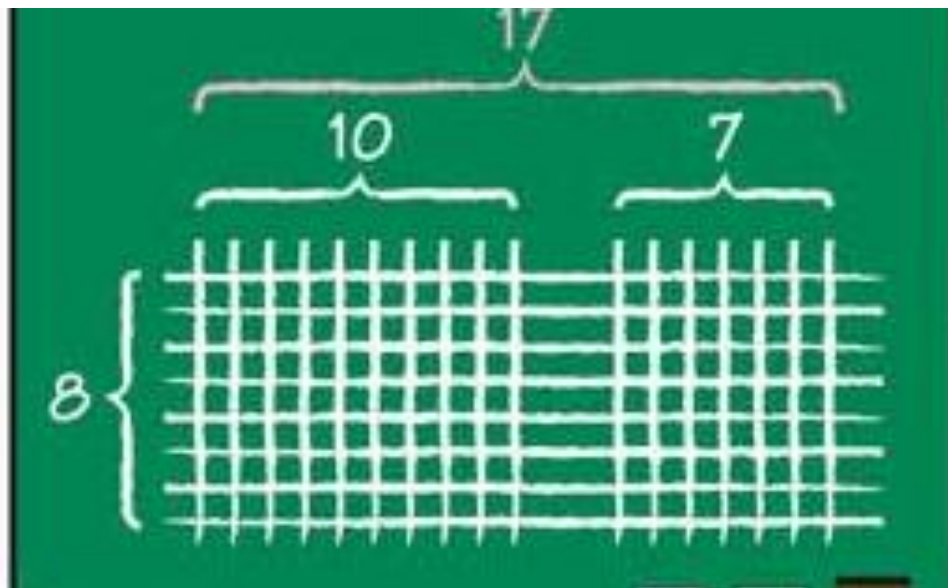
WHO AM I?

By Anika and Blake

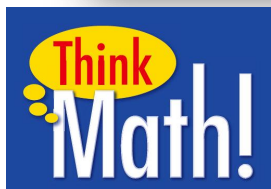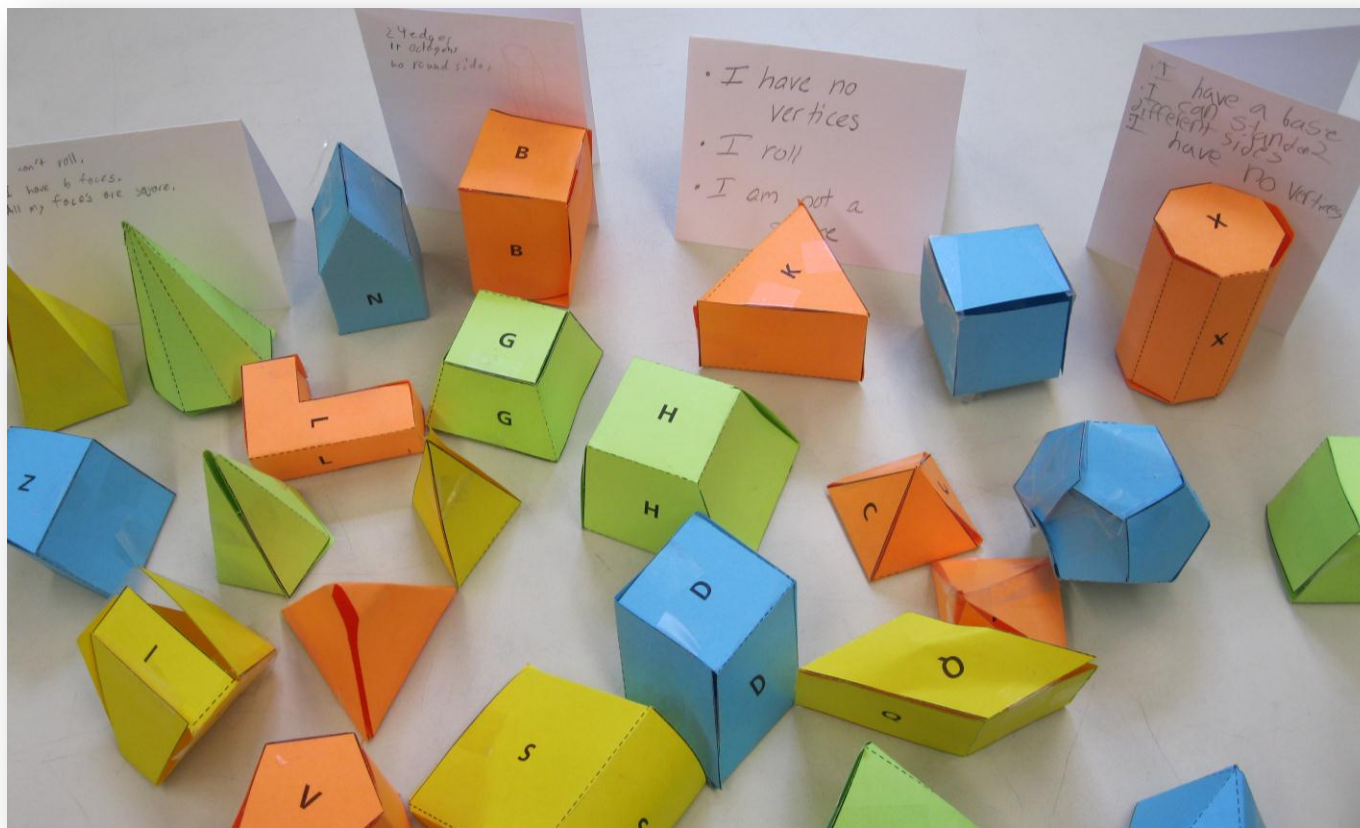Think Math!

Multiplication Puzzles

Division Puzzles

Suppose there is a town with 136 intersections. If 8 streets run east to west, how many run north to south?

Shape Safari

SMP 1 Make sense of problems and persevere in solving them
SMP 3 Construct viable arguments and critique the reasoning of others
SMP 6 Attend to precision
SMP 7 Look for and express regularity in repeated reasoning

Common Core Standards for Mathematical Practice

Mathematical Habits of Mind

1. Make sense of problems and persevere in solving them
6. Attend to precision

2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others

Reasoning and explaining

4. Model with Mathematics
5. Use appropriate tools strategically

Modeling and using Tools

7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Seeing structure and generalizing

Think Math!

Thank you

- For more information about Think Math! visit www.thinkmath.edc.org

- If you are interested in seeing the complete K-5 program visit www.schoolspecialtymath.com

- Contact Tracy Manousaridis manousaridist@weston.org

Attending to precision!