



Number Routines in Intermediate

Presented by Jen Barker
Adams Road Elementary, Surrey BC
September 26th, 2016

A little about Me...

- I teach in Surrey as an Early Numeracy Teacher
- Have 18 years experience in classrooms K - 5
- Mom to M&M, aged 13 and 11
- Twitter: @BarkerJbarker
- www.meaningfulmathmoments.com
- Email: barker_jennifer@surreyschools.ca
- Believe Math should be meaningful, authentic, engaging and build conceptual understanding

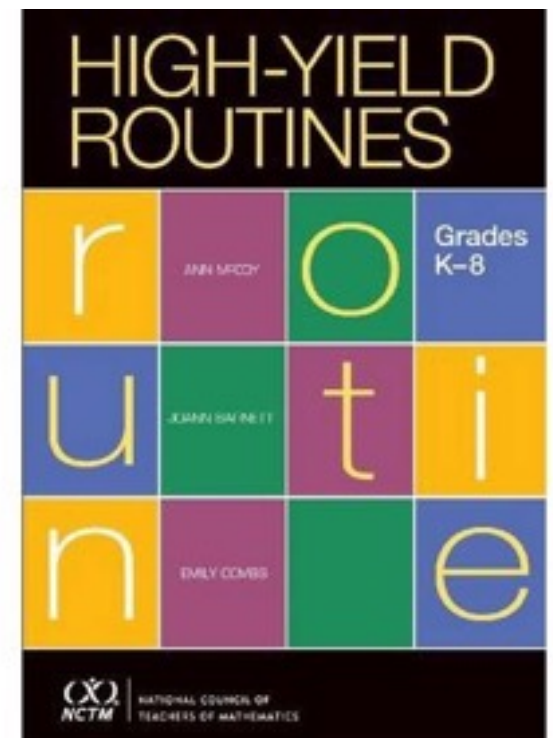
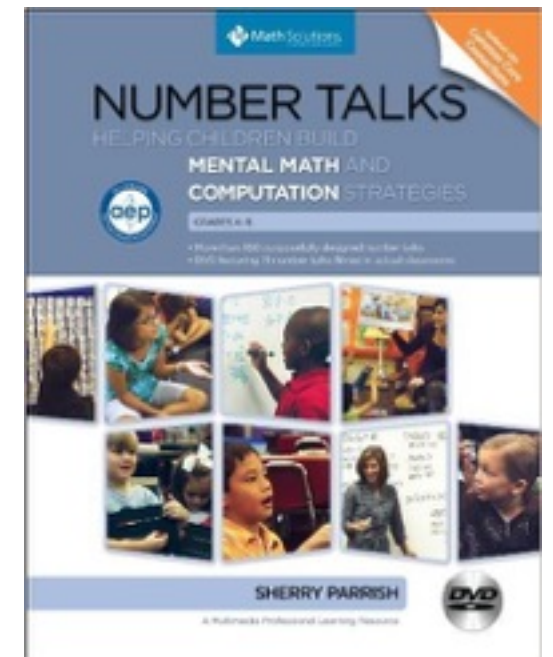
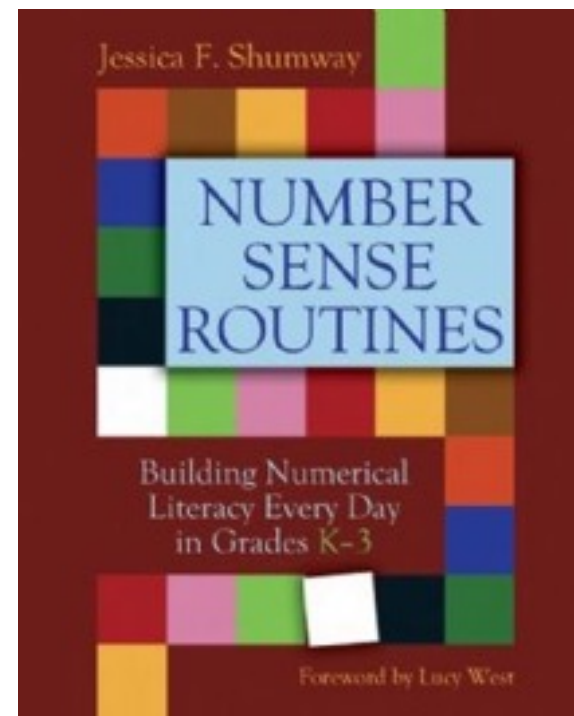


Learning Intentions

- I understand how using 5 - 10 minute daily Number Routines can develop my students' number sense, computational fluency and spatial sense.
- I understand how using Number Routines helps to build a Mathematical Community and encourages my students to share and communicate their thinking
- I have one or two Number Routines that I feel comfortable exploring with my class and I understand how to differentiate these to meet the needs of my students.

What are Number Routines?

- Collection of quick, low-prep 5 to 10 minute activities.
- They focus on the big ideas in Mathematics.
- They serve to reteach, reinforce, and enrich.
- Can be used as warm ups, mini lesson, with the whole class or in small groups.

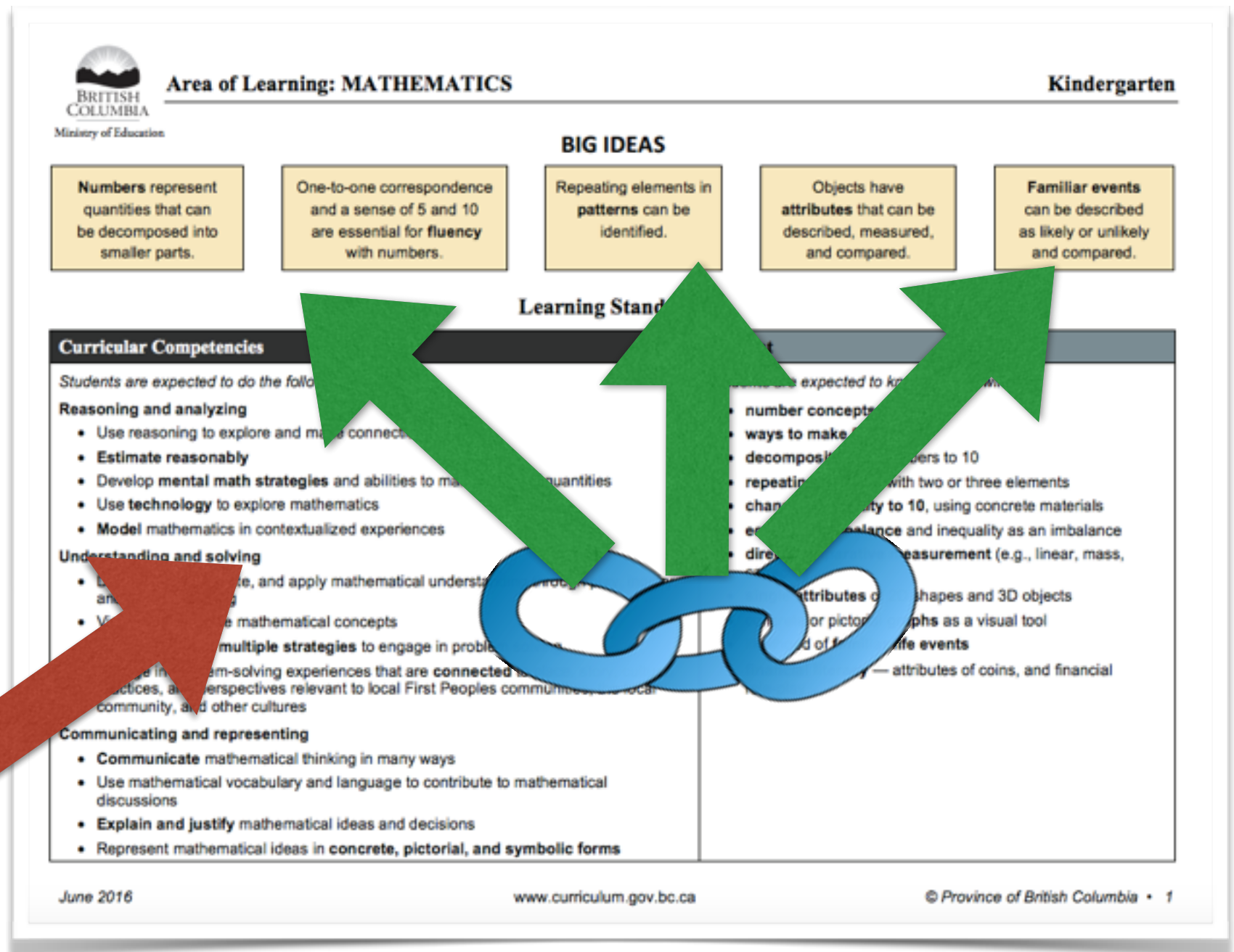


Why use Number Routines?

- Builds a Math community where students feel safe to take risks and can learn from one and other
- Provides daily number sense experiences
- Fosters discussion about numbers and their relationships
- Responsive to students' understandings
- Allows for spiralling through concepts and helps students make connections to the big ideas in mathematics
- Emphasizes the core and curricular competencies in relation to mathematical content.

How does this relate to the revised Curriculum?

The mathematical discussions embedded in the routines foster the curricular competencies in relation to the content.



What Curricular Competencies are fostered?

- Reasoning abstractly and quantitatively
- Analyzing by looking for and making use of structure
- Understanding by making sense of problems and persevering in solving them
- Communicating their thinking not only orally but through concrete materials and pictorial representations
- Connecting through seeing themselves as mathematicians - math to math connections - math to world connections.

SUBITIZING

It is the ability to instantly see how many!

It is important because students need to develop:

- ability to move beyond counting to see spatial patterns
- seeing groups/sets of #'s
- using benchmarks of five and ten
- develop part-part whole understanding

Quick Images



Learning Intentions:

- Subtilizing (Perceptual and Conceptual)
- Visualization
- Decomposing and Recomposing
- Mental Math Strategies

Perceptual Subtizing

Taking a “mental picture” and quickly being able to know how many are there.

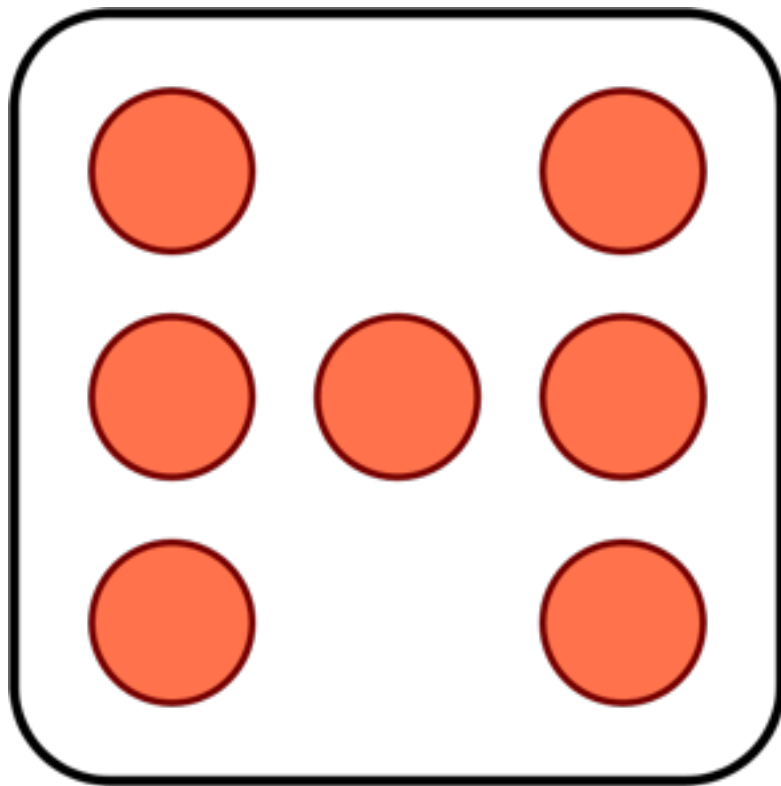


Conceptual Subitizing

Seeing quantities in groups (e.g., I see 3 and 3 and know it is 6)



Dot Cards



Flash and Say

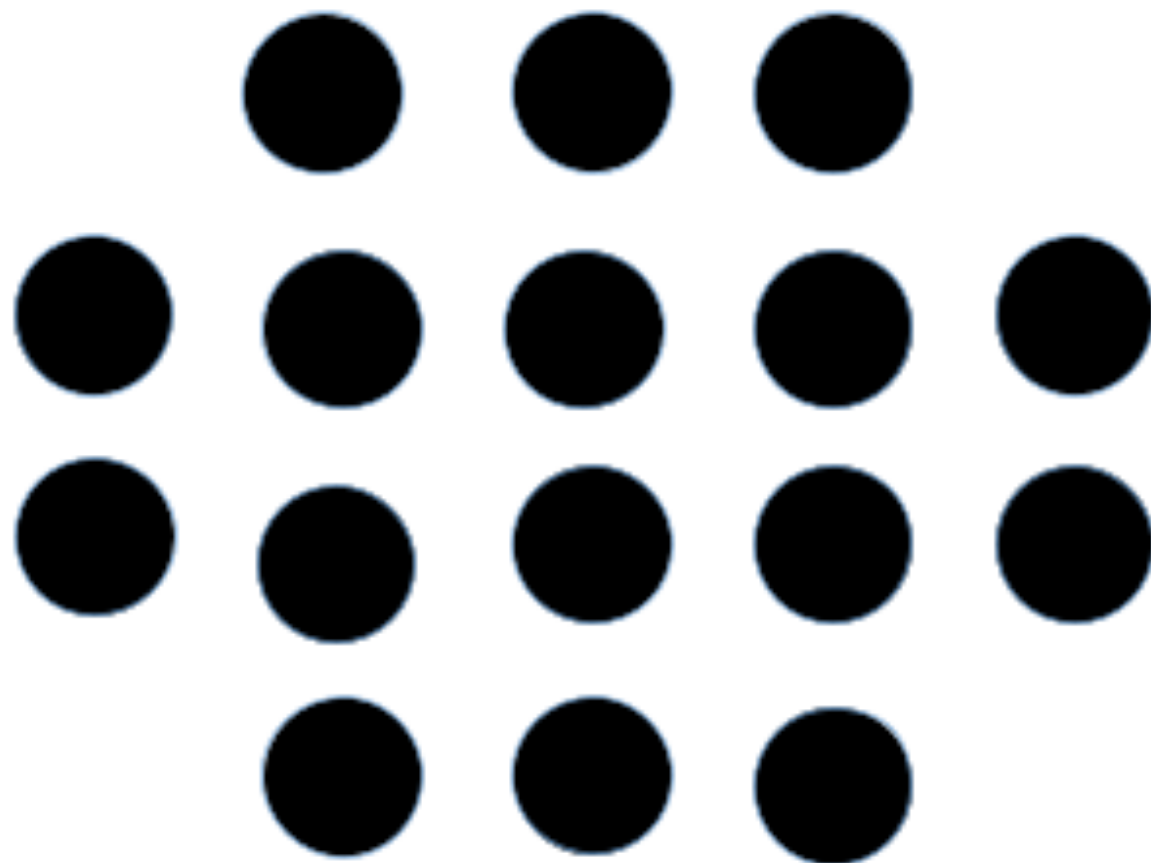
Flash and Show

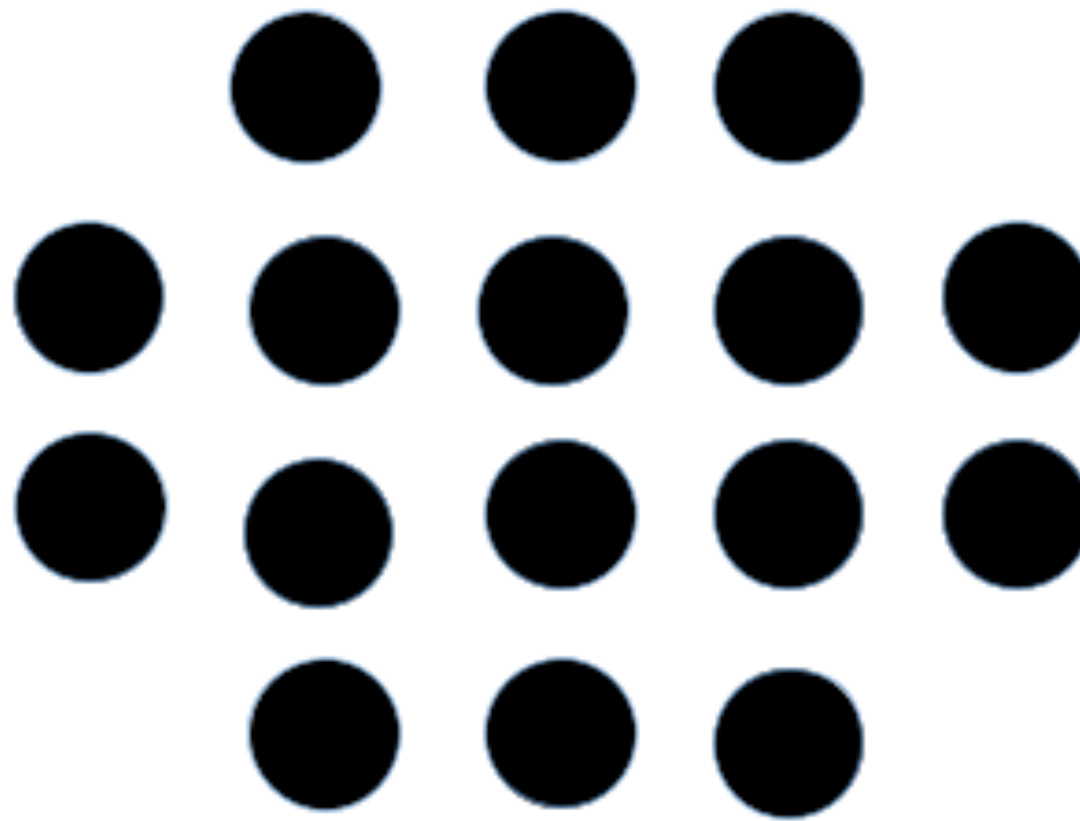
Give SILENT thumbs up!

“How many do you see?”

“How did you know so quickly?”

“How did you see them?”

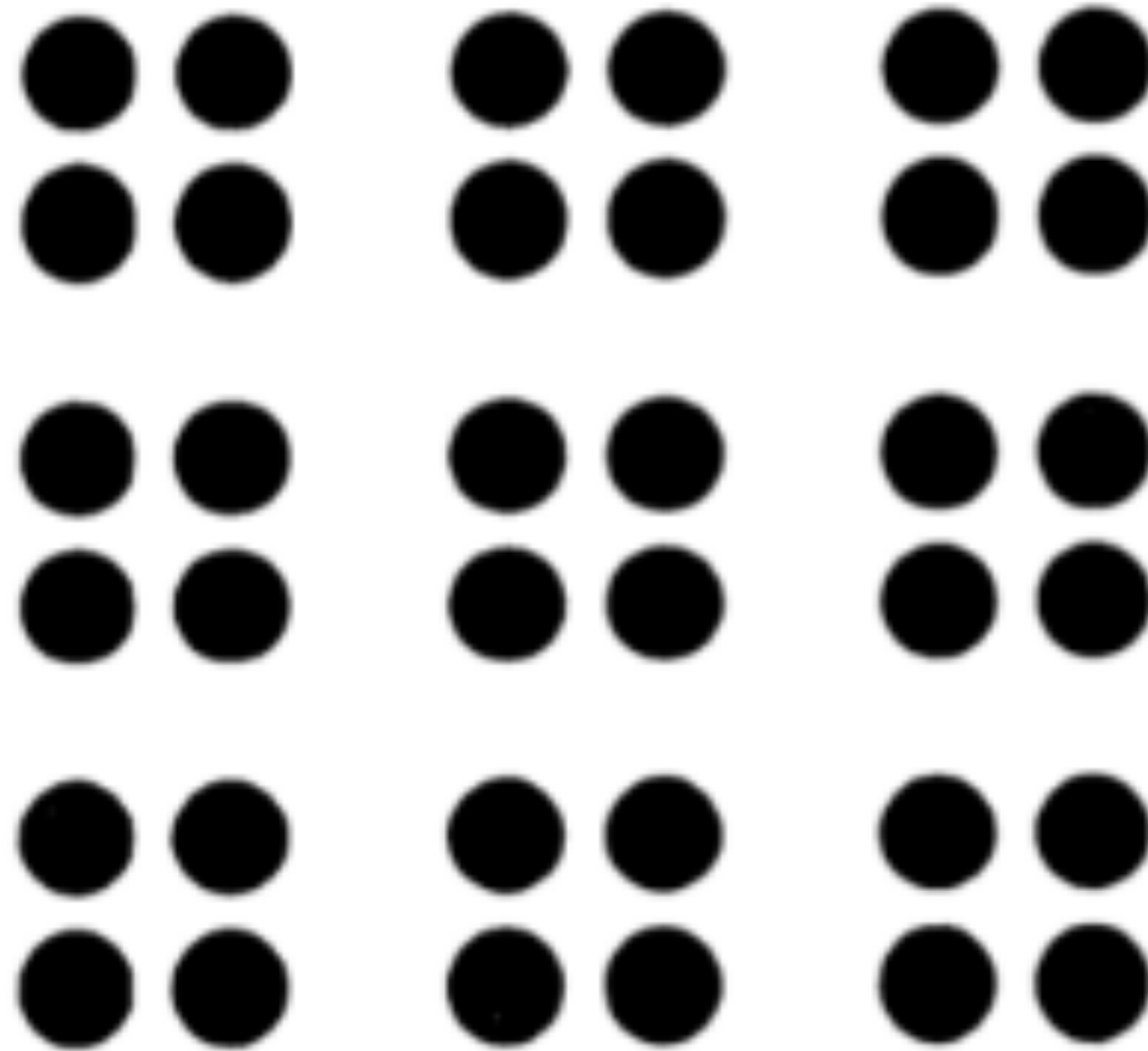




“How many do you see?”

“How did you know so quickly?”

“How did you see them?”



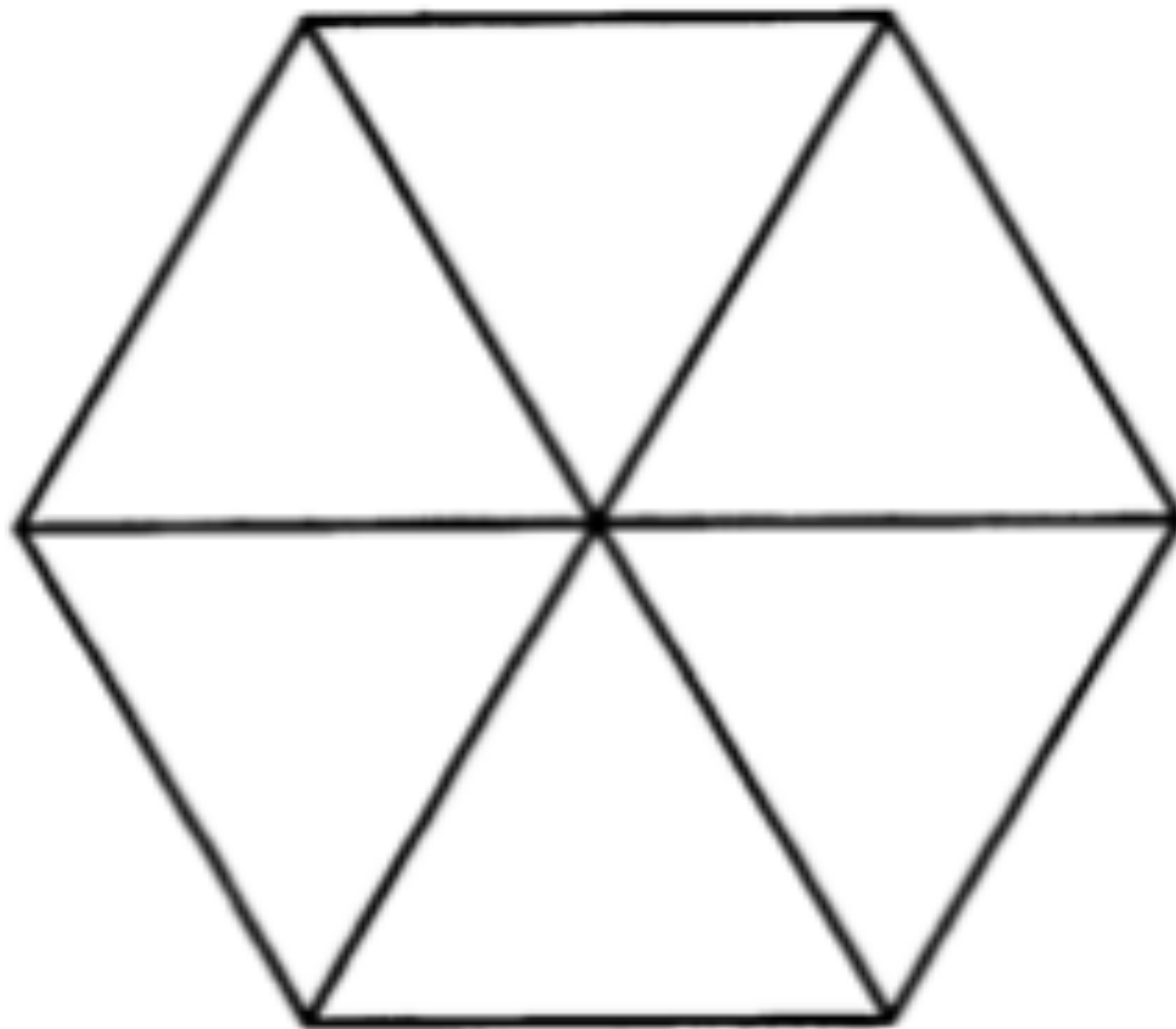
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“How many do you see?”

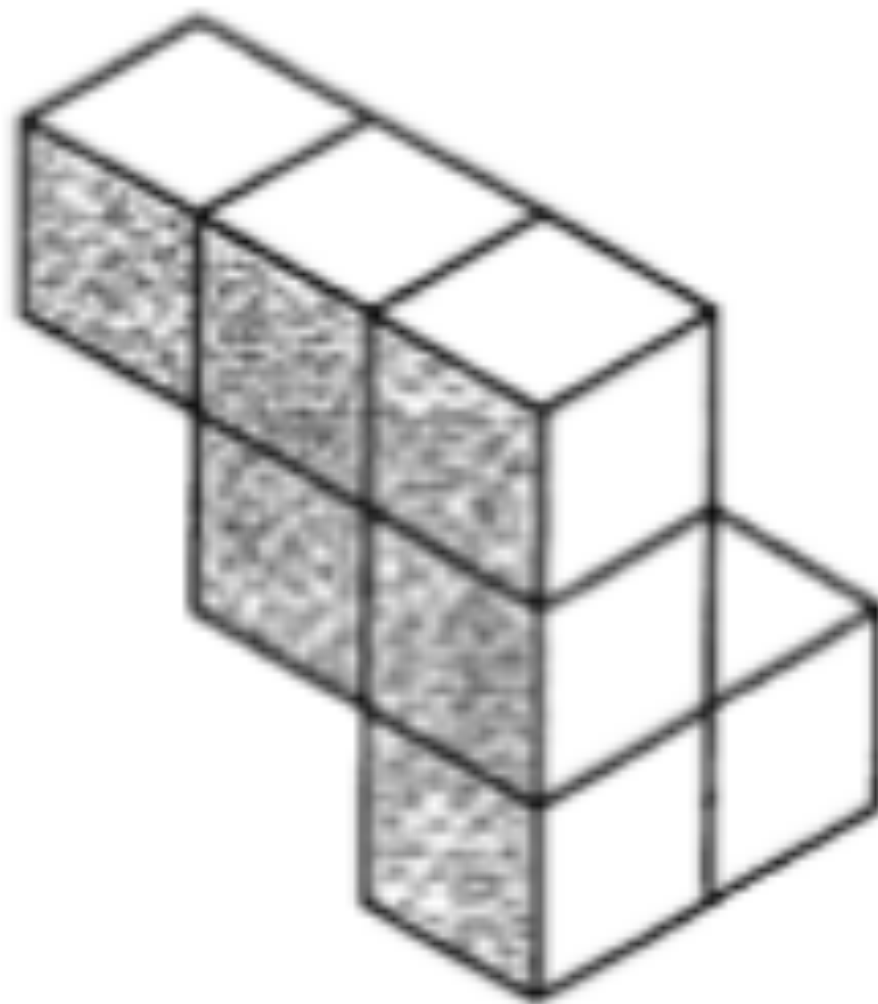
“How did you know so quickly?”

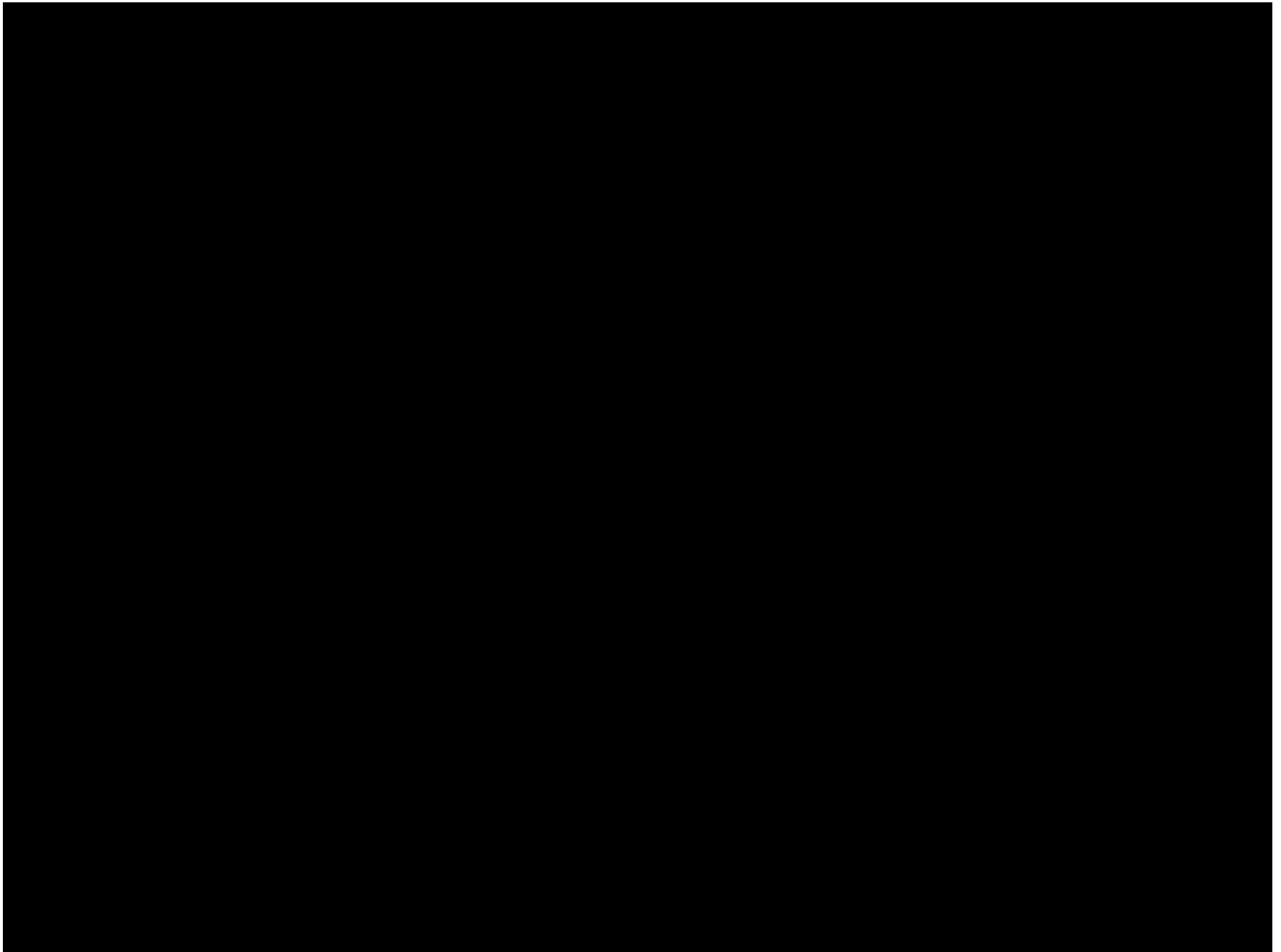
“How did you see them?”

How many triangles?
How many angles?



How many cubes?
How many faces?





Video from tedd.org

PLACE VALUE

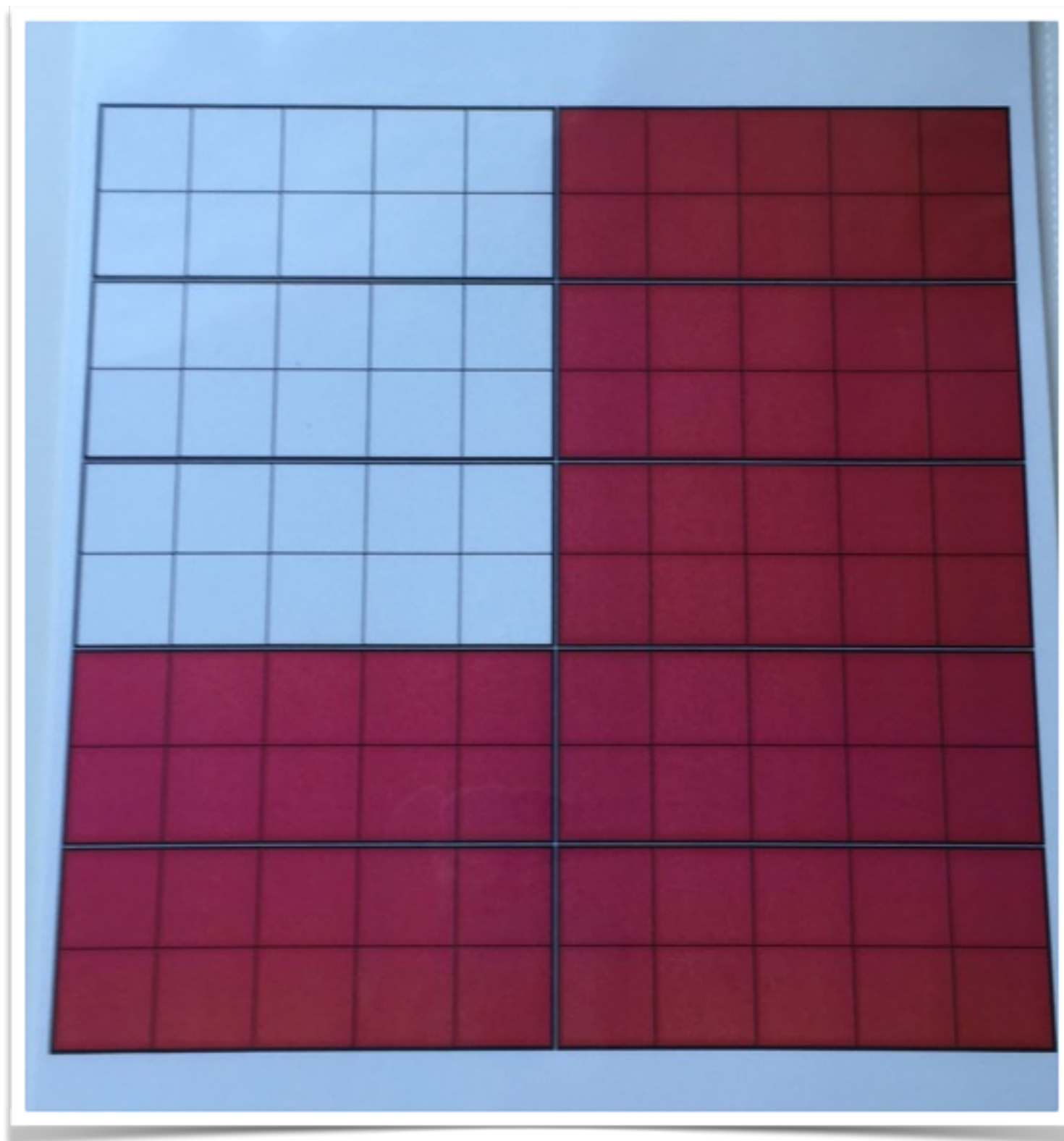
It is the ability to understand our base-ten system.

It is important because students need to develop:

- ability to know the value a digit has based on its place
- the ability to work with larger numbers
- the ability to work with decimals

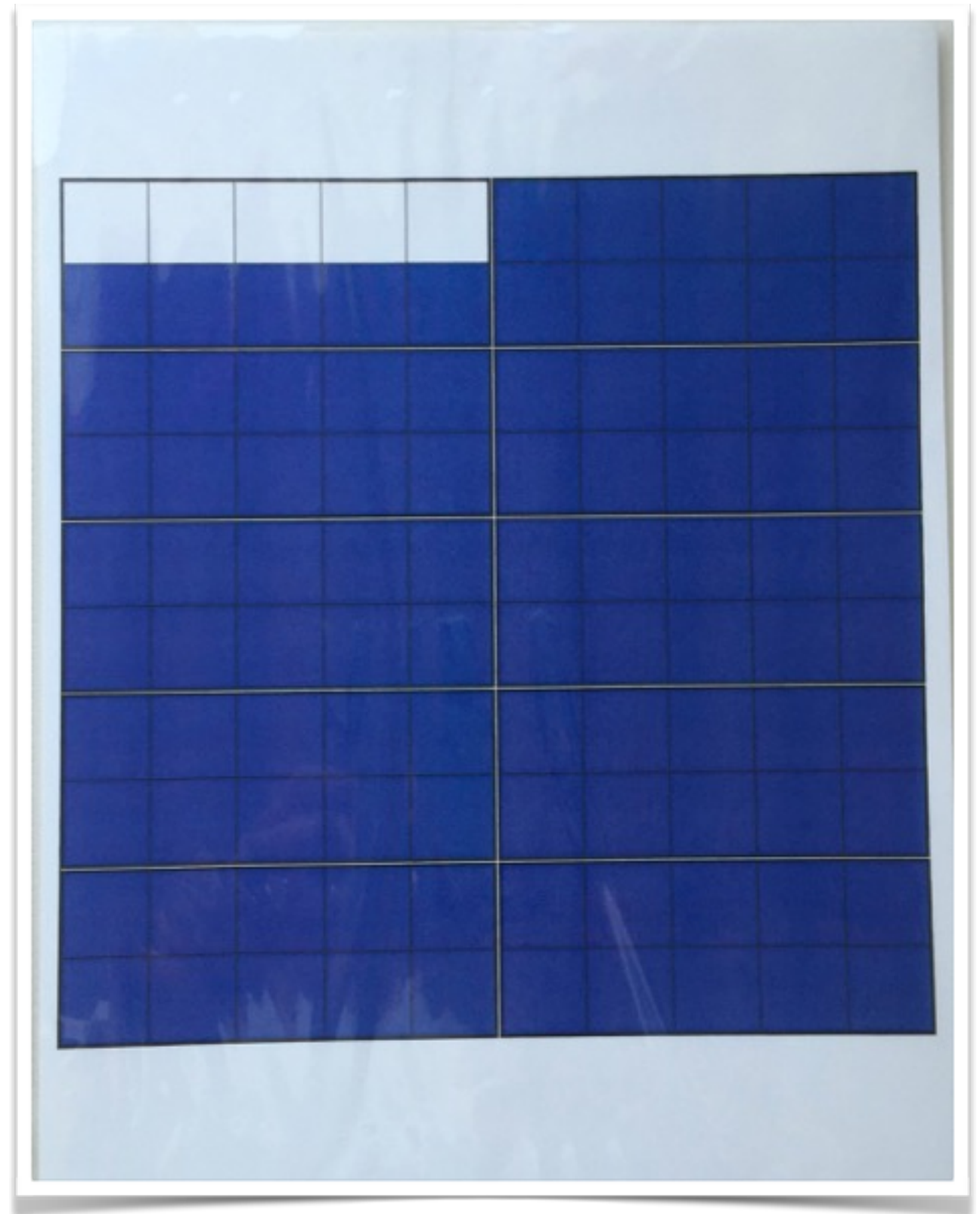
Hundreds Boards

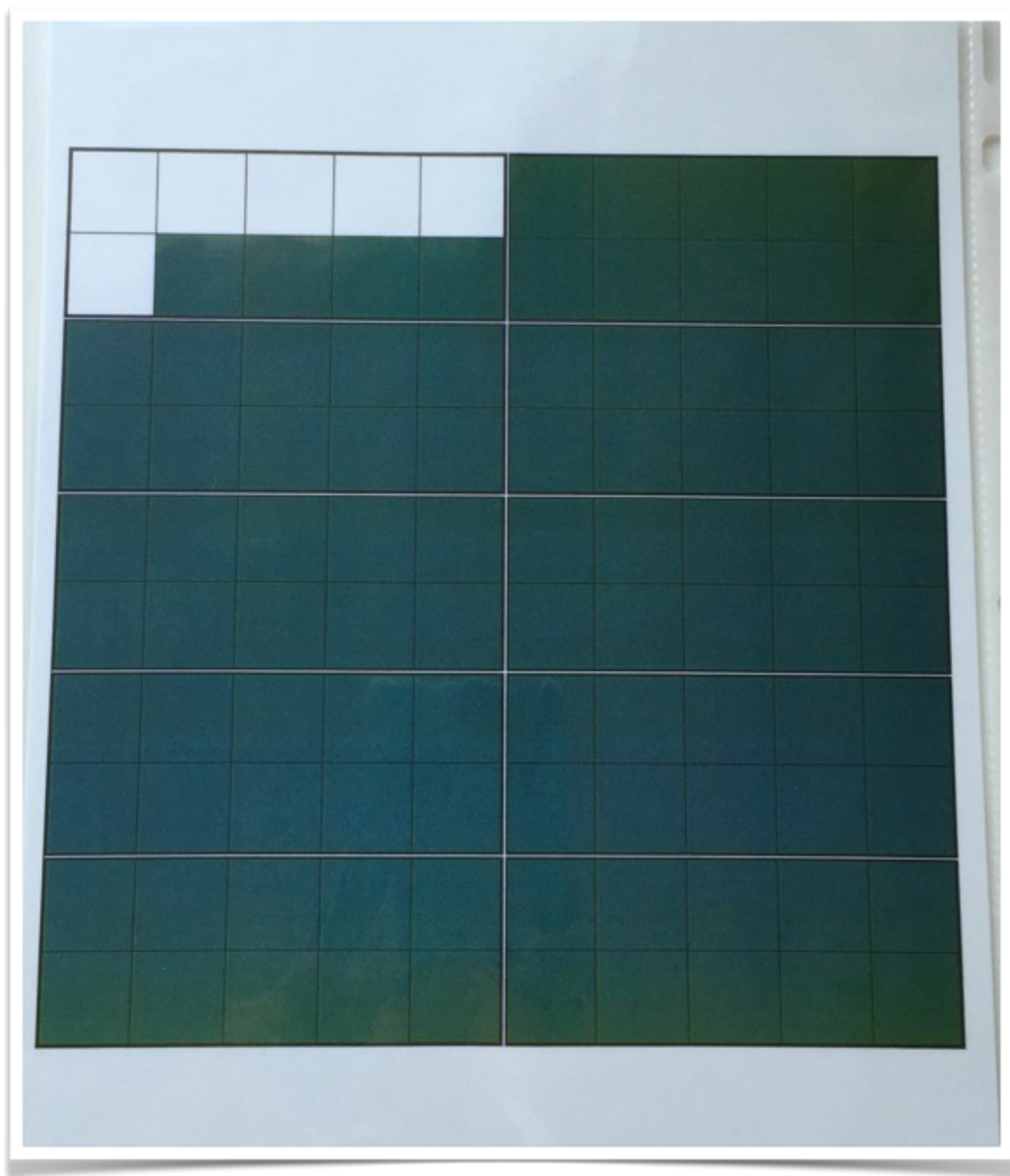
Could be used for
whole numbers as
well as fractions
and decimals.



What decimal do you see?

How do you see it?





Guiding questions...

- How many do you see?
- How do you see them?
- Does anyone see them a different way?
- Can you express what you saw as an equation?
- Explain your thinking.

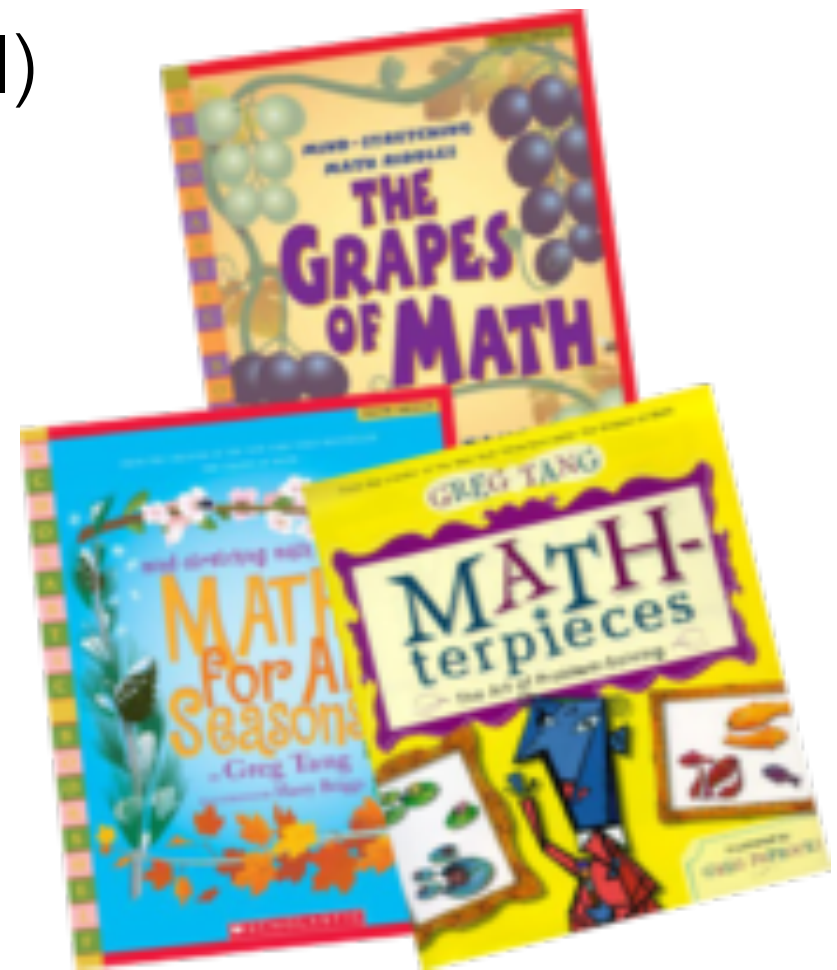
Picture of the Day

Learning Intentions:

- Subtilizing (Perceptual and Conceptual)
- Visualization
- Decomposing and Recomposing
- Mental Math Strategies

Items you could use:

- Greg Tang books
- Photos of real life items



FROM THE CREATOR OF THE NEW YORK TIMES BEST-SELLER THE GRAPES OF MATH

MATH STRATEGIES
THAT MULTIPLY

The Best of Times

BY Greg Tang
ILLUSTRATED BY
Harry Briggs

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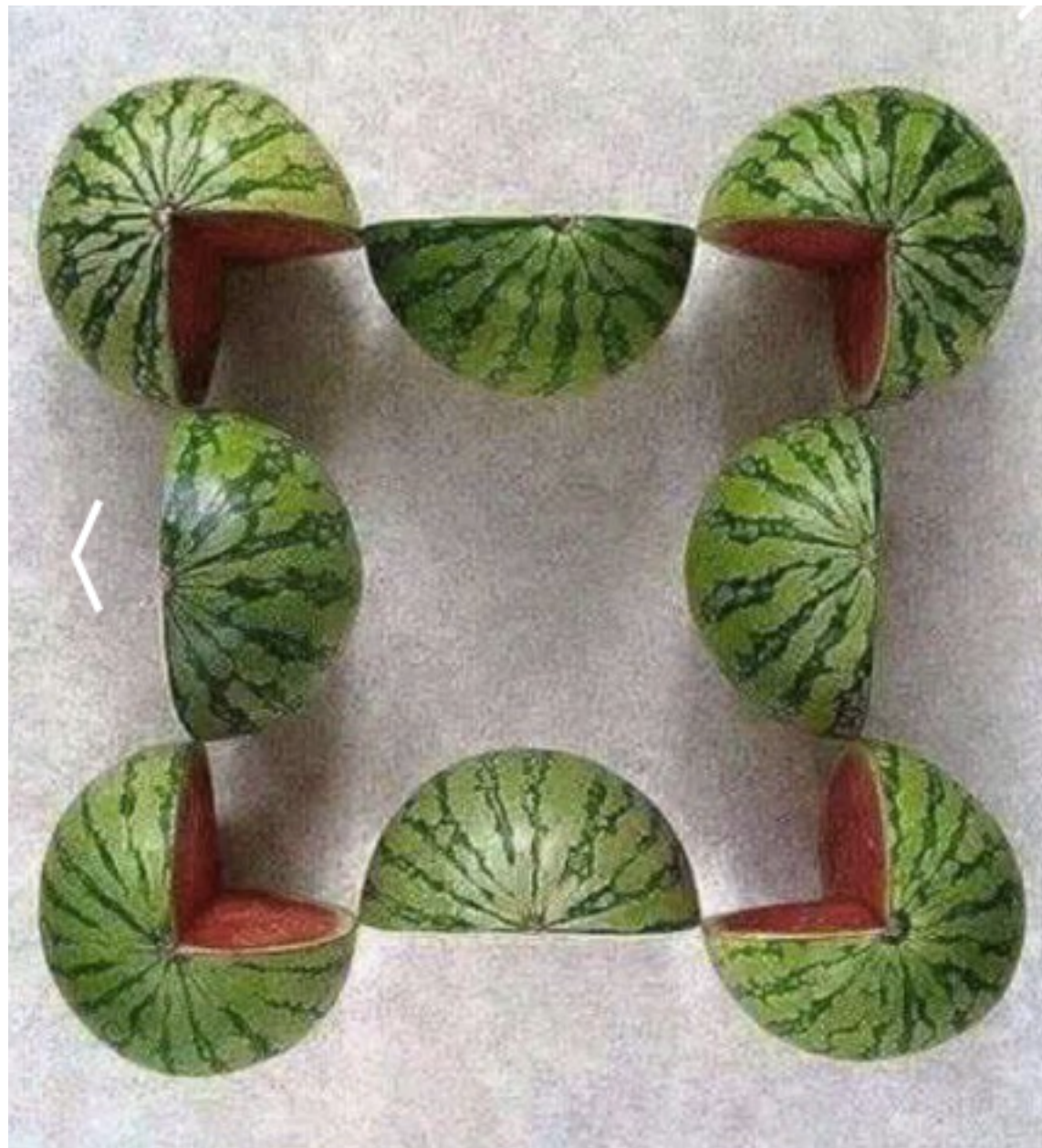
**ILLUSTRATED BY
Harry Briggs**



“How many do you see?”

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“How many do you see?”

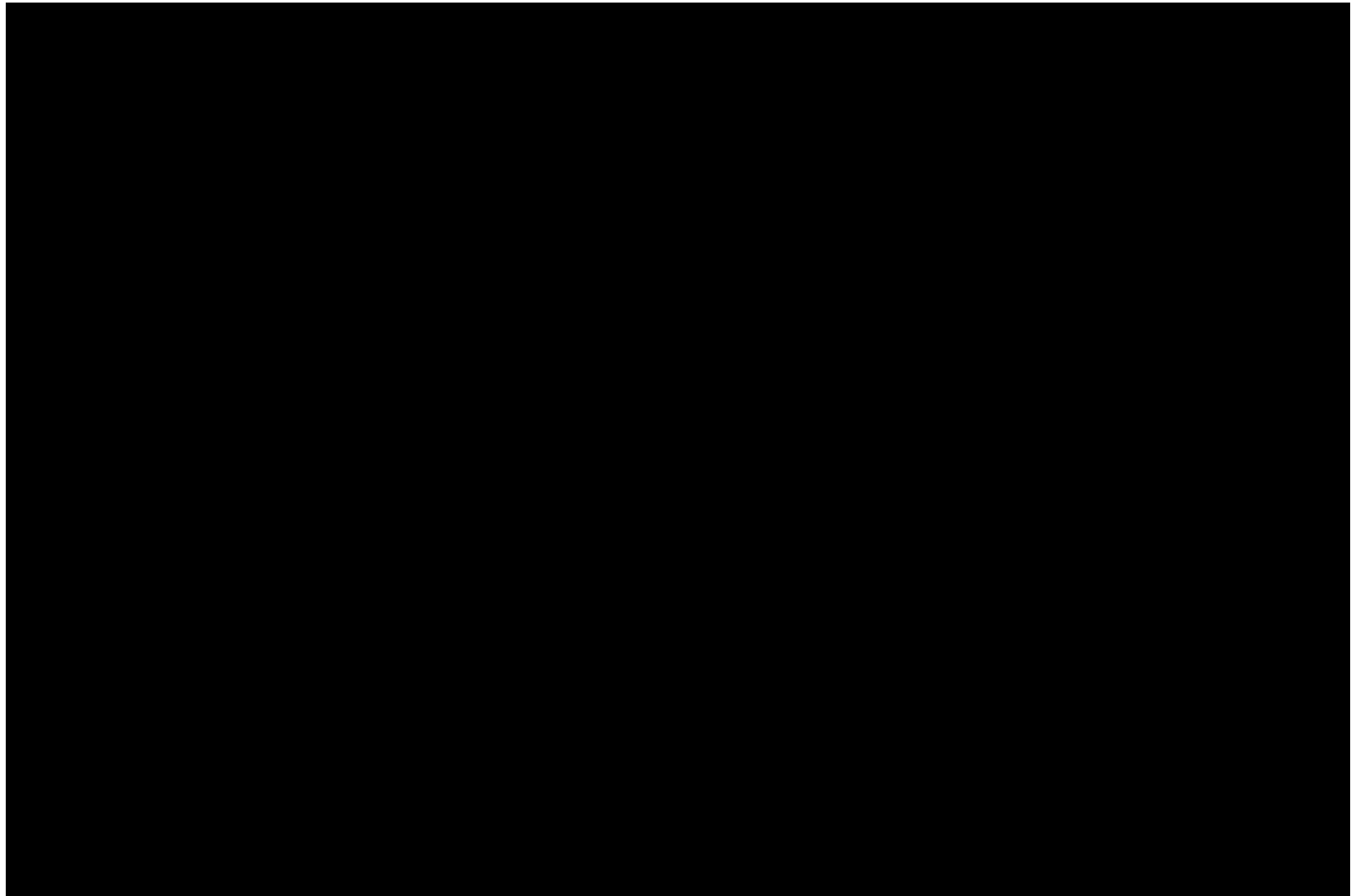
“How did you know so quickly?”

“How did you see them?”

How many did I use? Which pic makes it easier to answer?



COUNTING



Access this and other videos/key resources at tedd.org

Counting Collections

Learning Intentions:

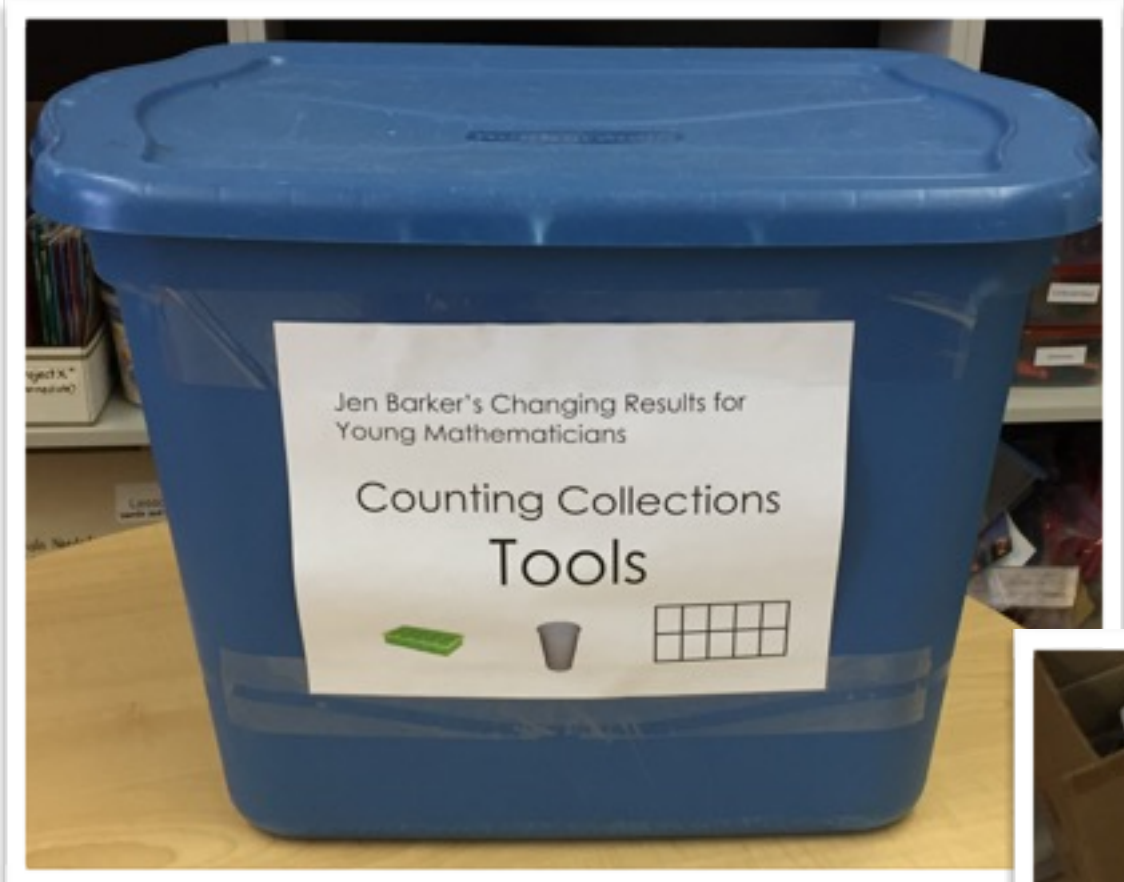
- Subtilizing (Perceptual and Conceptual)
- Counting forward
- Skip counting
- Place Value

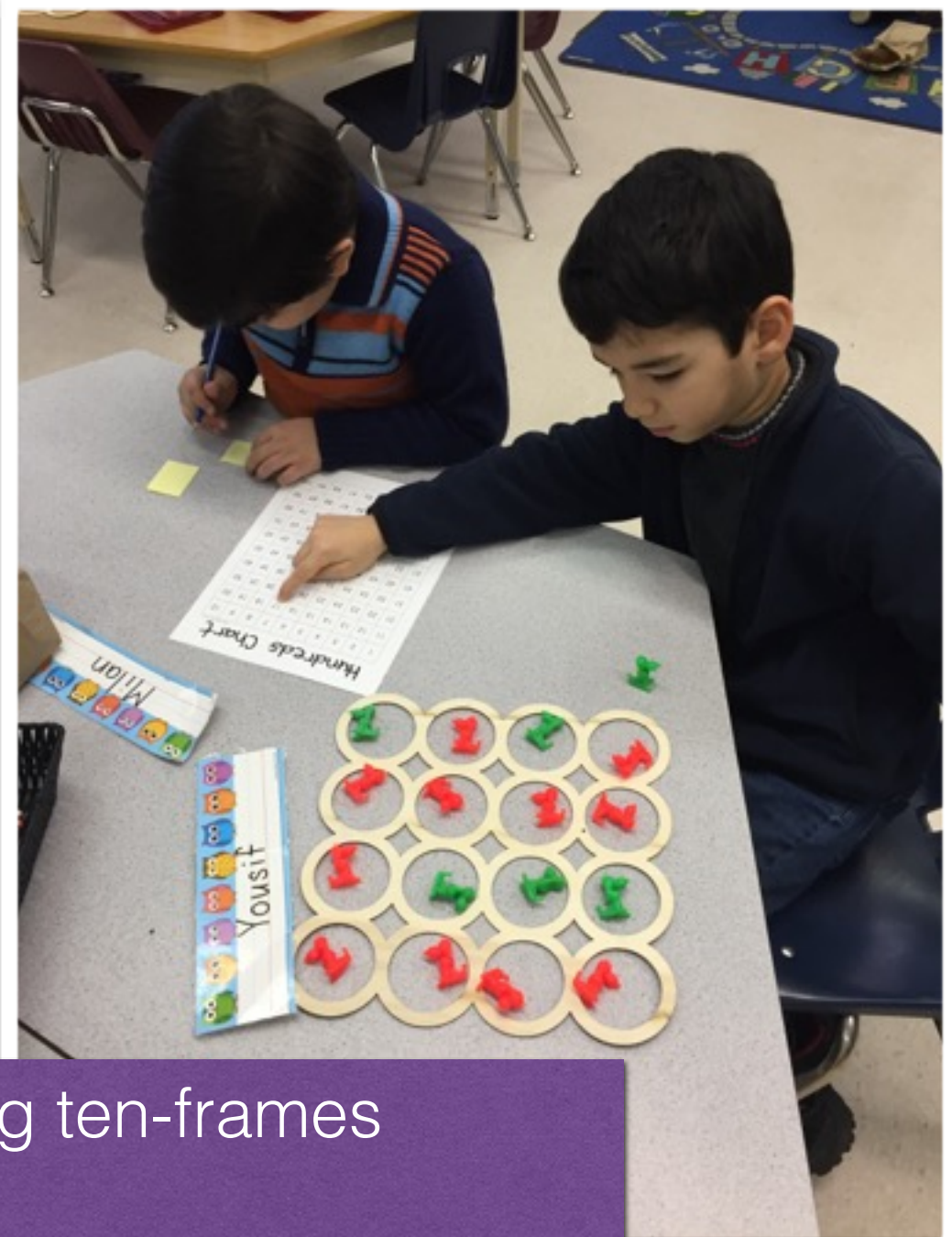


Items you could use:

- anything - straws, bottle caps, buttons, pompoms, craft sticks, beans, beads, toothpicks, mini-erasers, play cards, small animals

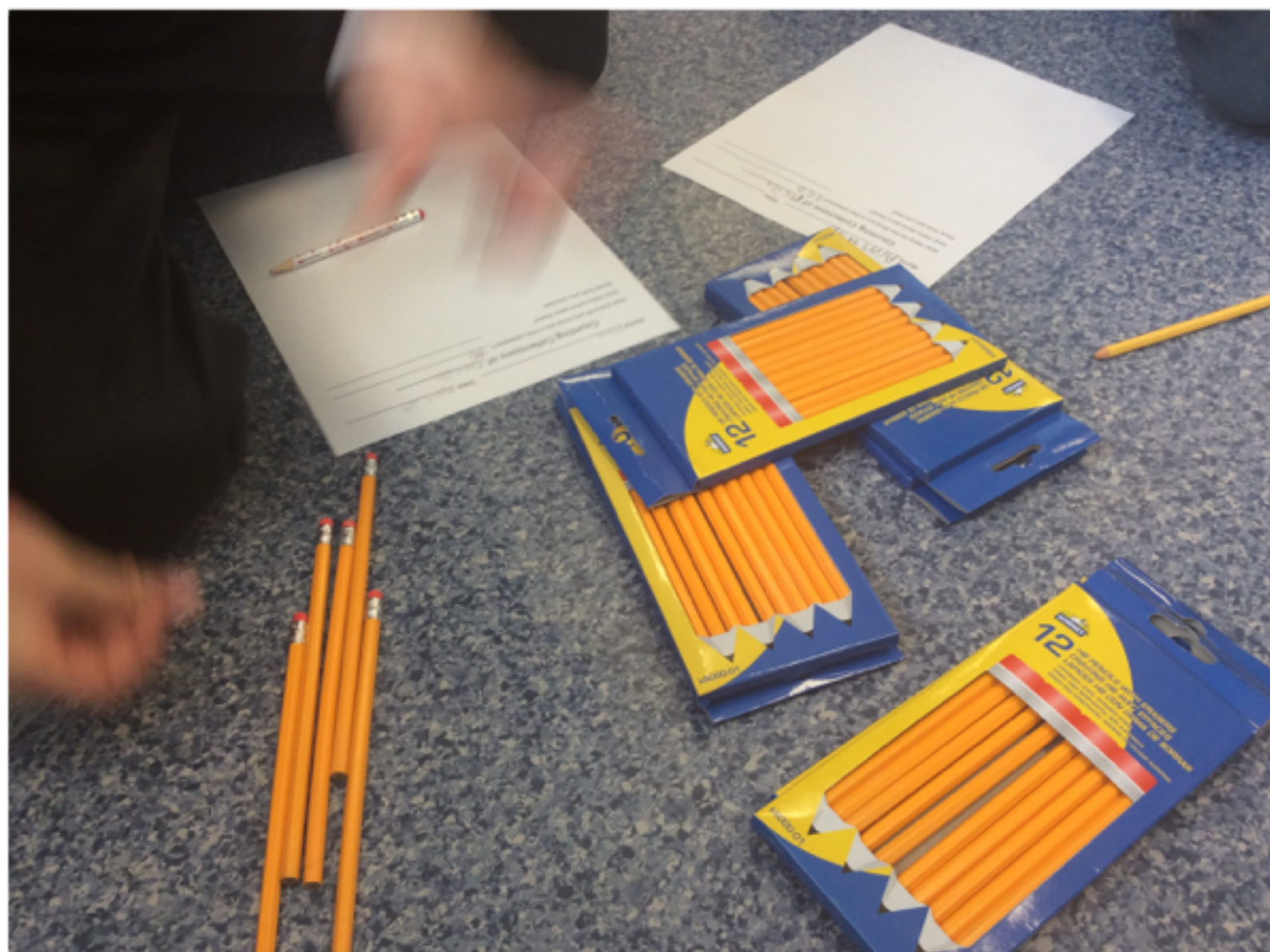
Our “Tools”
that help us
keep track.

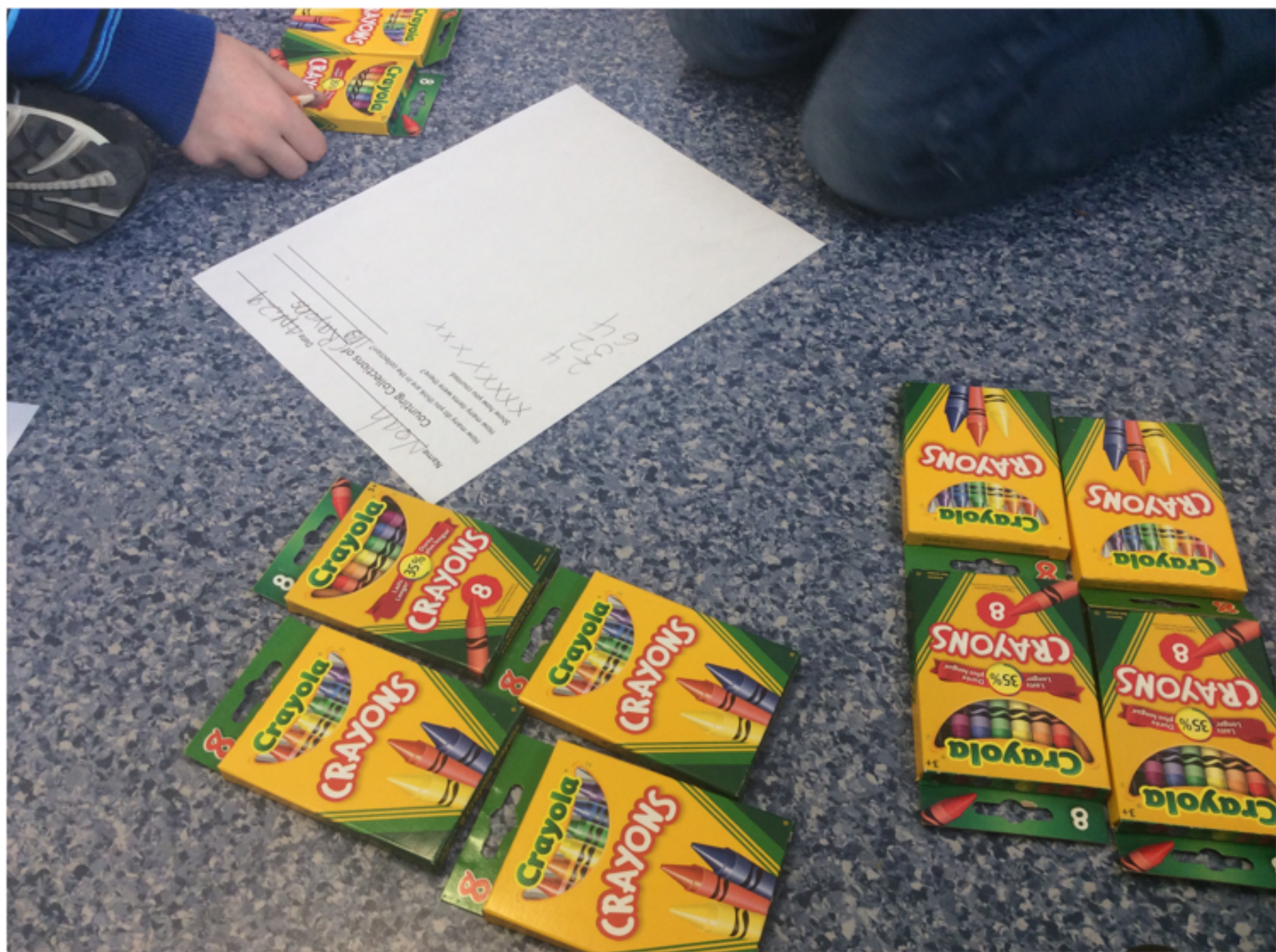




Count by tens using ten-frames
By fives using five-frames or a hand print
by twos using ice-cube trays
by fours using a circle mat

Counting by larger groups!





Sometimes we record how we counted on paper.

Name Tanner Date Apr. 29

Counting Collections of frogs

How many do you think are in the collection? 34

How many items were there? 33

Show how you counted.

We counted by 2's

Guiding questions...

- How many items do you think you have?
- How many items do you have?
- How did you count them?
- Can you record how you counted?
- What other ways could you count?

Reflection Time

- Take 5 - 10 minutes at the end or during the block to have students share out how they counted.
- Students could do a gallery walk.
- While circulating take pictures with your iPad and highlight new strategies used - bring student to the front to explain what they did.

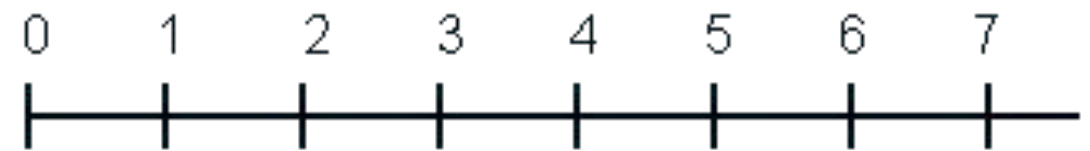


Choral Counting

Note: The main benefit of this routine is that children can hear and participate in a counting sequence without being put on the spot.

Learning Intentions:

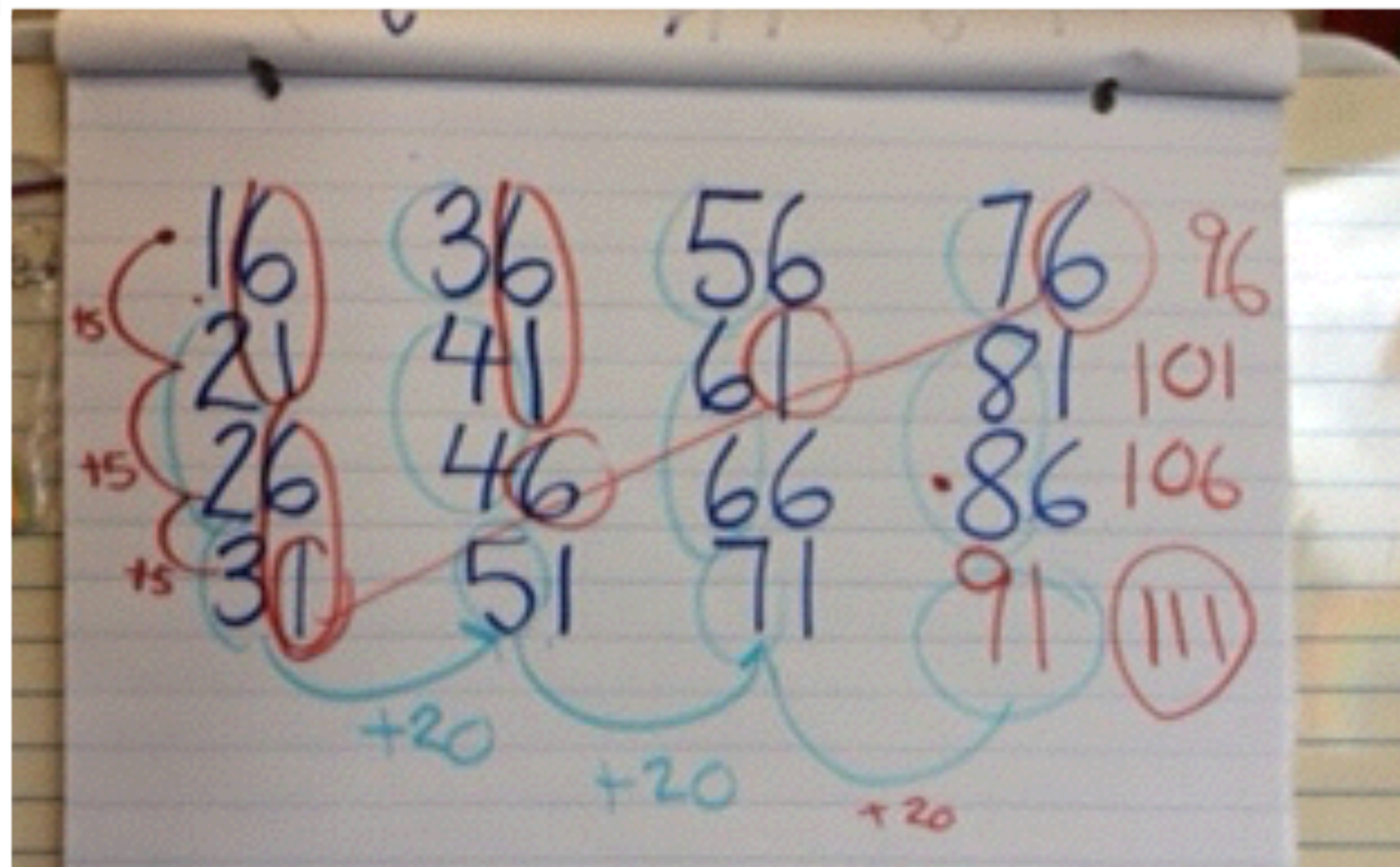
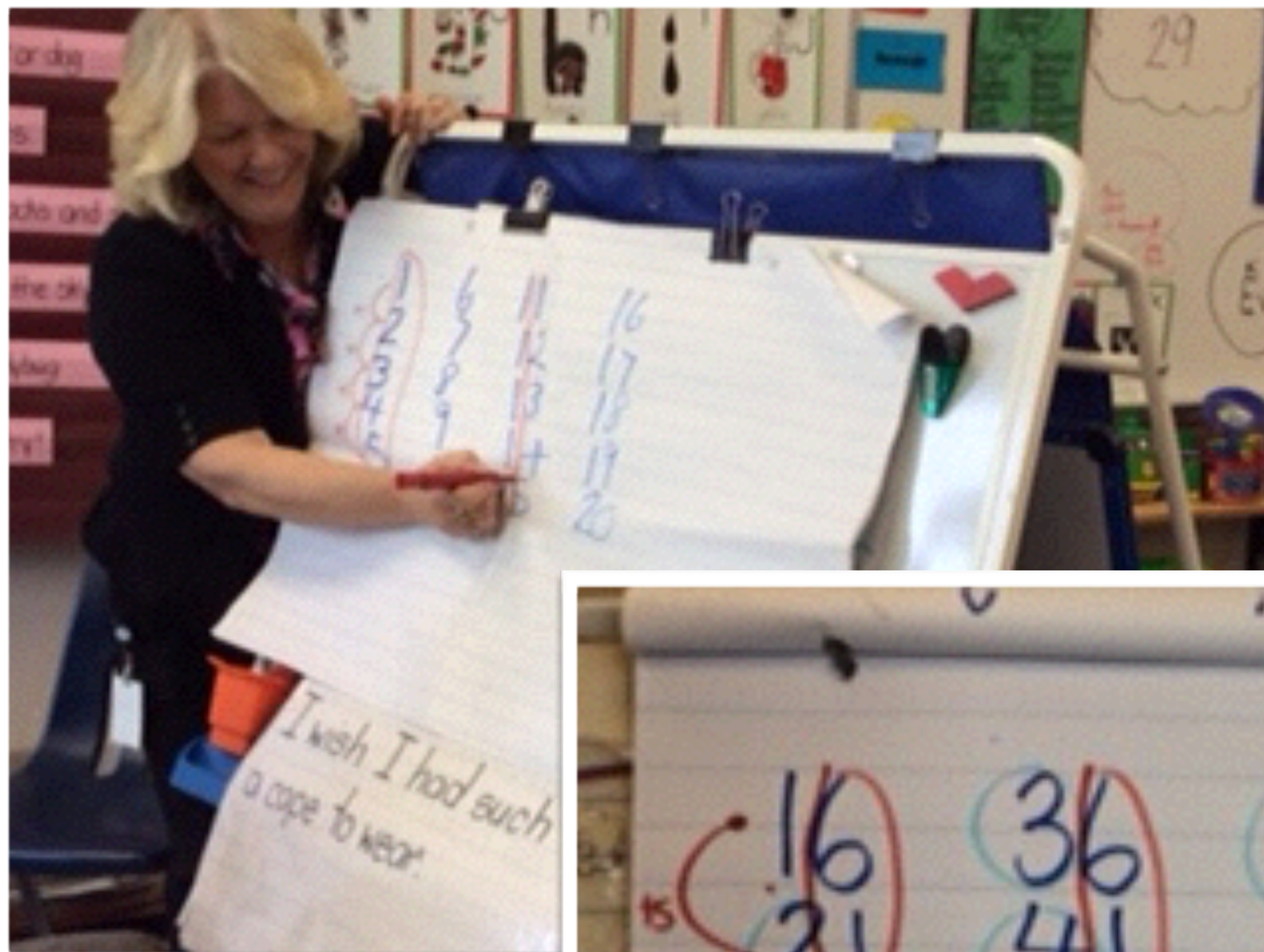
- Counting forwards and backwards
- Skip counting
- Magnitude of numbers
- Identify patterns in our base-ten system



1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Ideas for Counting...

- Count forwards or backwards by two's, three's, five's and ten's starting a 3-digit number (e.g., 322, 320, 318, 316)
- Count by halves (e.g. 0, $\frac{1}{2}$, 1, 1 and $\frac{1}{2}$, 2)
- Count by fourths, eighths, thirds, or sixths starting at zero or at various points.
- Count by wholes starting at a fractional number
- Count by hundreds or thousands or millions starting at zero or various points



Guiding questions...

- Which three numbers do you think will come next?
- How do you know?
- What number goes here?
- If we continue, will we say the number _____?

Start and Stop Counting

- Can be done chorally or in count around the circle
- Students start at a specified number and stop at another determined number
- Use number lines and/or number grids to assist students



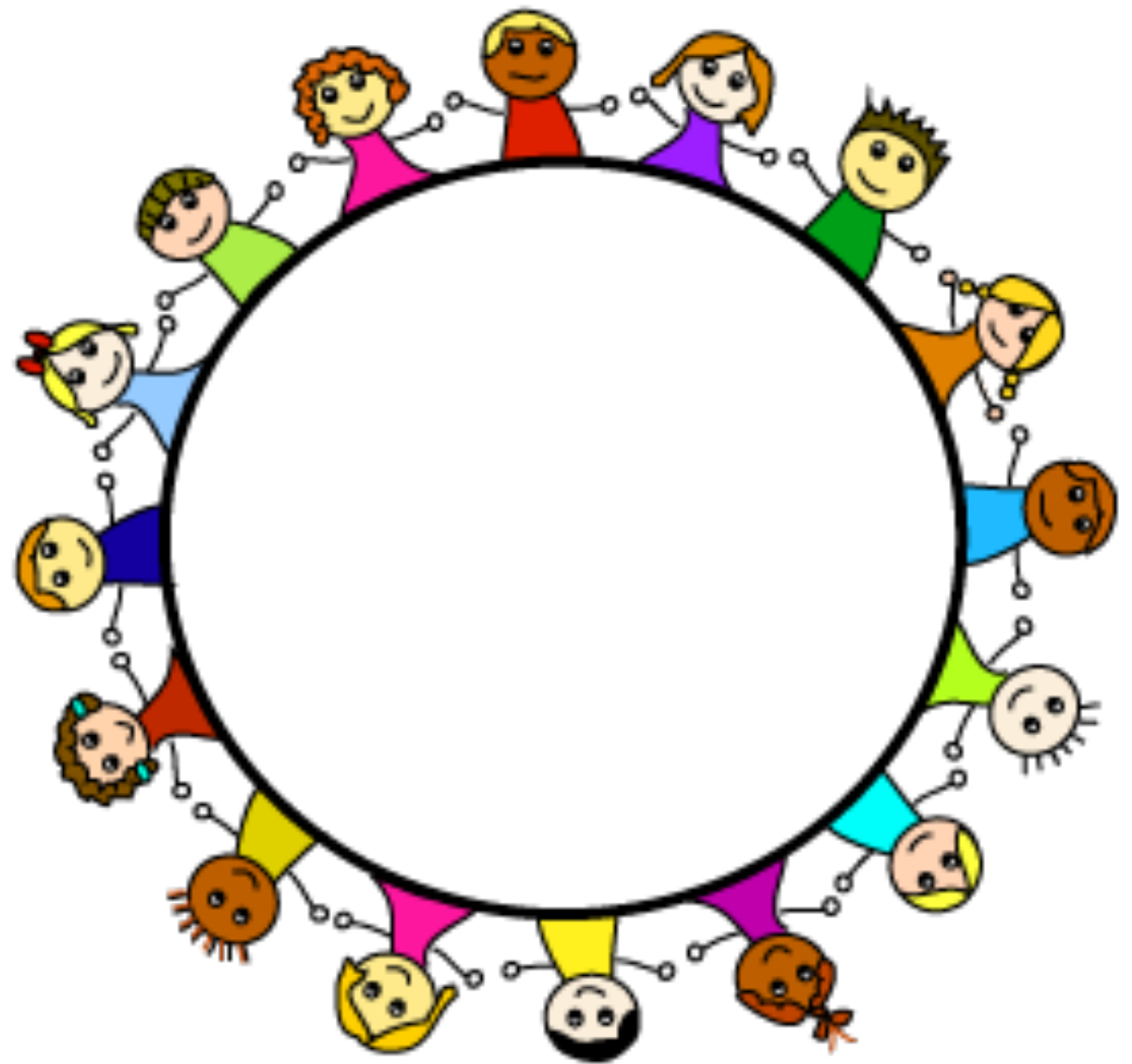
More ideas...

- Starting at 9.0 and count by tenths using decimals (e.g., 9.0, 9.1, 9.2, 9.3) stopping at 10.5
- Starting at 12.25 and count by .25 (or 0.5), stopping at 13.75
- Starting at 12, 992 and count by ones, stopping at 13, 012

Counting Around The Circle

Learning Intentions:

- Counting forwards and backwards
- Skip counting
- Magnitude of numbers
- Multiples
- Connections to Multiplication



Reminders:



1. Everyone needs to listen to each person. We cannot be talking to each other. We need quiet to hear each person talking.
2. Give everyone time to think. Calling out the answer turns our friends' brains off.

To scaffold the activity, consider recording the numbers on the board while students count aloud.

And if it is too difficult - move to a choral count aloud.

Differentiation:



- Prior to counting ask some **ESTIMATION** questions

“If we count by one’s starting at Megan, and go all the way around the circle, what number do you think Michael will say?”

“Why did you choose ____ as an estimation?”

“Why didn’t anyone choose _____ as an estimation?”

Count Around the Circle: Knock-down

Teacher picks a “Knock-Down” number (e.g. 96) and we will skip count by 6’s

Everyone in the circle stand ups. The first student says “6”, next one says “12”, continuing until someone says “96”

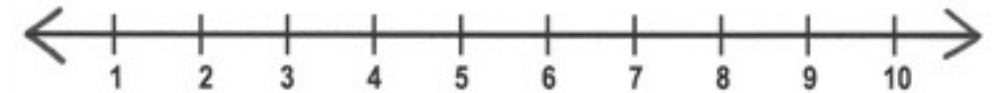
The student who says “96” turns to the person beside them and uses pretend fists to “Knock-Down” them down. Play keeps going until only one person is standing!



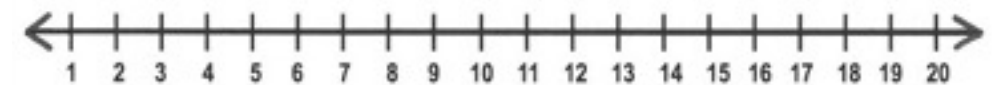
Number Lines

Learning Intentions:

- Visualization
- Spatial Sense of Quantities and Magnitude
- Relationships Among Numbers
- Computational Fluency
- Mental Math Strategies



Items you could use:



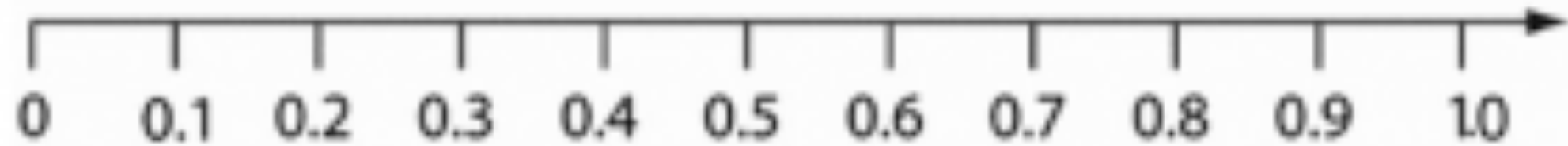
- White boards
- Class Calendars
- Calendar numbers and Edging at Home Depot

Where would $\frac{1}{10}$ be located?



Explain your thinking!

Guess My Number!



True/False Equations

Learning Intentions:

- Subtilizing (Perceptual and Conceptual)
- Visualization
- Decomposing and Recomposing
- Mental Math Strategies

Highlight important math concepts, such as:

- breaking numbers apart into tens and ones
- using patterns
- using the Commutative Property
- using two or more addends
- using repeated groups

$$6 \times 5 = 7 \times 4$$

True or False

Explain your thinking!

Which One Doesn't Belong?

Learning Intentions:

- Understanding attributes
- Encourages Mathematical language
- Spatial Awareness
- Reasoning
- Explain and Justify

Items you could use:

- Letters
- Numbers
- Money
- Graphs



17

26

44

65

1 : 7

2 : 14

3 : 11

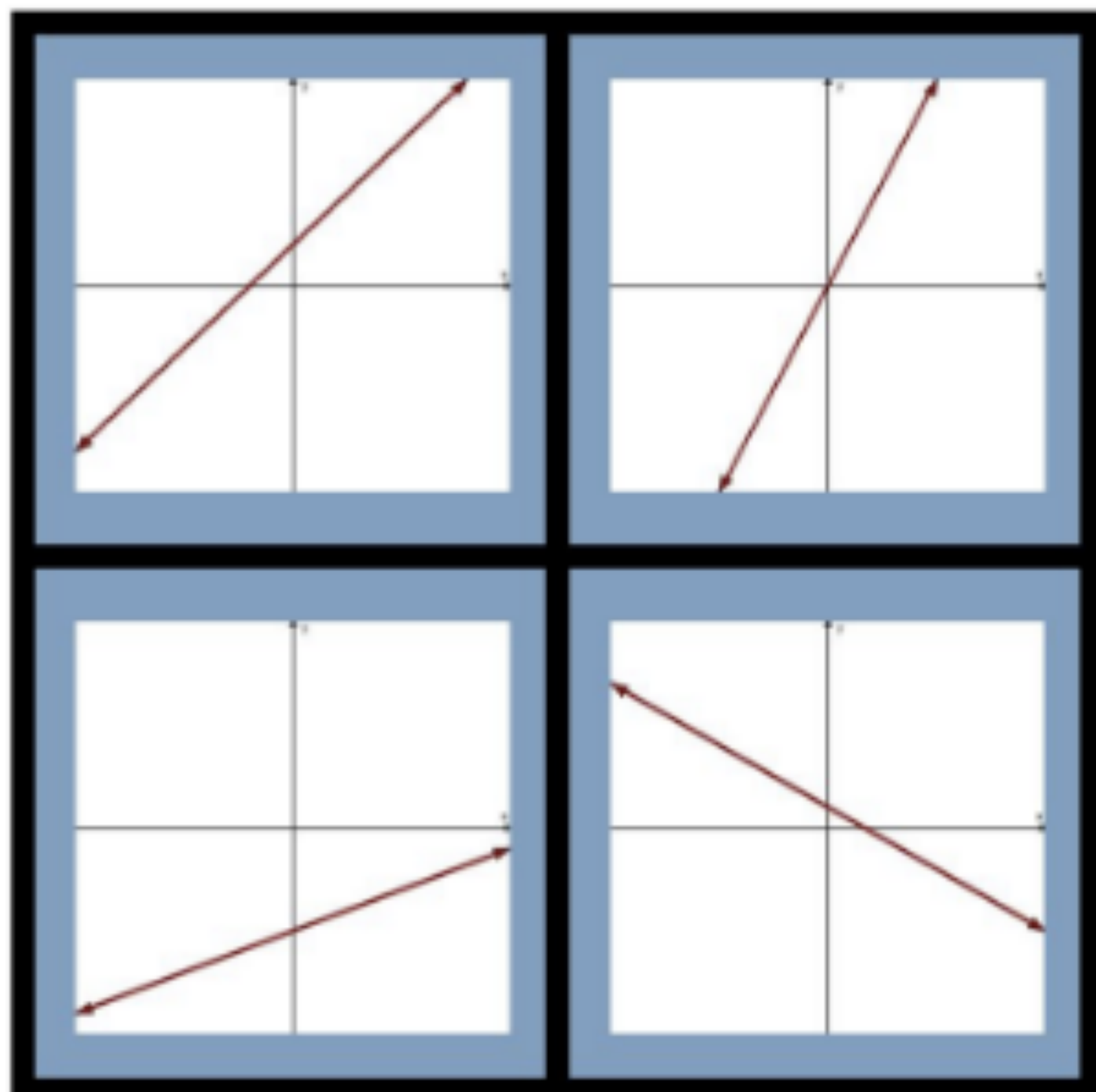
7 : 49

$$\frac{1}{2}$$

$$\frac{5}{3}$$

$$\frac{2}{10}$$

$$\frac{2}{5}$$





Guiding questions...

- What do you notice?
- What makes all the the items alike?
- What makes them different?
- Which one doesn't belong?
- Can you share your reasoning to justify your answer?

Number Talks

Learning Intentions:

- develop multiple strategies for Decomposing (Mental Math)
- developing flexibility through use of multiple strategies
- Computational Fluency
- Place Value

10 - 15 minutes focussed on one question or a
“string” of questions

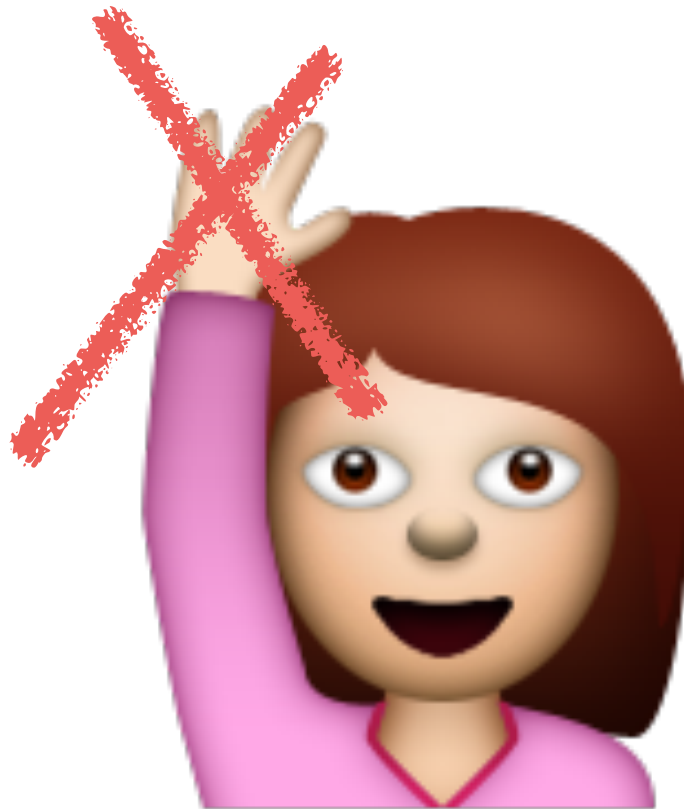
$$6 \times 600$$

$$10 \times 600$$

$$16 \times 600$$

$$16 \times 599$$

Thinking time is needed



NO HANDS UP

SECRET SIGNALS

Hold up one thumb if you have one way to find the answer.



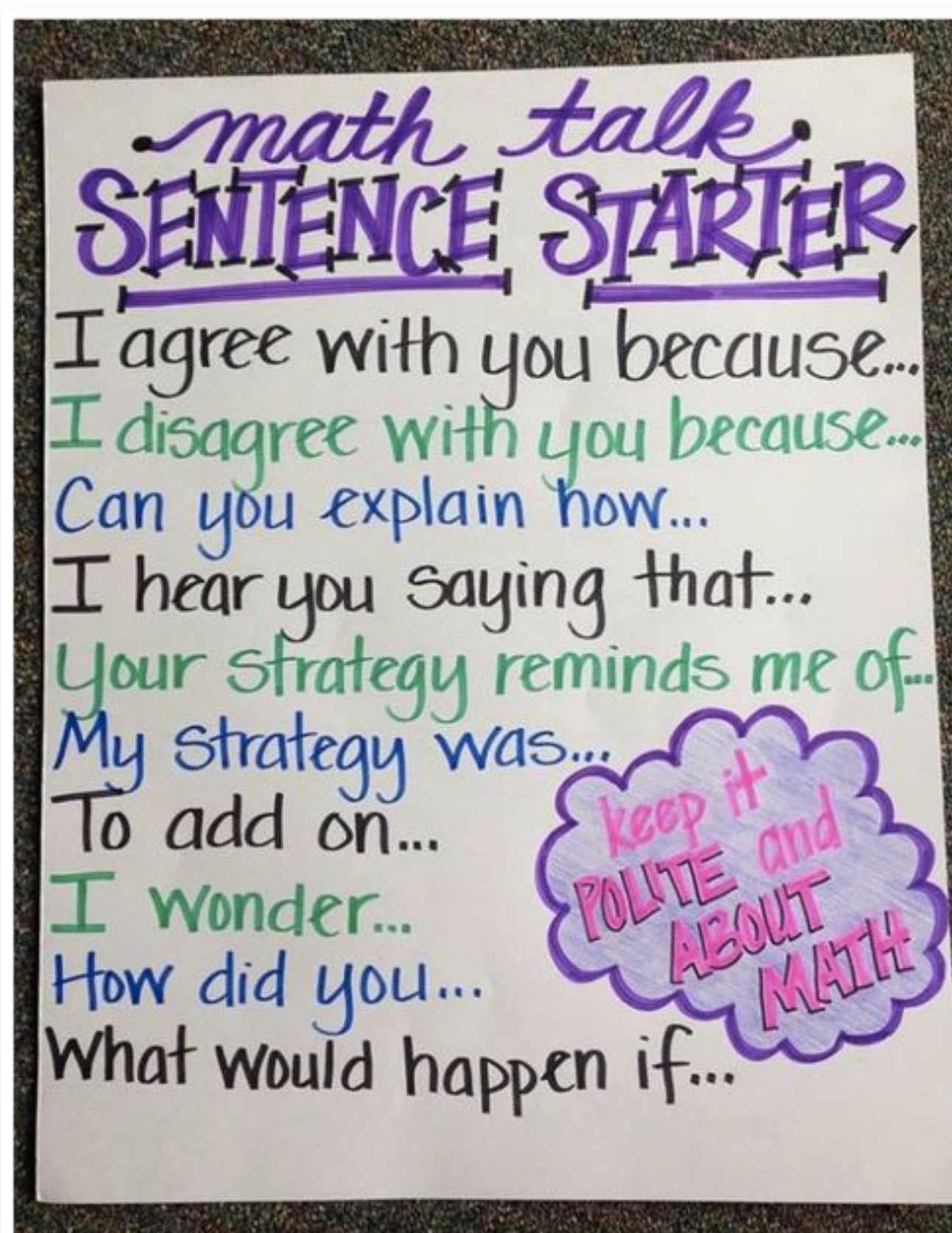
Hold up another finger if you have another way...



Sample Discussion Prompts

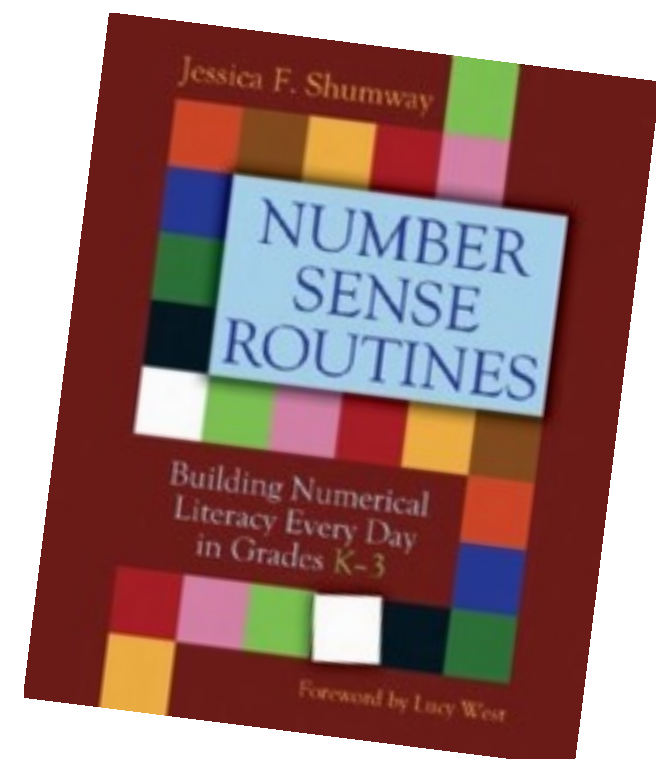
- I agree with _____ because _____.
- I do not understand _____. Can you explain this again?
- I disagree with _____ because _____.
- How did you decide to _____?

Anchor Charts



“These number sense routines are not ‘auto pilot’ activities, but opportunities for meaningful practice. You’ll learn when to use a particular routine, how to differentiate, and how to use routines as formative assessment tools.”

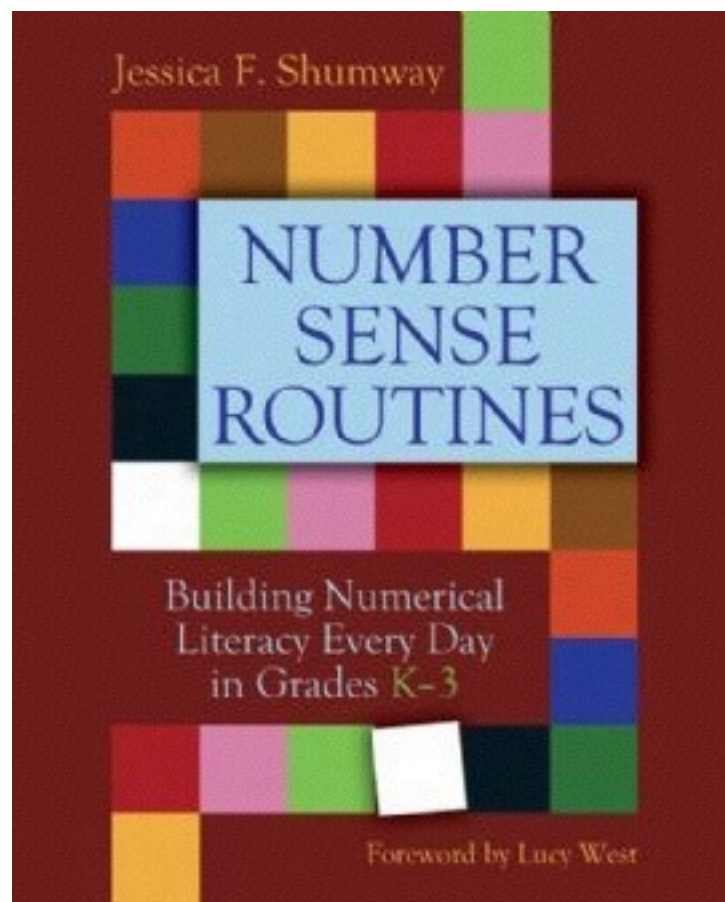
—Jessica Shumway (p.g.14)



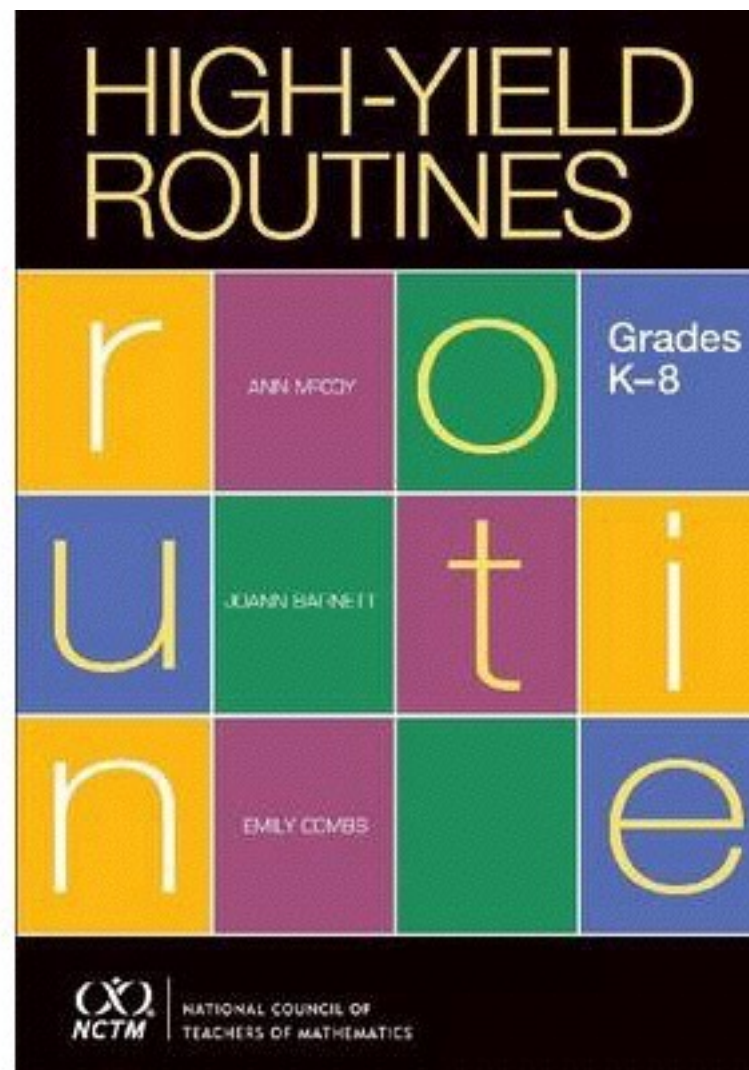
Resources - Websites

- Which One Doesn't Belong - wodb.ca
- Various Number Routines - <http://visiblethinking.weebly.com/daily-routines.html>
- Teacher Education by Design tedd.org

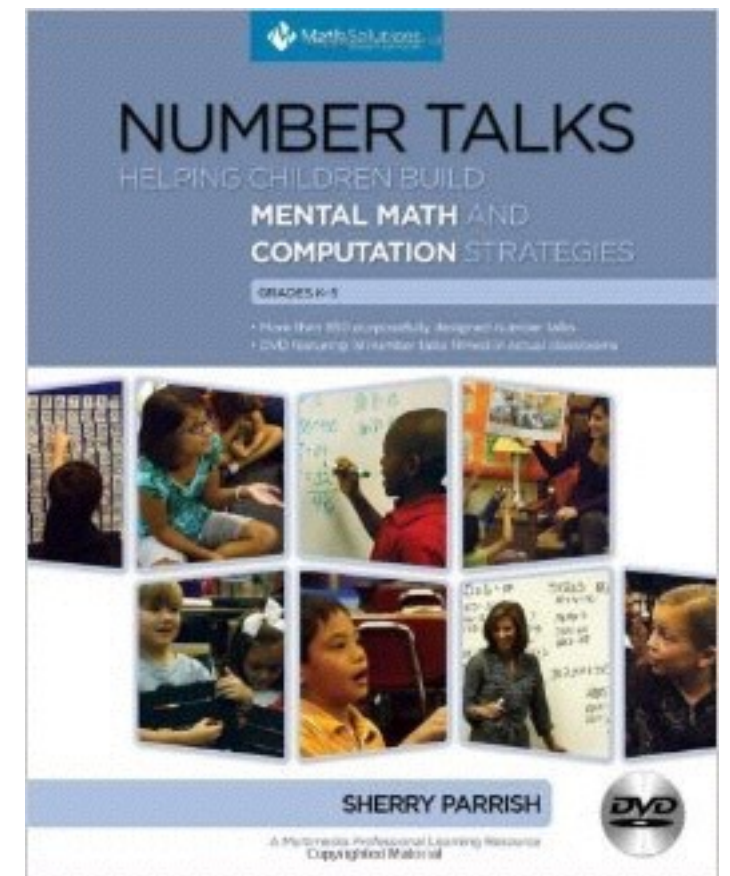
Books



Jessica Shumway



Ann McCoy, Joann Barnett
Emily Combs



Sherry Parrish



Christopher Danielson

Thanks so much for sharing your time with me!

MATHEMATICS
is not about
numbers, equations,
computations, or
algorithms:
it is about
UNDERSTANDING.

William Paul Thurston