# Building Students Number Sense with Number Routines: Part Two

Presented by Jen Barker
Cambridge Elementary
February 6th, 2018

# A little about Me…

- I am the newest Numeracy Helping Teacher

- Have 19 years experience in classrooms K - 5

- Mom to M&M, aged 14 and 12

- 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 what it means to have Number Sense.

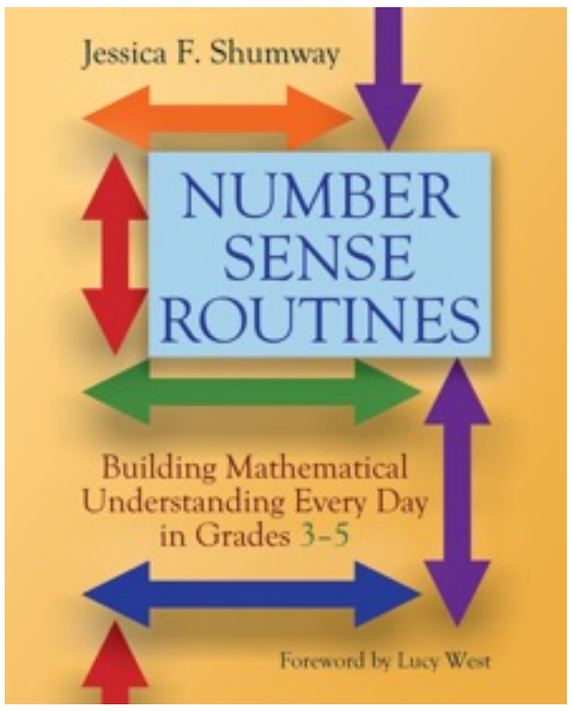
- I understand how using 5 - 10 minute daily Number Routines can develop my students' number sense, computational fluency, and develop curricular competencies in connection to mathematical content.

- 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.

- I know some teacher "Talk Moves" I can use to hear more student voices in mathematical discussions.

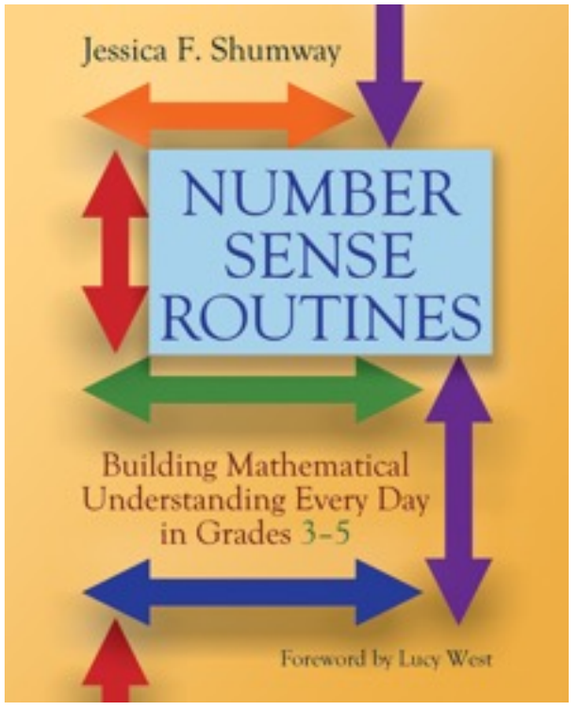
# What does it mean to have Number Sense?

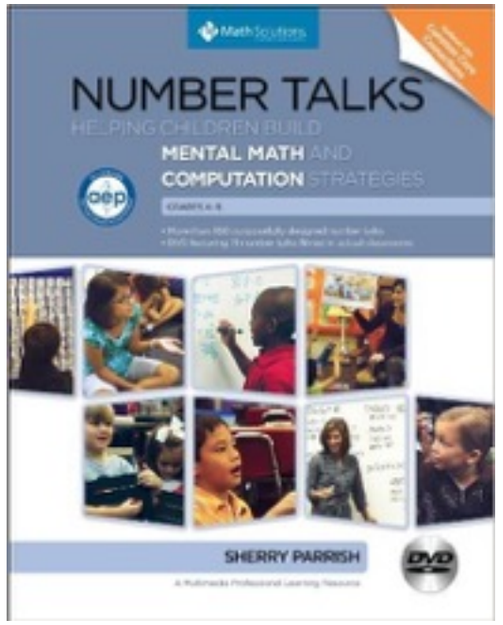
https://www.stenhouse.com/content/number-sense-routines-grades-3-5

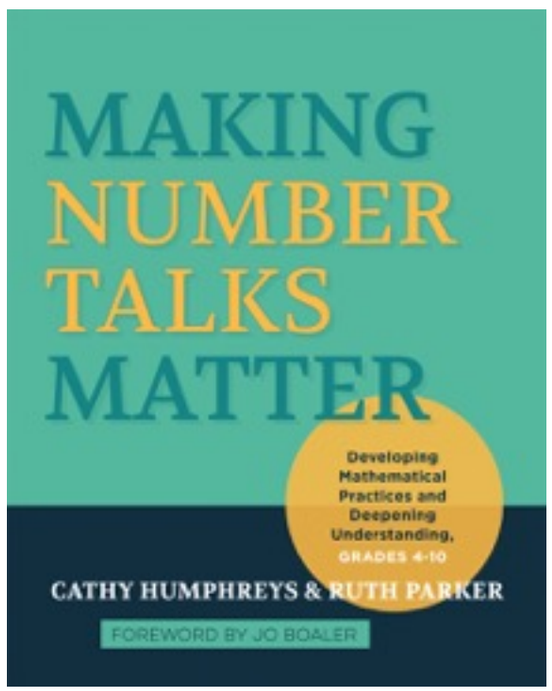


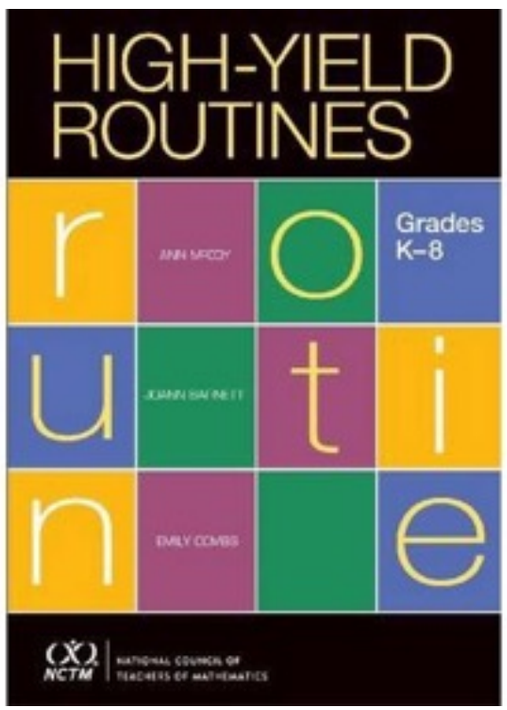
# What are Number Routines?

- 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 where students clarify their thinking, consider and test strategies, and build a repertoire of efficient strategies

- Fosters discussion about numbers and their relationships

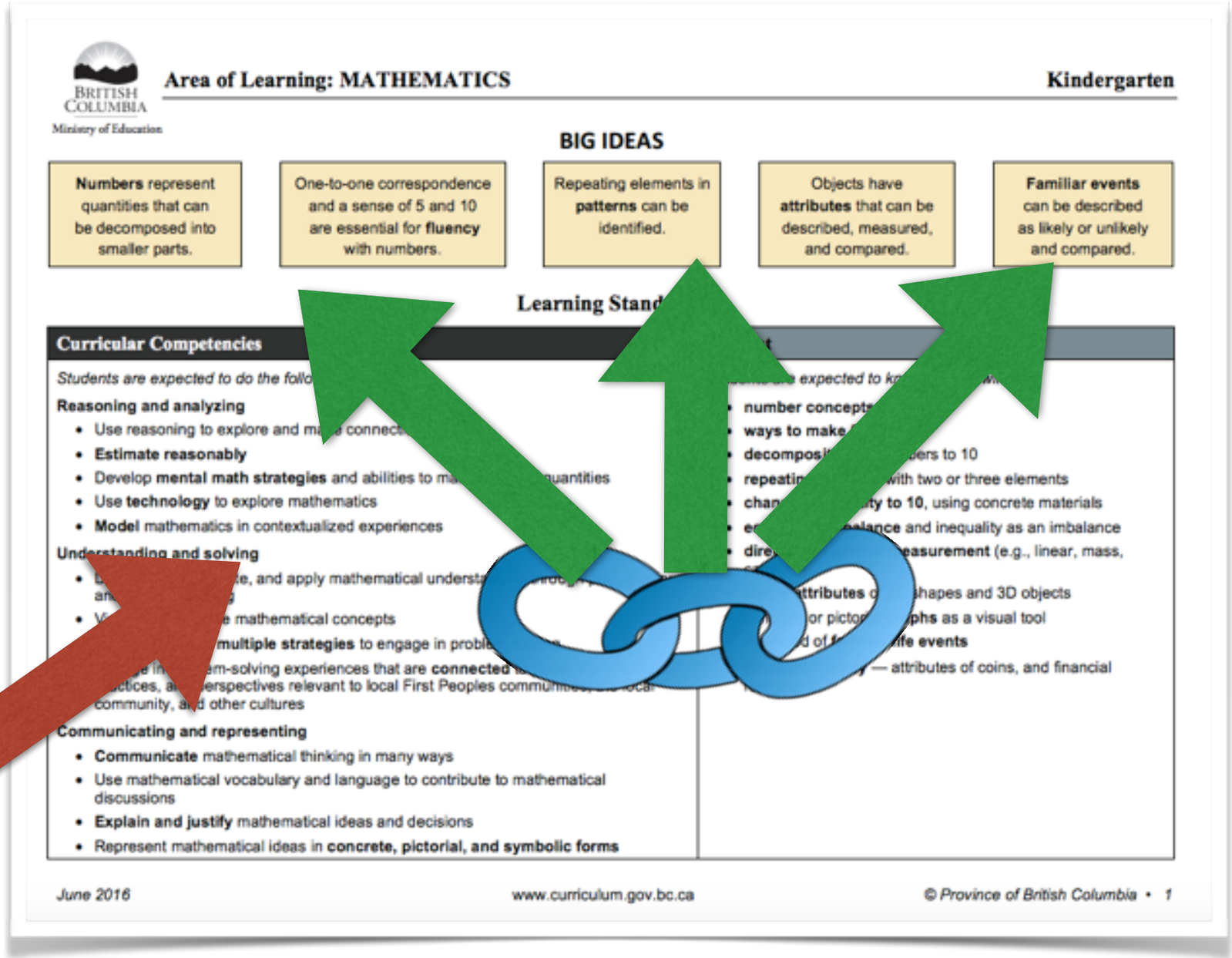
- Responsive to students' understandings

- 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?

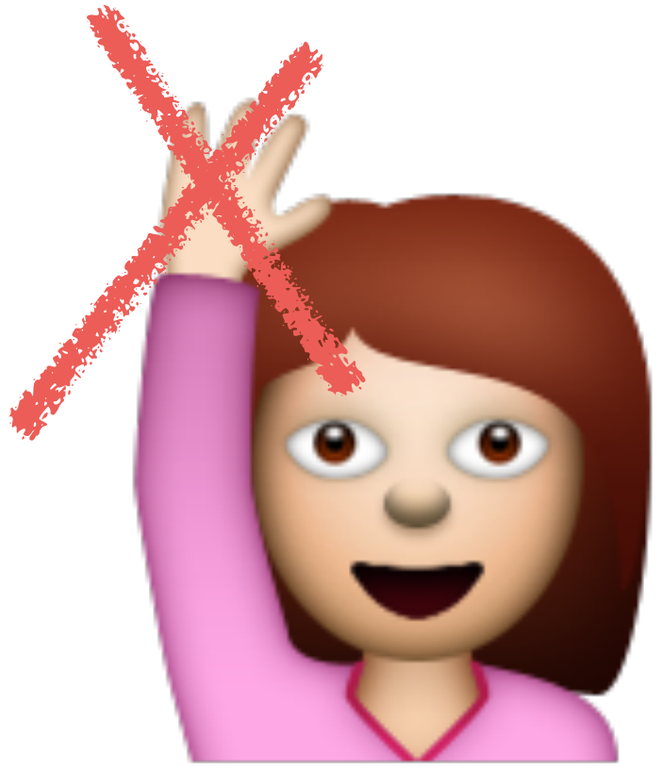
The mathematical discussions embedded in the routines foster the curricular competencies in relation to the content.



# What Curricular Competencies are fostered?

- **Reasoning and Analyzing** through estimating and developing mental math strategies and abilities to make sense of quantities
- **Understanding and Solving** through using multiple strategies
- **Communicating and Representing** their thinking not only orally but through concrete materials, pictorial representations, and symbolically
- **Connecting and Reflecting** through visualizing and describing mathematical concepts, connecting mathematical concepts, and sharing and reflecting upon their thinking

# Thinking time is needed



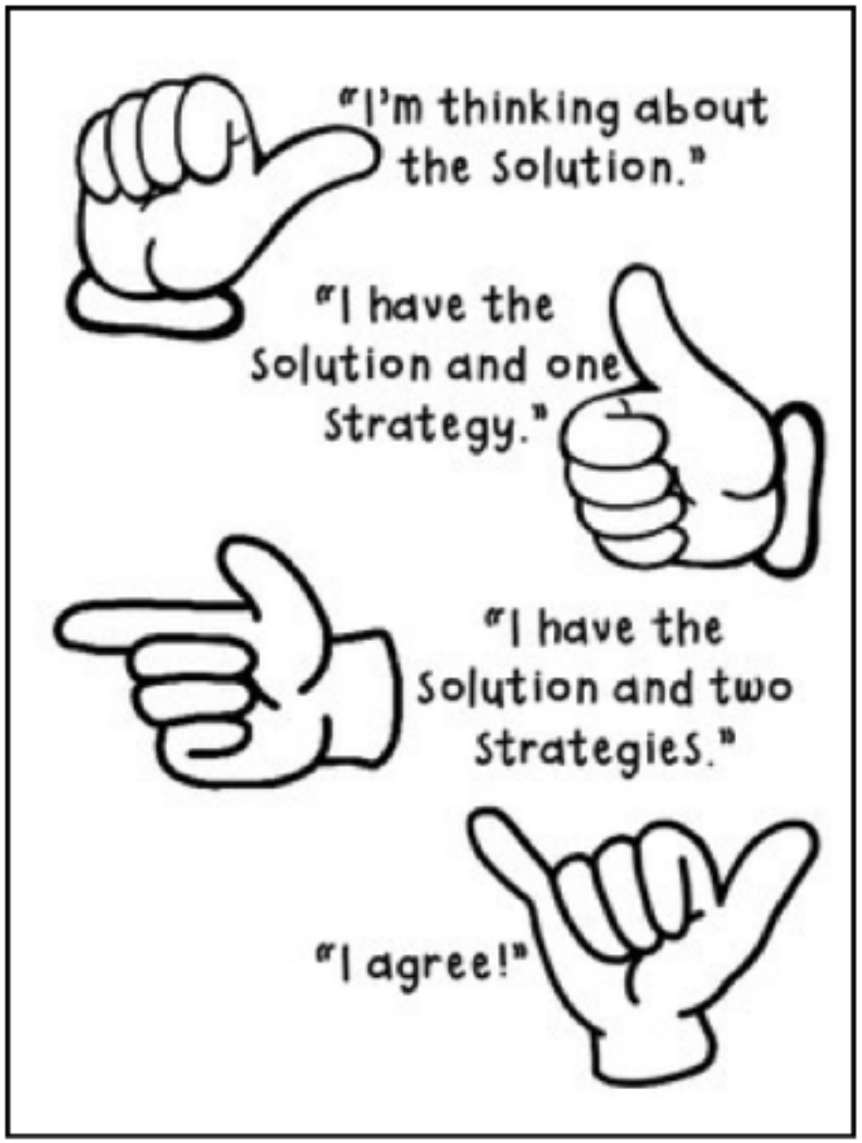
**NO HANDS UP**

**SECRET SIGNALS**

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

Hold up another finger if you another way…

# Thinking Thumbs



# We are doing Number Routines to:

- develop mental math strategies

- think about the strategies we use - Which strategies are connected? Is one more efficient than another?

- become flexible in how we can approach problems

- become better communicators about our thinking and reasoning in mathematics

# TELL ME EVERYTHING

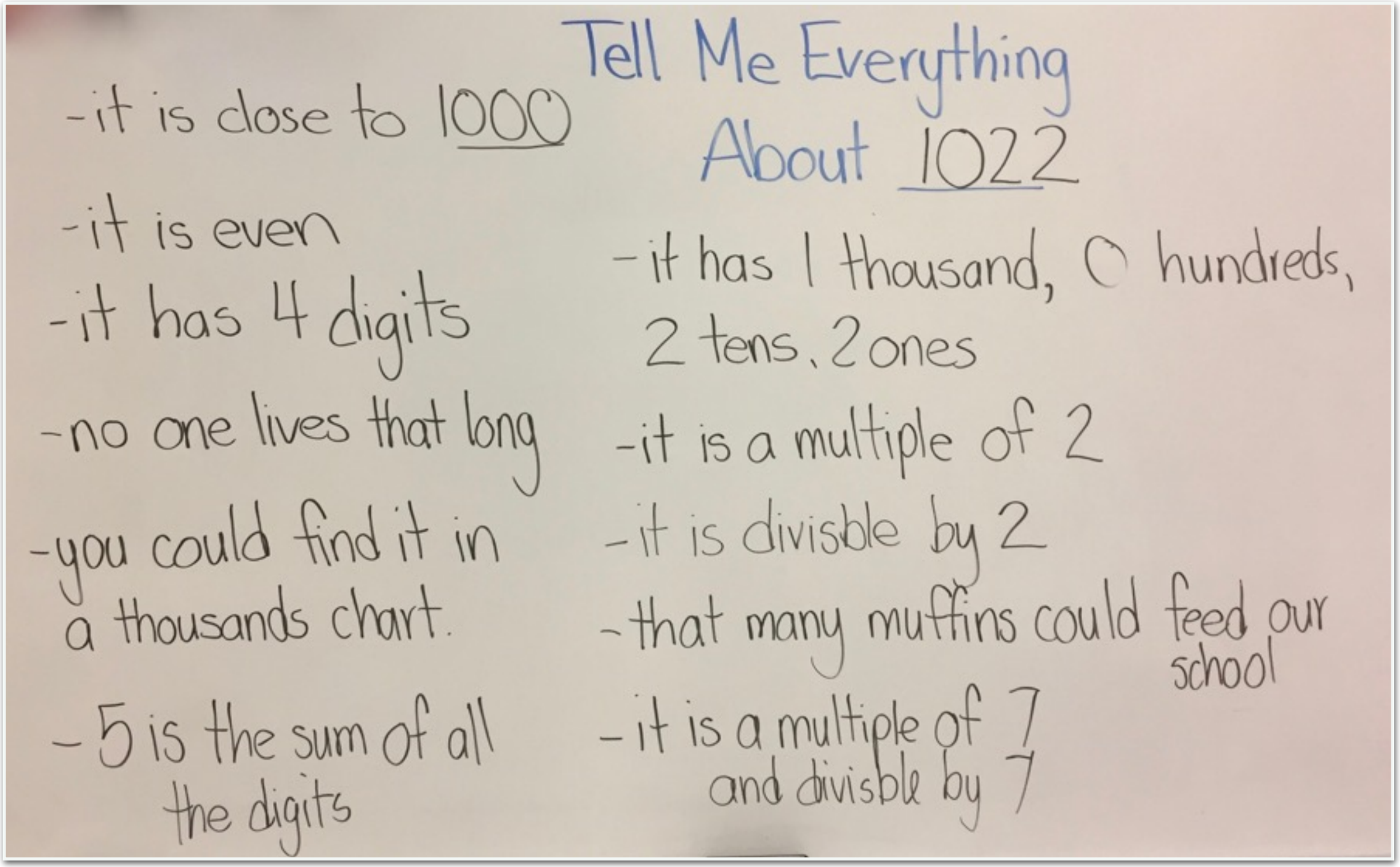
**What does this look like in the classroom?:**

- The teacher selects a number. He/she then asks the students to tell them everything they know about the number. Some teachers have students record this information in math journals or on white boards.

**What is the learning:**

- Depending on the number the teacher selects and how he/she records the students' thinking, different mathematical concepts can be highlighted. Students can demonstrate their understanding of the number through concrete, pictorial, and abstract representations. This could involve using patterns, place value, computation, money, etc. Therefore the content learning is open and provides choice for the students.

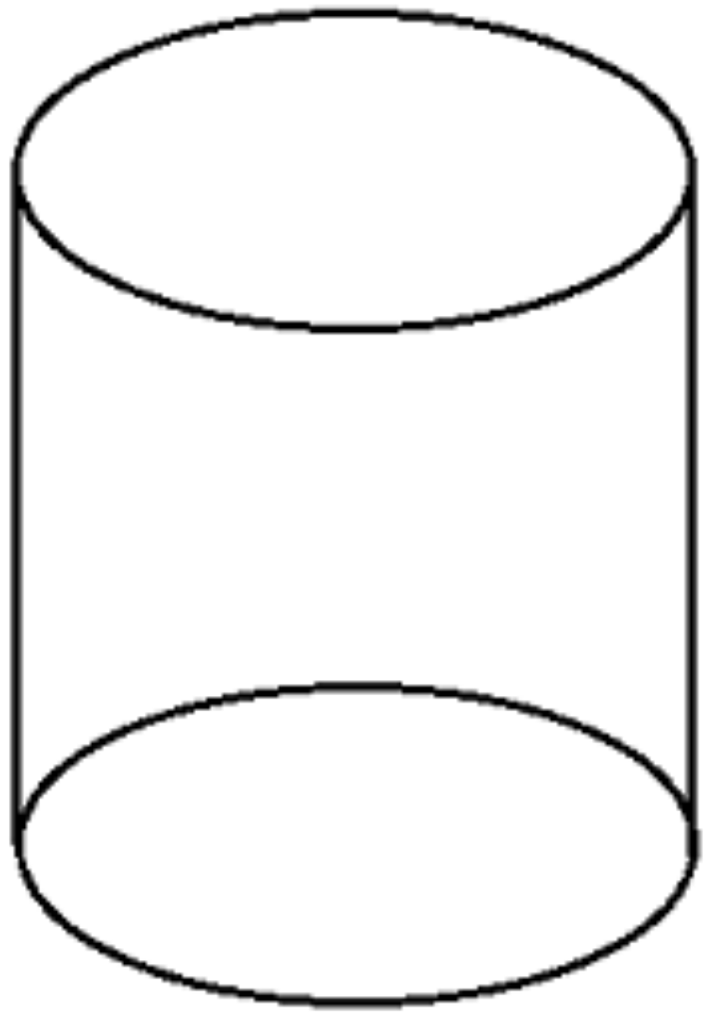
# Tell Me Everything



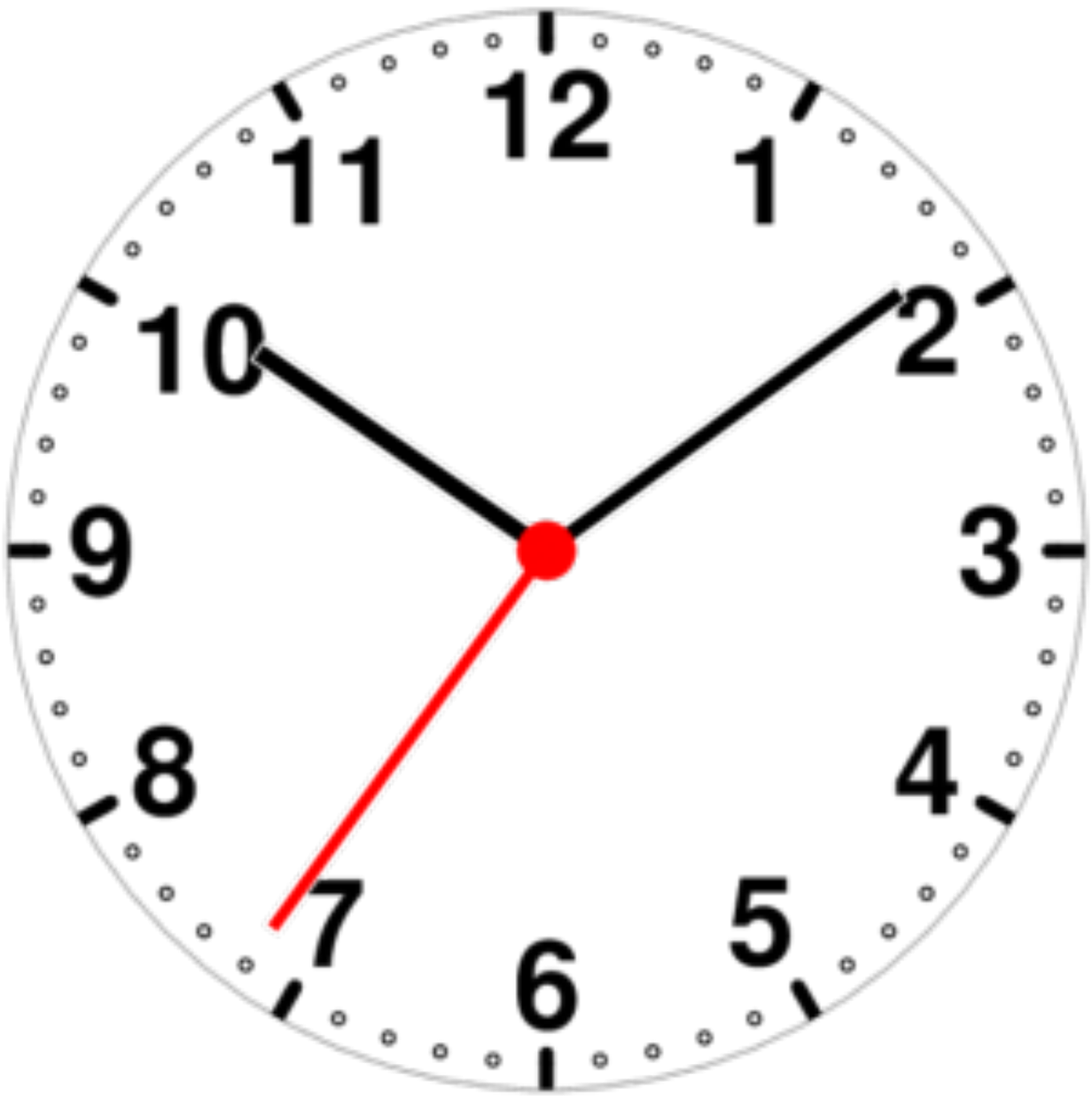
# Tell Me Everything About 495

- it is an odd #
- 3-digit #
- it is close to 500
- it is a multiple of 5
- it is divisble by 5
- it has 4 hundreds, 9 tens, and 5 ones
- it is the 495th number if we counted by ones
- it is in the ones period
- 18 is the sum of all the digits

# Tell Me Everything



# Tell Me Everything




How is this routine inclusive of *ALL* learners?

# WOULD YOU RATHER?

http://www.wouldyourathermath.com/

Curated by John Stevens

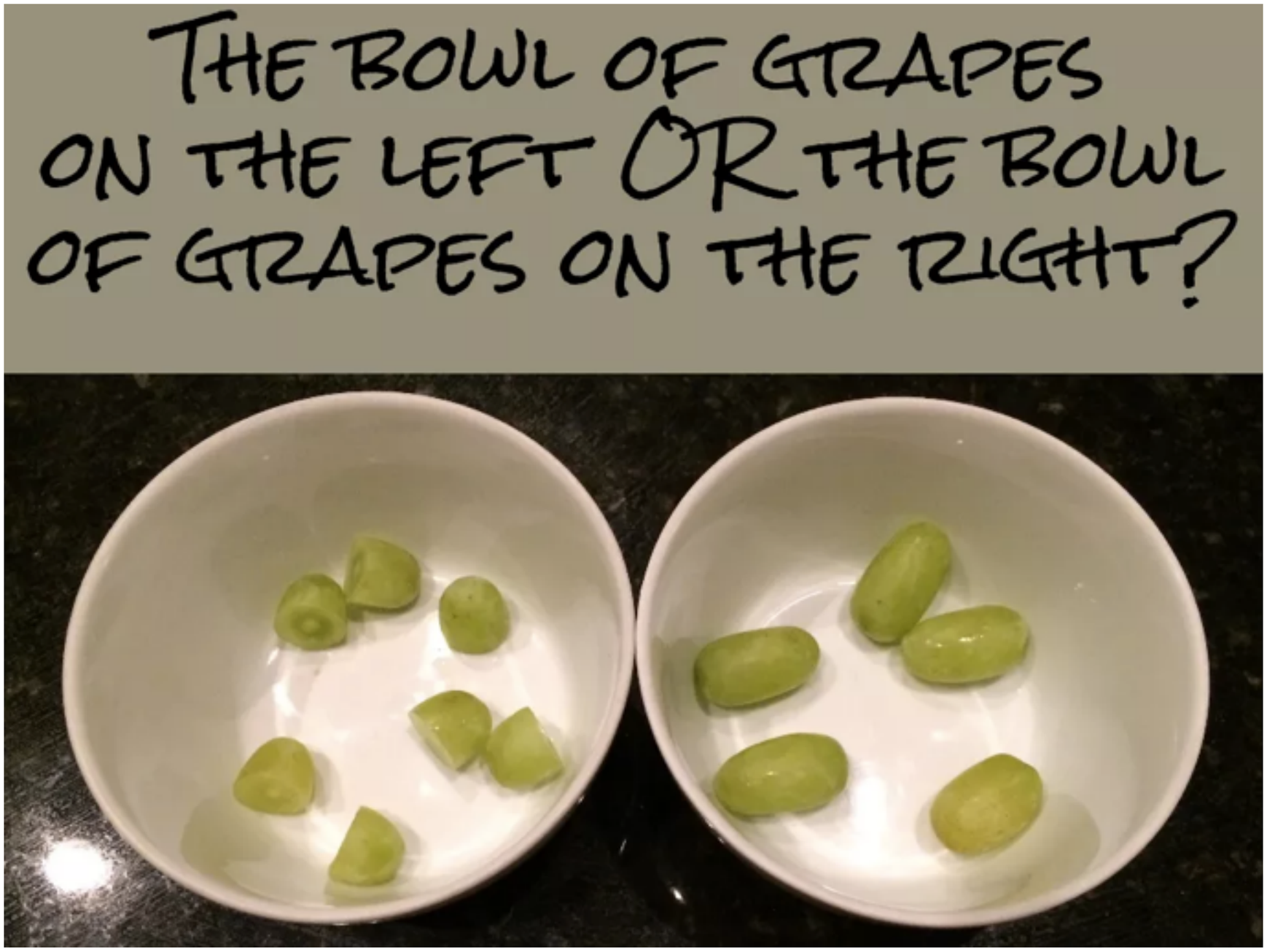
**What does this look like in the classroom?:**

- The teacher carefully selects two different options for the students to consider. Students must make a decision as to which they would prefer. Next students communicate which option they preferred and why.

**What is the learning:**

- Depending on the options the teacher selects different mathematical concepts can be highlighted. Students must engage in problem solving and reasoning to determine

# Which would you rather?



# Which would you rather?

## Option A


$225

## Option B


Quarters stacked up to your chin

# Which would you rather?

## Option A


Pay $0.25 per text


## Option B


$5.00 for 25 texts

# Which would you rather have?

**Option A**


30 squares of chocolate

**Option B**


2 and a half chocolate bars

# Which would you rather have?

**Option A**


6 packages
of tree peeps

**Option B**

9 packages
of reindeer peeps

# Which would you rather have?

**Option A**


6 and a half packages of tree peeps

**Option B**

9 and 1/3 packages of reindeer peeps

# Which would you rather purchase jeans from?

**Store A**

30% off one pair

$70

**Store B**

$30 dollars off

# Which would you rather?

**Option A**

2 hundred dollar bills
41 ten dollar bills
12 five dollar bills
2 twenty dollar bills
8 loonies
12 quarters


**Option B**

1 hundred dollar bill
10 fifty dollar bills
11 ten dollar bills
2 five dollar bills
9 loonies

# Would You Rather?

| Option A | or | Option B |
|---|---|---|
| | Break it down. ↓ | |
| | Conclusion | |
| I would rather… | | |
| because | | |


How might you use Would You Rather to develop understanding of a mathematical concept you are currently exploring.

www.wouldyourathermath.com/category/elementary/

aged Bookmarks | Facebook | Twitter / Home | Pinterest | I wonder... | Teaching | Literacy | Mathematics | Web 2.0 Programs | Personal Reading | Family

Would You Rather...?

Choose a path. Justify it.

About Me | WYR Sample Sheet

Would You Rather...? > elementary

# elementary

## Would You Rather...

stevens009 February 12, 2017 1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"In math classes students mostly answer someone else's questions and solve someone else's problems… After years of enduring this kind of teaching, once inquisitive little kids evolve into passive, apathetic teenagers… It is not possible to do good mathematics - or enjoy it - without being curious, asking questions, seeking out patterns, probing for underlying reasons and structures, wondering *Why does that happen?* or *What if…?* Curiosity drives mathematics and leads to posing problems in the first place!"

–Tracy Zager (2017) Becoming the Math Teacher You Wish You'd Had

# 101 QUESTIONS

http://www.101qs.com/

Curated by Dan Meyer

**What does this look like in the classroom?:**

- It can be incorporated at any point during a day or lesson.

**What is the learning?:**

- Students develop the ability to ask questions creates curious students and fosters a positive disposition towards mathematics.

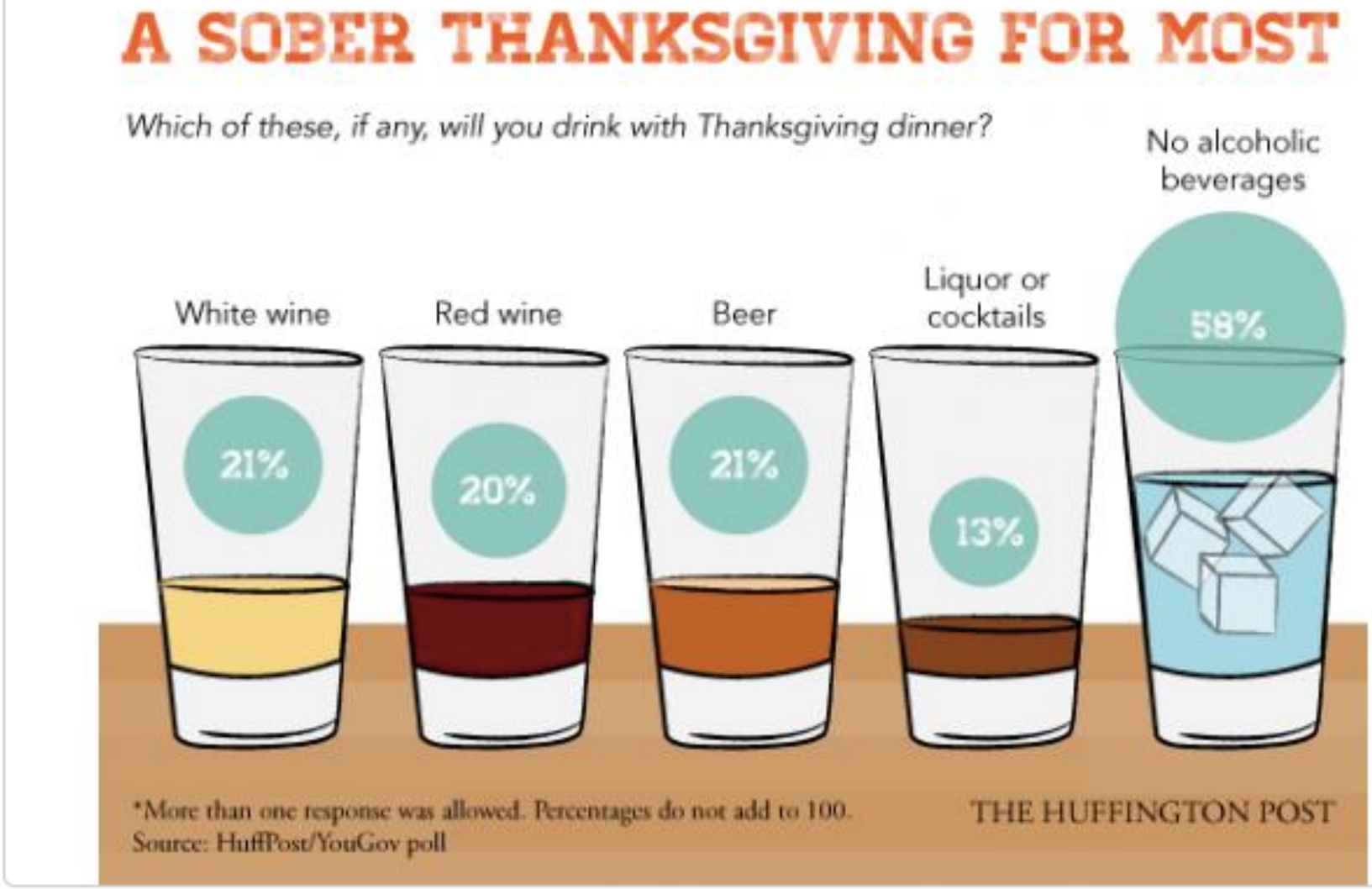
# What’s the first question that comes to mind?

Download More

What's the first question that comes to your mind?

140 Skip It, I'm Bored Submit & See Next

Download More




## What's the first question that comes to your mind?

140 Skip It, I'm Bored Submit & See Next

### Ken Meehan

November 26, 2013

Why not 100%?

## Sequel

### Nathan Amrine

February 26, 2014

If I throw a company party with 154 guests, how much of each booze should I buy?

### Sue Kwon

March 30, 2014

Do the percentages represent the fraction of the cup that is full?

### Rene Levario

April 01, 2014

What is the actual data set for my family?

### Peyton Miller

May 13, 2014

water- no alcoholic drinks because im a child

### Chuck Baker

September 17, 2014

Why don't these percentages add up to 100?

### Teresa Powell

October 24, 2014

Were kids included in this survey

### Heather Michelle Burrow

November 16, 2014

Who thinks...Thanksgiving = Alcohol?

# Tacoma School of the Arts 3

14 questions 4 skips

*by Lily Walker*

Prologue

Download

More

### Mark Walker

January 08, 2018

No qunction. That's a very nice picture.

### Michelle Altop

January 10, 2018

Why that brown one broken?

### Steven Prak

January 23, 2018

How many crayons did you use to make that?

### Heather F

January 23, 2018

Why is there half a brown crayon?

### Alexis Brown

January 24, 2018

why is there only half the crayon?

### Bria Gold

January 24, 2018

who broke the crayon?

### Bob

January 24, 2018

who ate dat crayon

### gabe

January 24, 2018

were is the other half of that crayon be?

# MY FAVOURITE NO

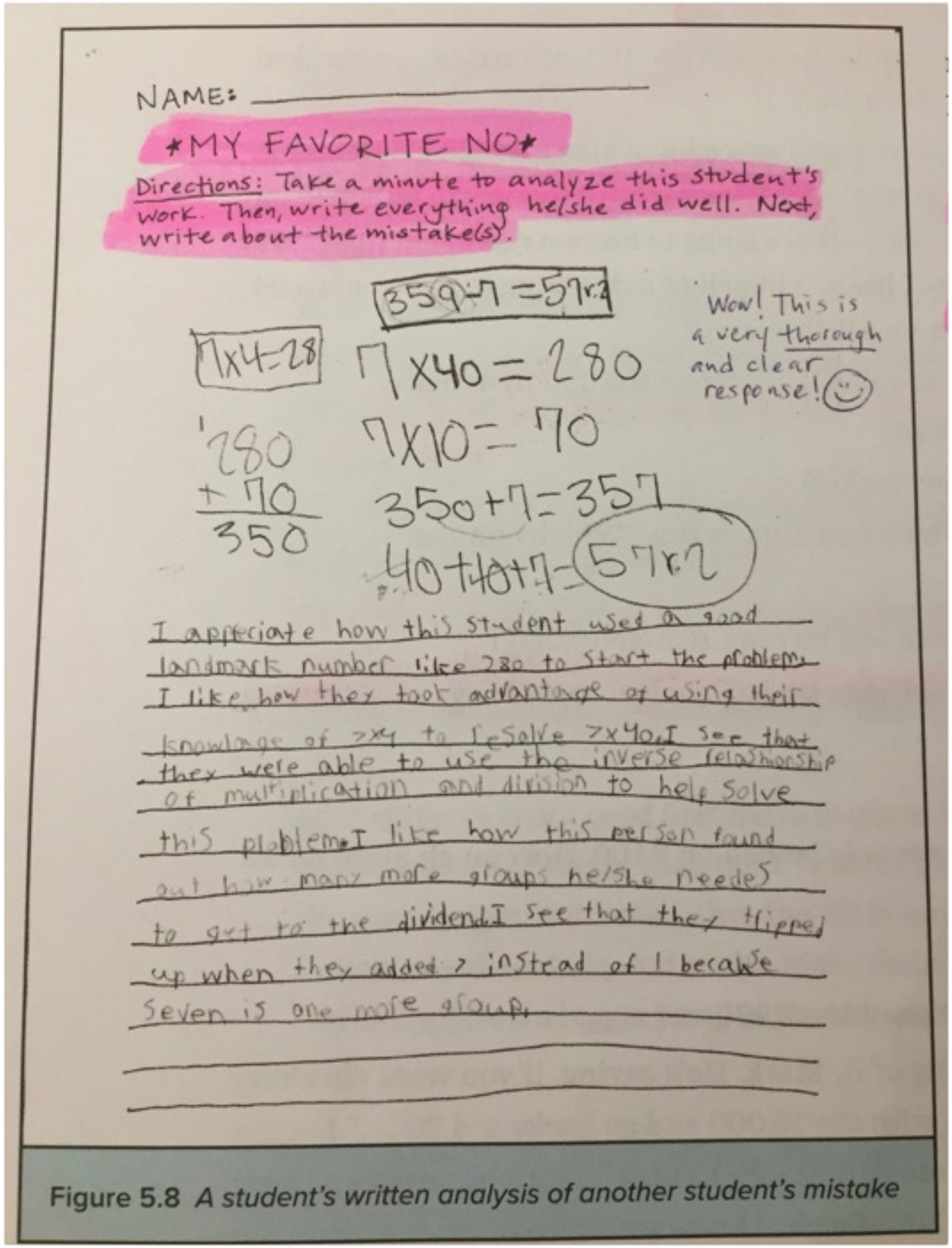
**What does this look like in the classroom?:**

- It can be incorporated at any point during a day or lesson. Students are asked to solve a question on an index card.
- The teacher collects the index cards and sorts them into correct and incorrect answers.
- The teacher picks an incorrect response that either many student made or a misconception she believes the students can learn from and re-writes it and explores it with the students.
- Begin with what the student did well

**What is the learning?:**

- Students can learn from each other's mistakes and their reasoning. Common misconceptions can be explored.

https://www.teachingchannel.org/videos/class-warm-up-routine


NAME: _____

*MY FAVORITE NO*

Directions: Take a minute to analyze this student's work. Then, write everything he/she did well. Next, write about the mistake(s).

359÷7=57r.2

7x4=28

7x40=280

280
+ 70
350

7x10=70

350+7=357

40+40+7=57r.2

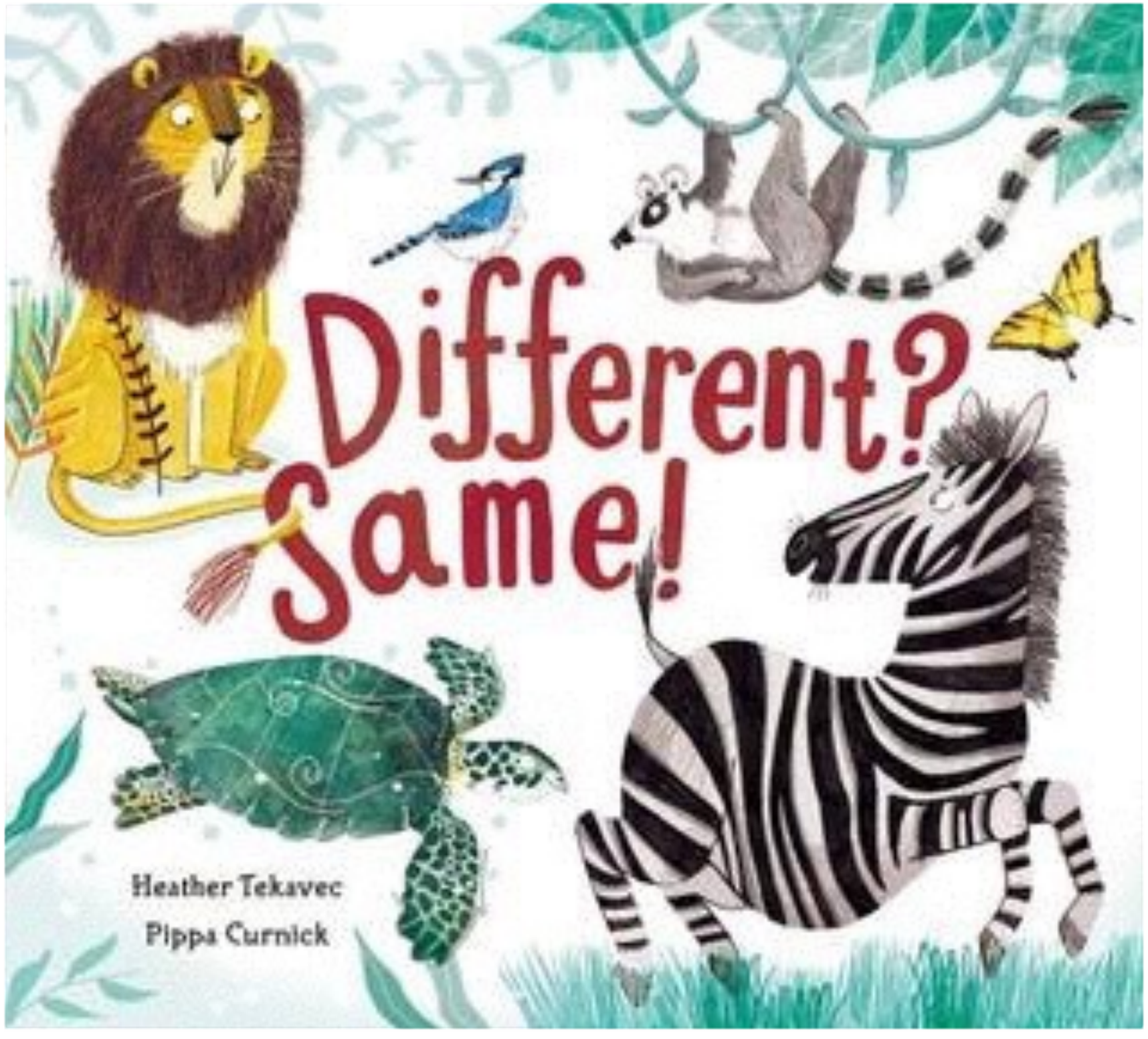
Wow! This is a very thorough and clear response!

I appreciate how this student used a good landmark number like 280 to start the problem. I like how they took advantage of using their knowledge of 7x4 to resolve 7x40. I see that they were able to use the inverse relationship of multiplication and division to help solve this problem. I like how this person found out how many more groups he/she needed to get to the dividend. I see that they tripped up when they added 7 instead of 1 because seven is one more group.

Figure 5.8 *A student's written analysis of another student's mistake*

Source: Tracy Zager (2017) Becoming the Math Teacher You Wish You'd Had


Why are the benefits of using this routine in our classes?


Different?
Same!
Heather Tekavec
Pippa Curnick

# SAME AND DIFFERENT

https://samedifferentimages.wordpress.com/

**What does this look like in the classroom?:**

- It can be incorporated at any point during a day or lesson.

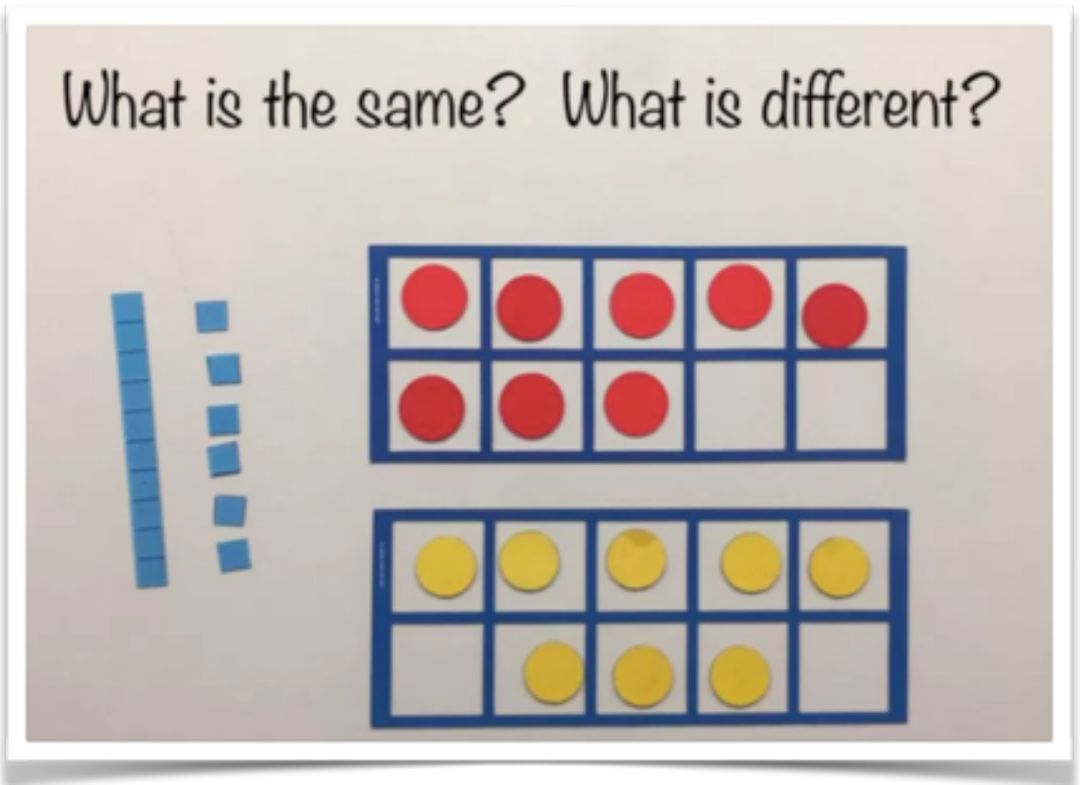
- The teacher presents the students with two or more numbers, shapes, etc. Careful selection of the numbers and shapes to be compared allows the teacher to focus student thinking on the desired mathematical concept.

- The students are asked to think about ways in which the two are the same or different? Give quiet thinking time first. You may also wish to provide to have students share their thinking in pairs. Then ask for volunteers to share with the class and explain what they notice is the same and/or different.

# SAME AND DIFFERENT

**What's the learning?:**

- identifying relationships between objects, shapes, and numbers
- using reasoning to construct arguments when comparing objects, shapes, and numbers
- develop their ability to communicate mathematical ideas

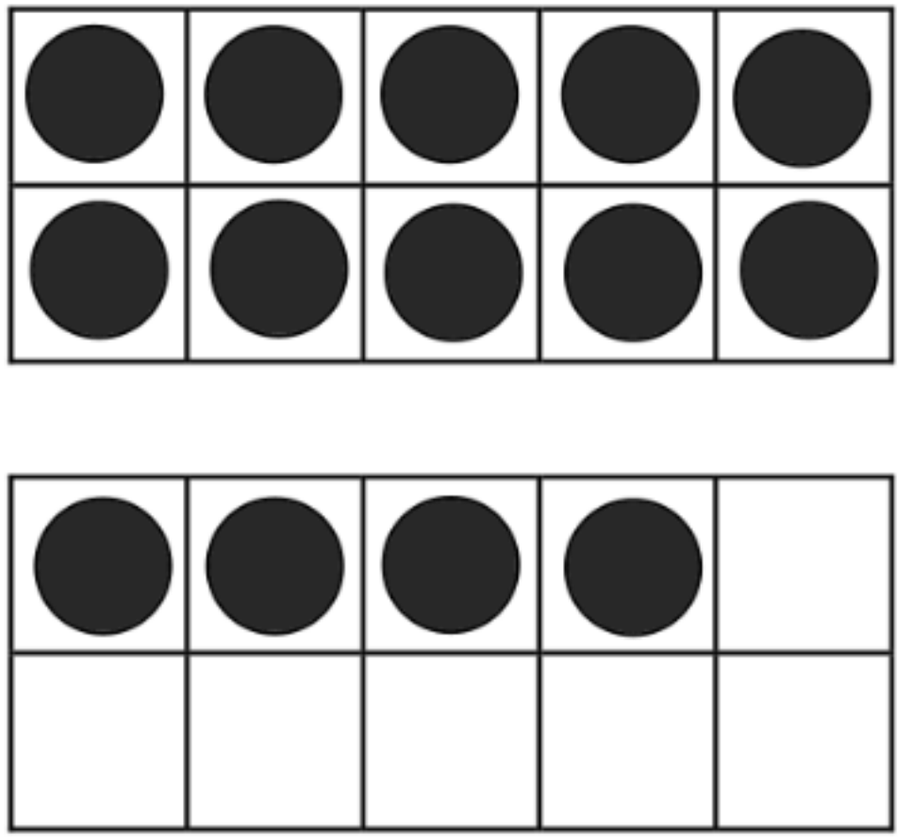


# What is the same?
# What is different?

# What is the same?
# What is different?

# SAME and DIFFERENT?

# What is the same?
# What is different?



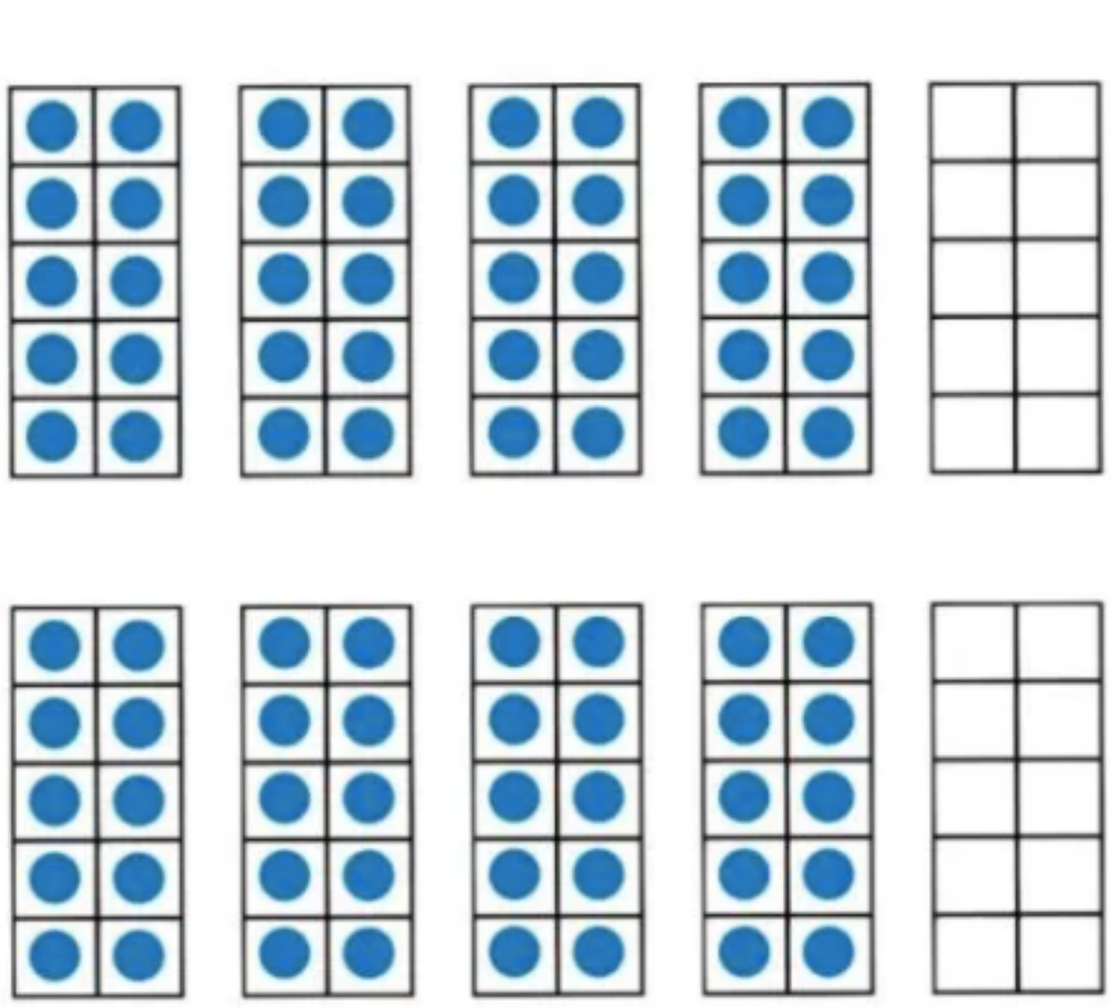
# 1.4

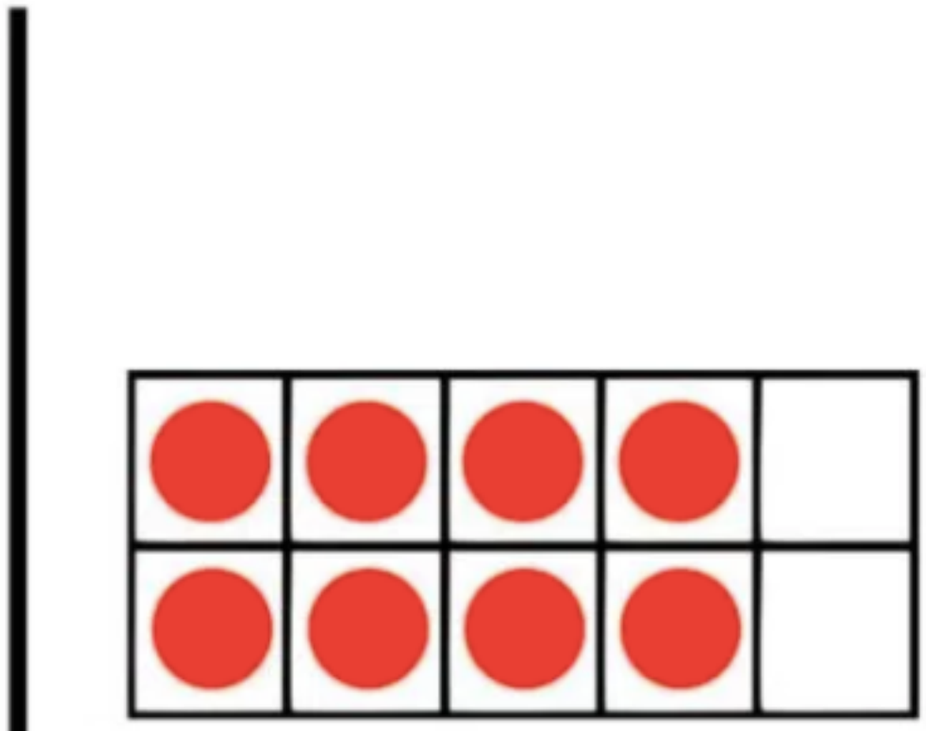
What is the same? What is different?

What is different? What is the same?

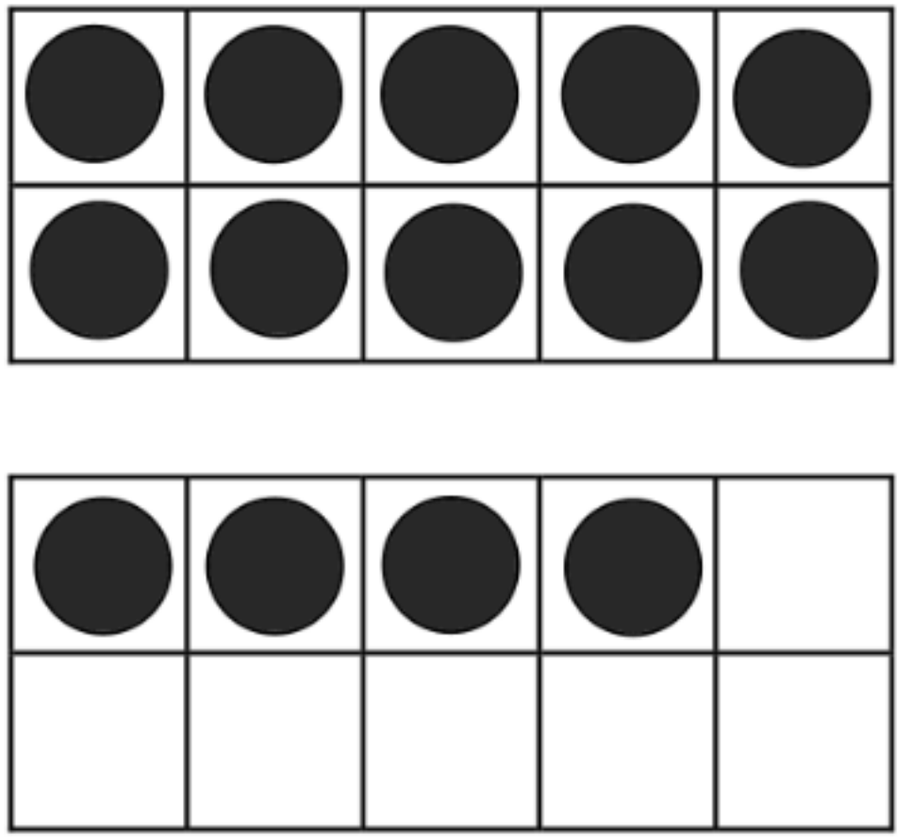
# What is the same?
# What is different?


# What is the same?
# What is different?



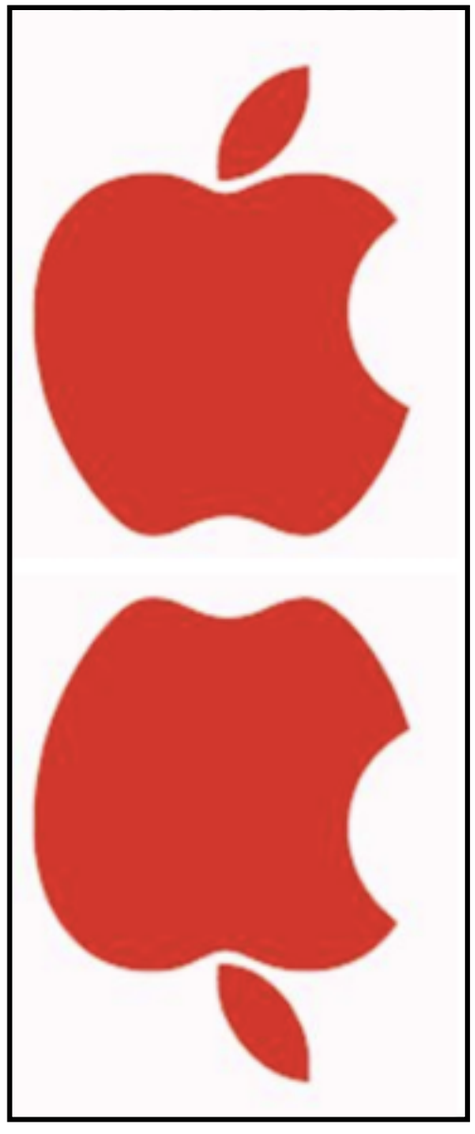


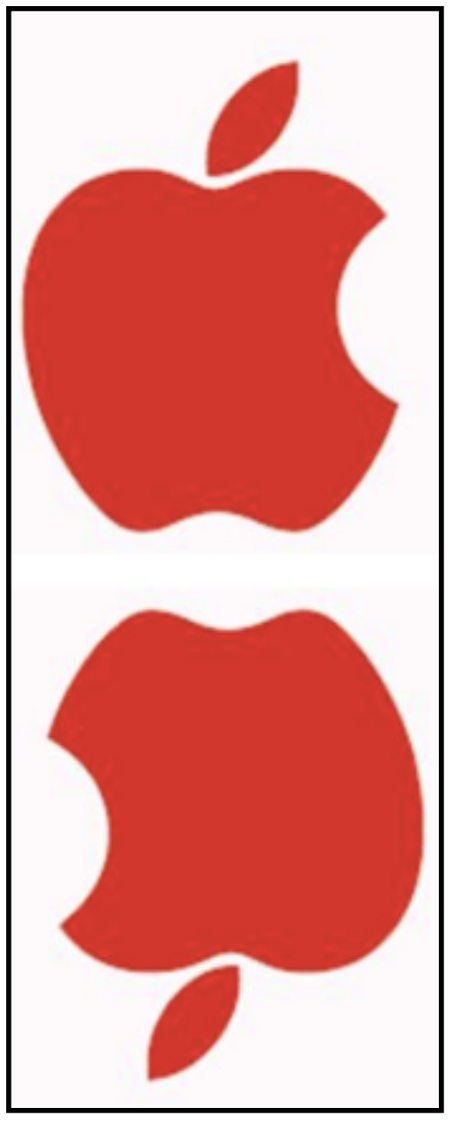
# What is the same?
# What is different?



# 1.4

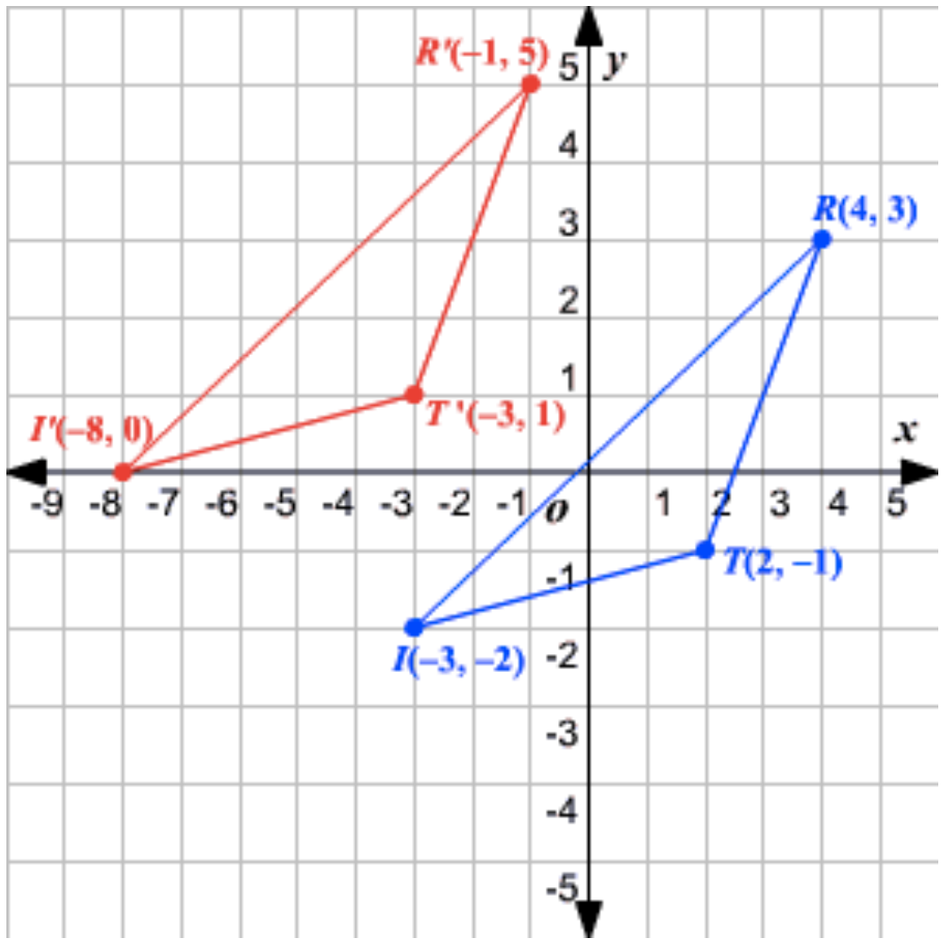
# What is the same?
# What is different?

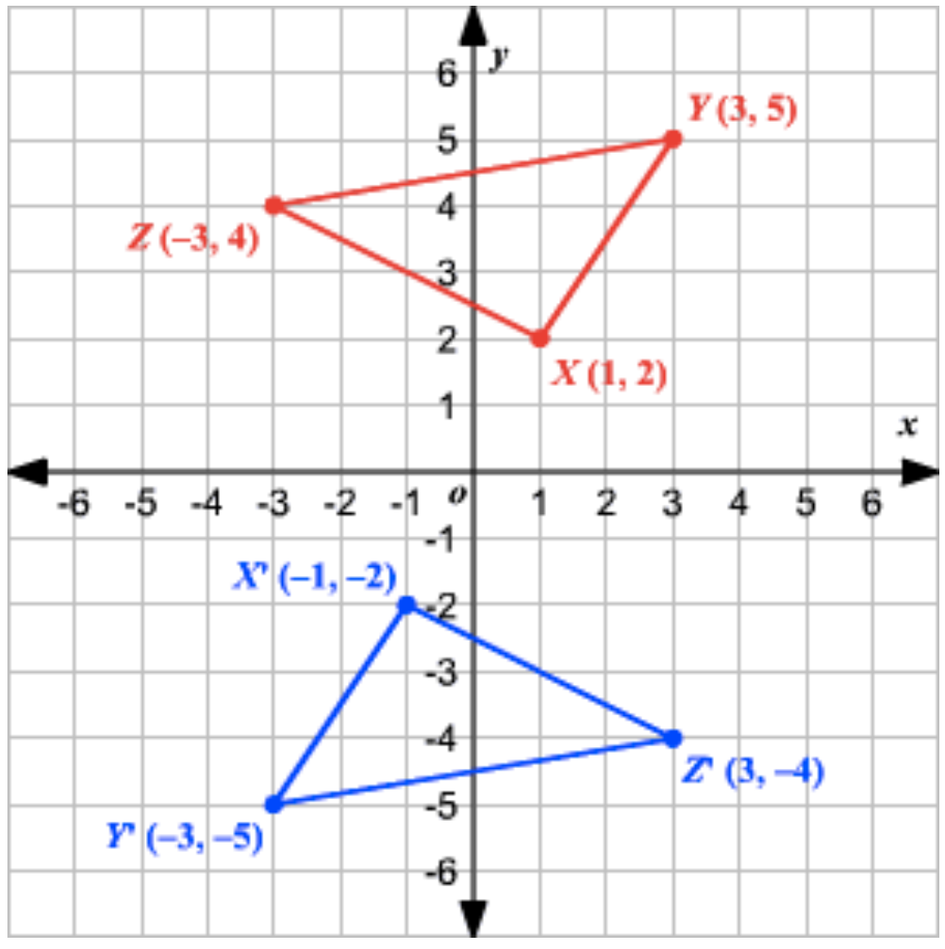


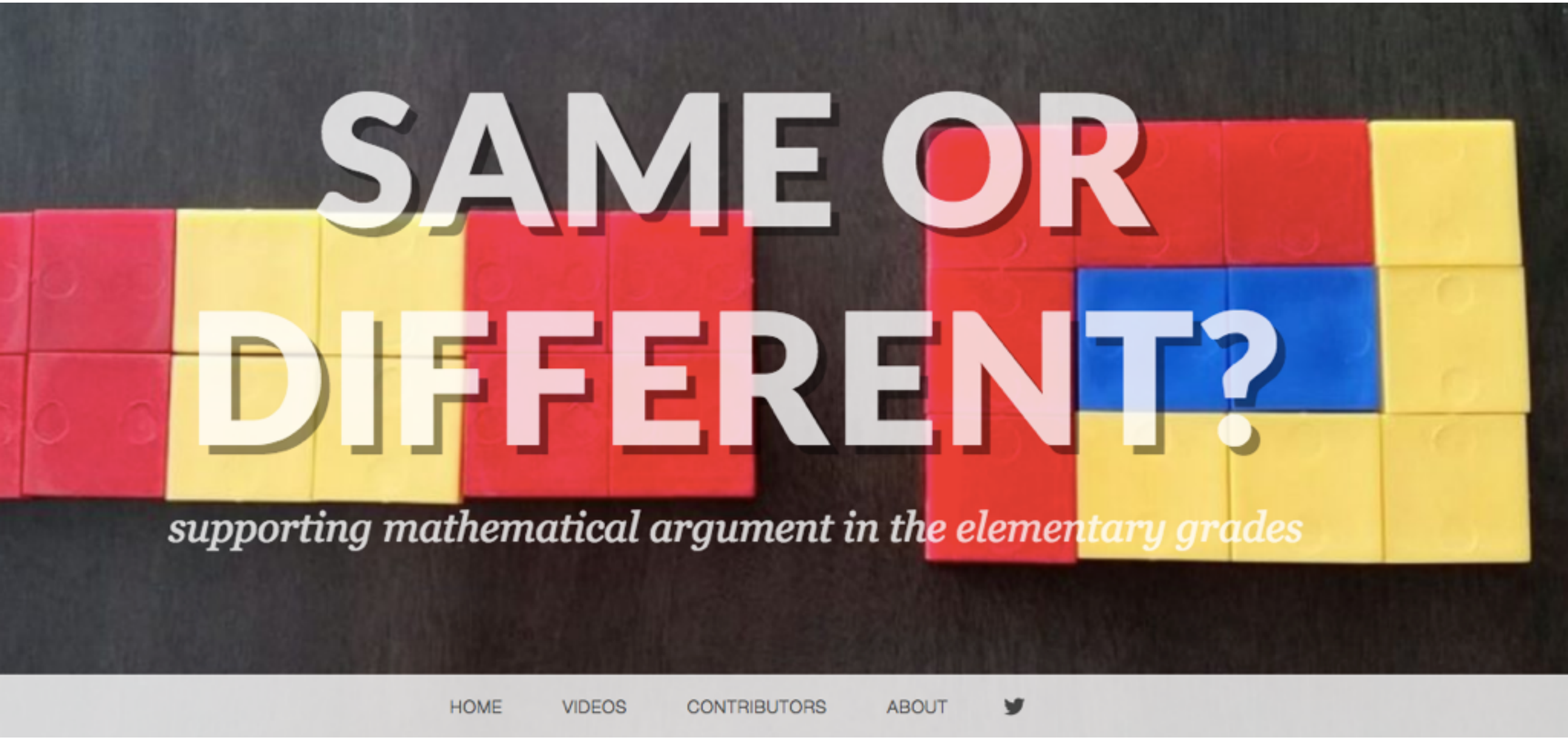


# What is the same?
# What is different?

# SAME and DIFFERENT?






https://samedifferentimages.wordpress.com/

Website curated by Brian Bushart et al.

#samedifferent

# BETWEEN 2 NUMBERS

http://www.between2numbers.com/

Fawn Nyguen

**What does this look like in the classroom?:**

- It can be incorporated at any point during a day or lesson. Students are presented with information about two different things and they must consider how they are related.

**What is the learning?:**

- Ratios and proportional reasoning

Tortoises have the longest life span among vertebrates, about 200 years. But if we scaled the 200 years to 1 day and do the same with the fruit fly's life span, then it would be about ____.

- 1 minute
- 30 minutes
- 2 hours
- 4 hours


If each of the homes in Oregon had two leaking faucets that drip at a rate of 1 drip per minute, this would amount to about ____ liters of water wasted per year.

- 400,000
- 4,000,000
- 40,000,000
- 400,000,000

# BETWEEN 2 NUMBERS

1-10 11-20 21-30 ABOUT/CONTACT

Please hover over the section links above to see the entries in French.
Glisser votre souris au-dessus des liens de section afin d'accéder aux sections françaises.

1


If a snail's rate is 1, then the North American X-15 aircraft's rate is about ____.

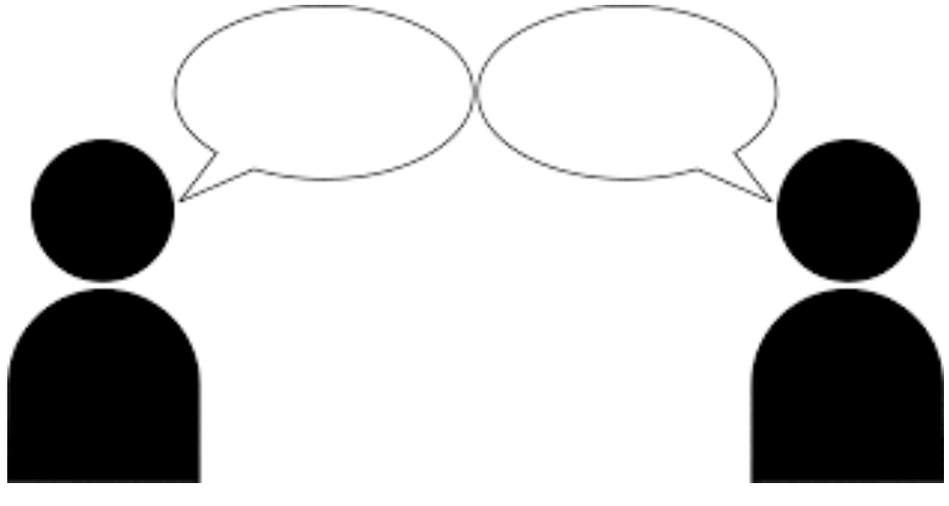
- 5,000
- 15,000
- 150,000
- 1,000,000

http://www.between2numbers.com/

# Talk Moves

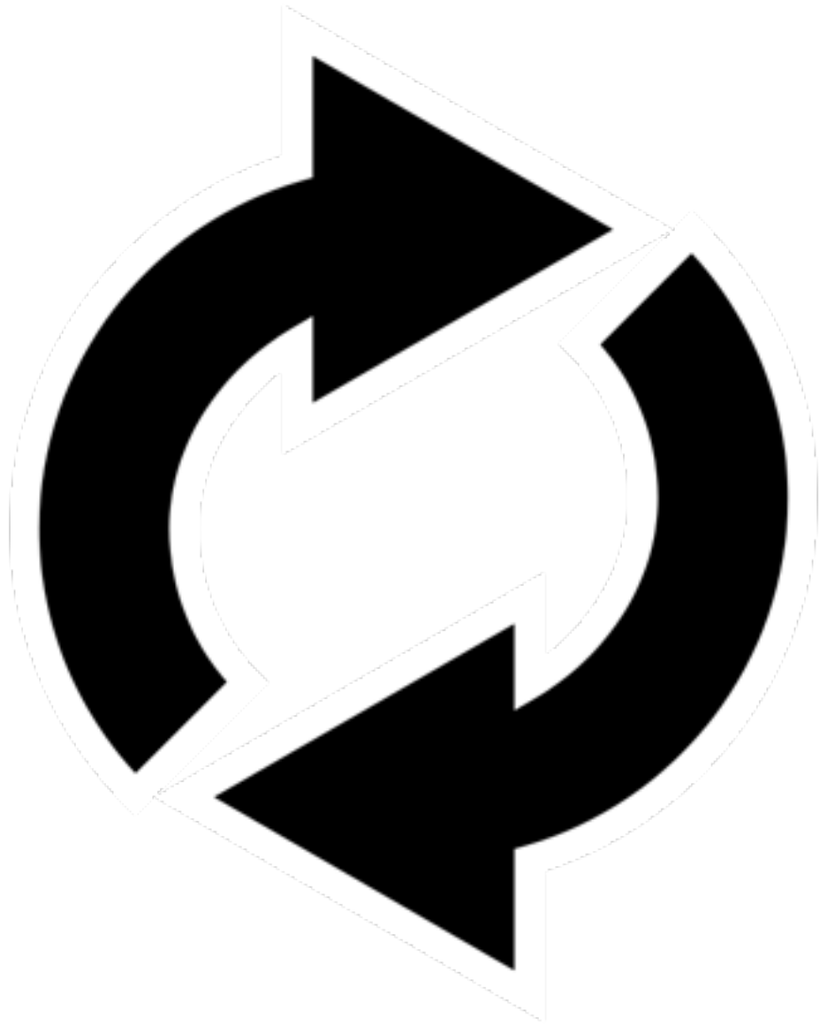
# Revoicing

- The teacher tries to repeat what the student said, then asks the student to verify
    - If I hear what you are saying, then…
    - Are you saying?
    - Do you mean?
    - What I think you said?



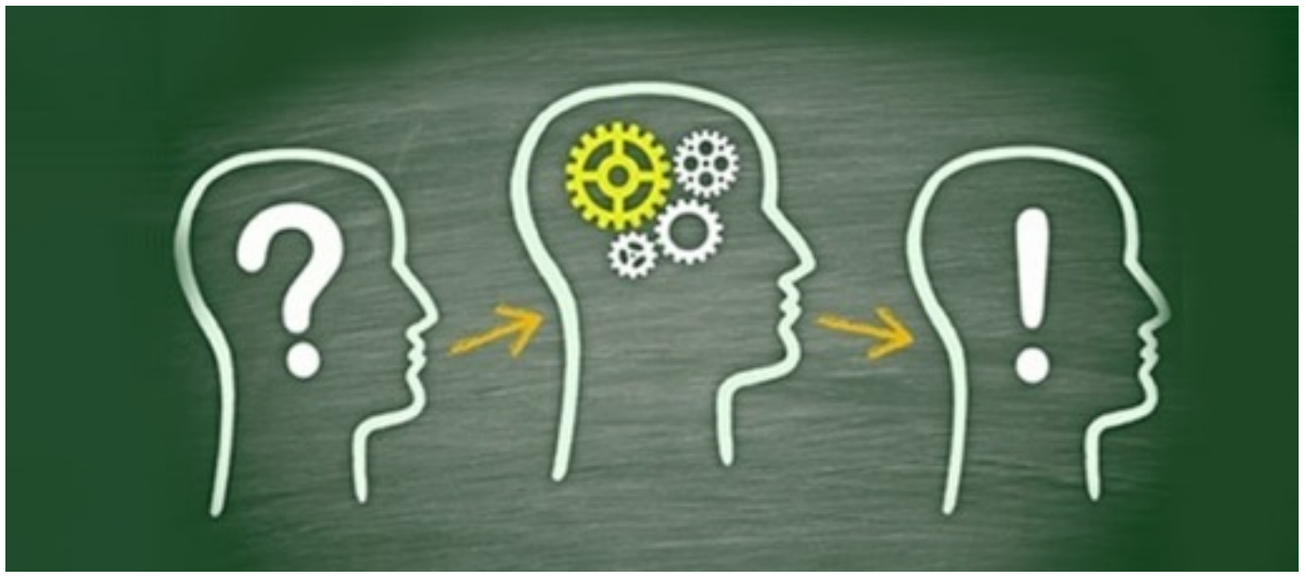
# Repeating

- The teacher asks a student to repeat what they heard another has said, and follows up with the first student.



# Reasoning

- Students think about what someone else is saying and compare their reasoning to another's.
    - Do you agree or disagree? Why or why not?
    - Why do you think that?
    - Will it always work?

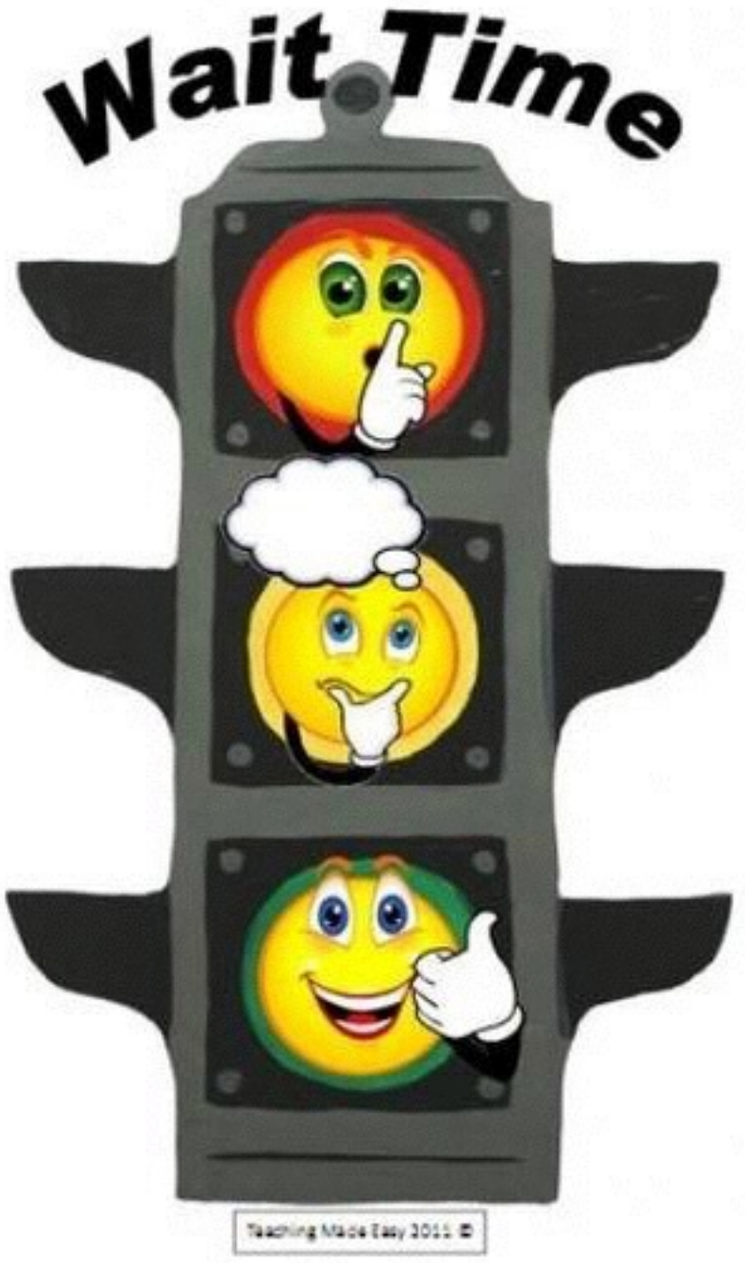


# Adding On

- The teacher asks for further commentary.
    - Can you add to that?

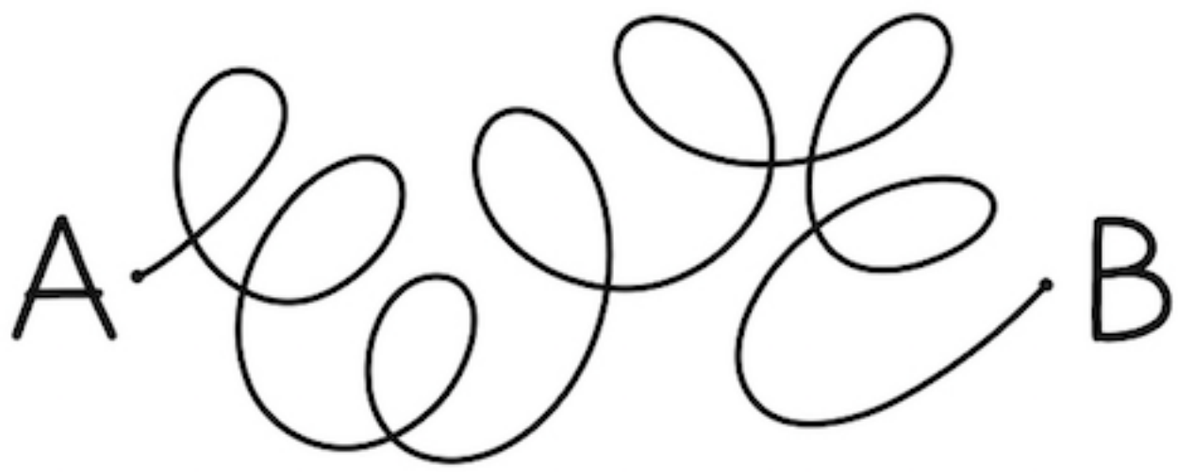
# Wait Time

- Is a strategy that provides quiet thinking time for students to think.



# Revising

- Is a strategy that students apply after listening to the thoughts and ideas of others.
    - After hearing others, I now think…
    - How has your thinking changed?




Which “Talk Move” are you most excited to try? Take a look at the classroom discussion and see if you can determine the moves used.

# Revisiting our Intentions

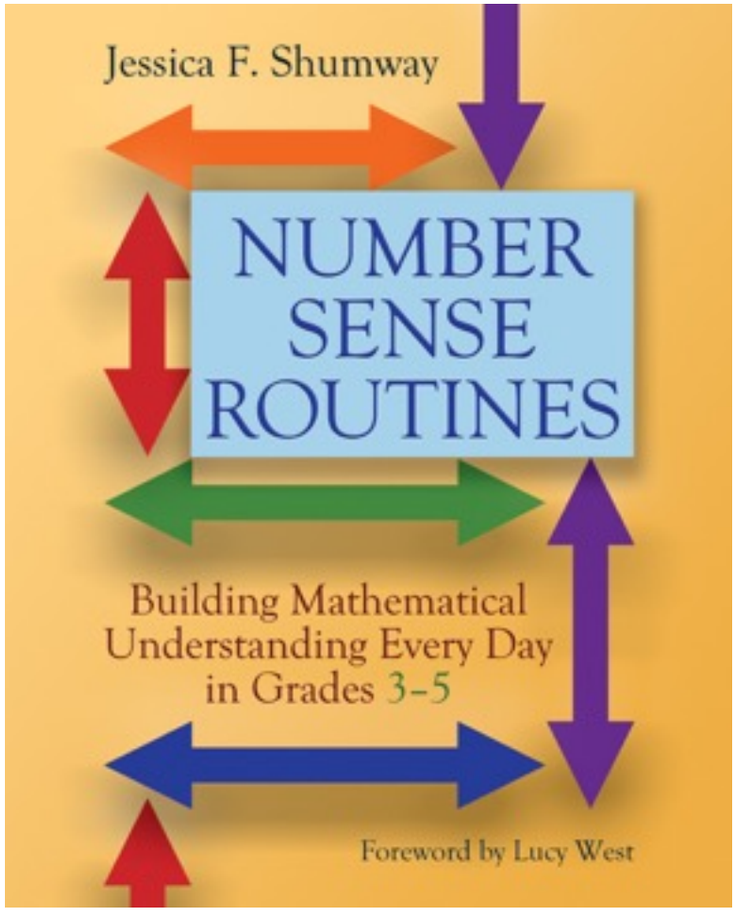
- I understand what it means to have Number Sense.

- I understand how using 5 - 10 minute daily Number Routines can develop my students' number sense and computational fluency

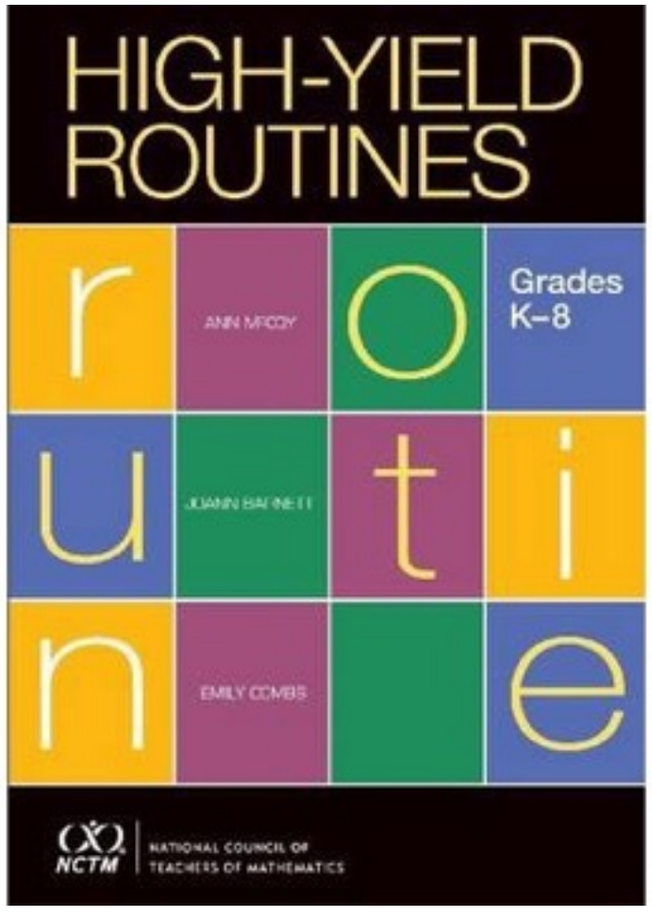
- I understand how using Number Routines helps to build a Mathematical Community and encourages my students to share and communicate their thinking

- 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.

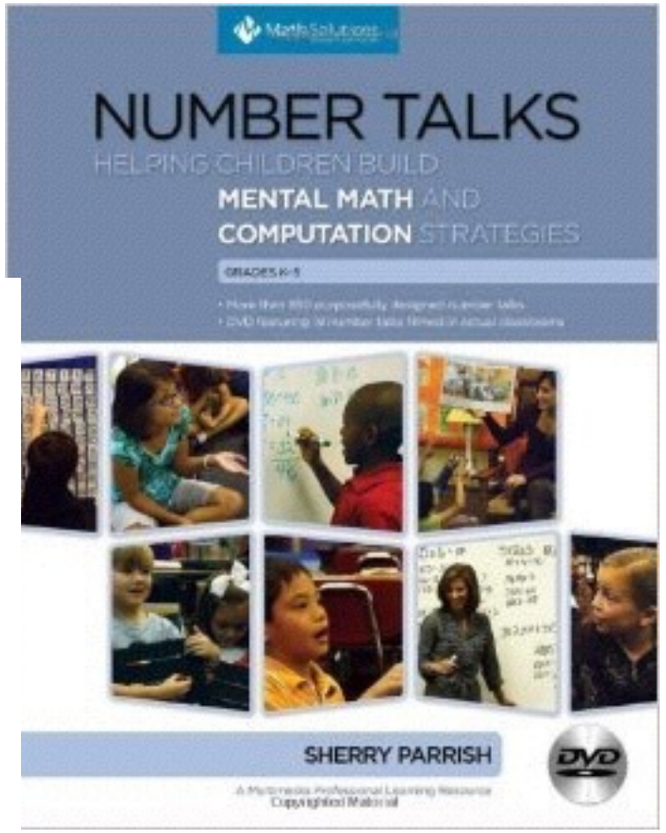
# Resources:



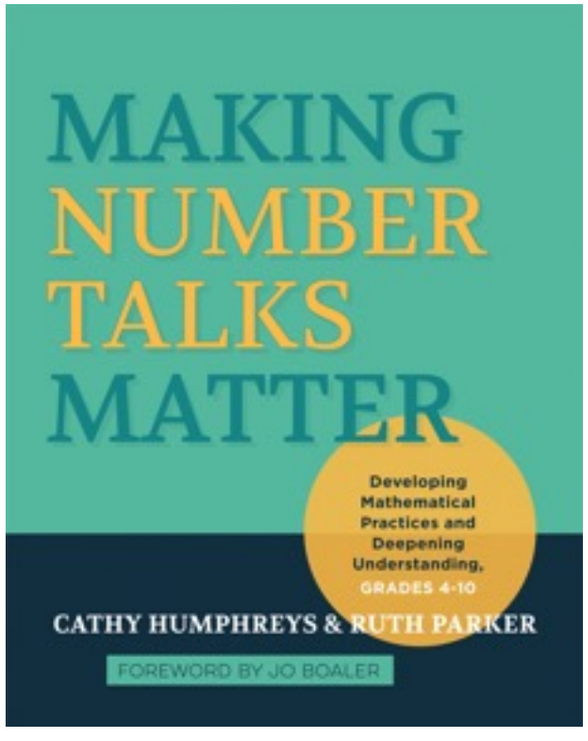

Jessica Shumway




Ann McCoy, Joann Barnett
Emily Combs




Sherry Parrish




Cathy Humphreys and Ruth Parker

Thanks so much for sharing your time with me!