10 FUN FACTS

1. You can’t see your ears without a mirror.
2. You can’t count your hair.
3. You can’t breath through your nose, with your tongue out.
4. You just tried number 3.
6. When you did number 3, you realized that it is possible, only you look like a dog.
7. You are smiling right now because you were fooled.
8. You skipped number 5.
9. You just checked to see if there is number 5.
10. We are going to have some fun today!

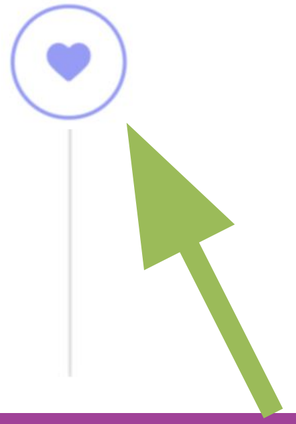
PLEASE GO TO THIS LINK!

Go to

www.menti.com

Enter the code

6620 1357



Or use QR code

Click the heart icon to let me know you have successfully made it!

CTLG Consulting

BUILDING CLASSROOM COMMUNITIES WITH REASONING ROUTINES & STUDENT DISCOURSE

V²CTM Spring 2023 Workshop

CTLG Consulting

Skip Tyler
@SkipTylerMath
skipt@ctlgconsulting.com

Which gif best describes how you are feeling?

A

B

C

D

E

F

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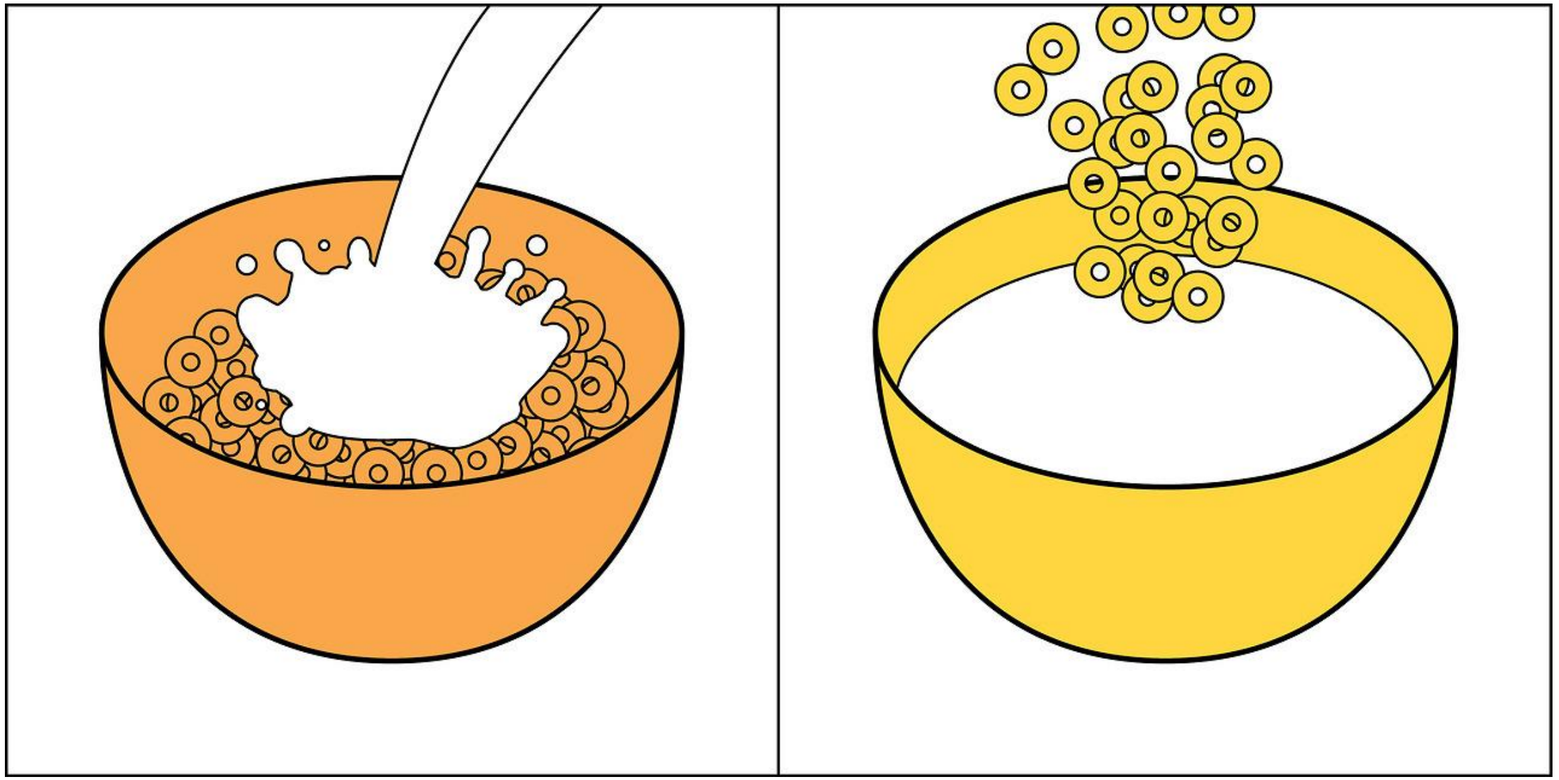
SkipT@CTLGconsulting.com

REASONING ROUTINE

2 Kinds of People



LEARNING INTENTIONS

- Engage in a variety of High-Yield Reasoning Routines
- Explore various ways to increase student engagement and discourse
- Build a math community while formatively assessing student understanding

SUCCESS CRITERIA

- I will be able to identify best practices for implementing High-Yield Reasoning Routines in my classroom
- I will be able to use math talk moves to increase student discourse

ABOUT SKIP

- Retired from Henrico County after 31 years
  - Taught high school mathematics for 18 years
  - Secondary Mathematics Specialist for 13 years
- Passions include
  - Math Education
  - Bourbon
  - Humor
  - #SkipSelfie

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#SkipSelfie

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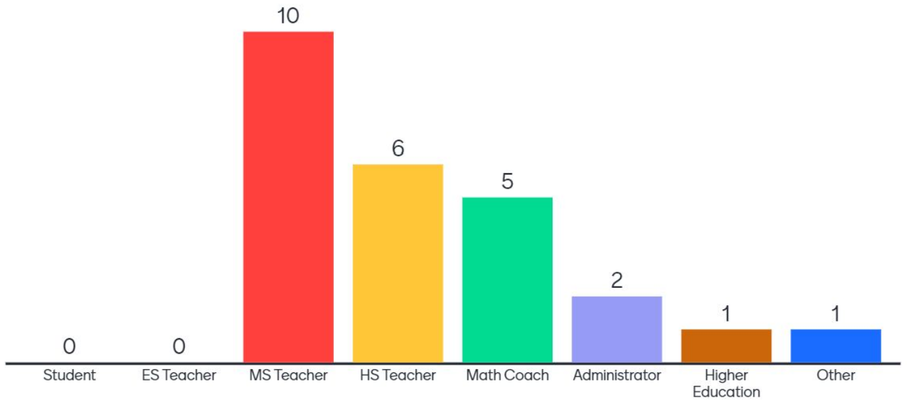
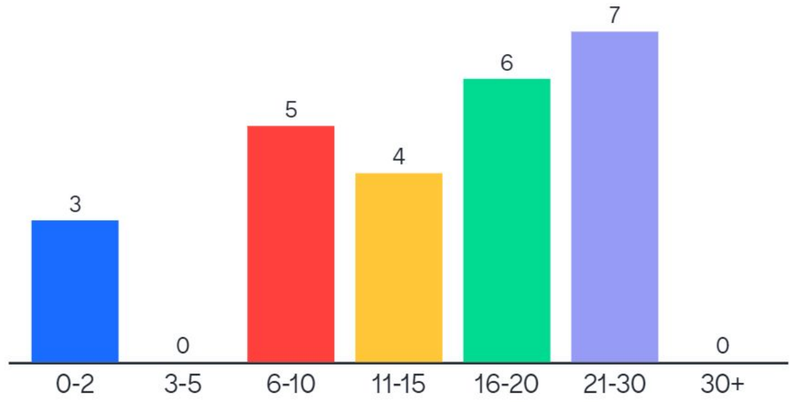
WHO ARE YOU?

What is your primary role?



How many years of experience do you have in education?



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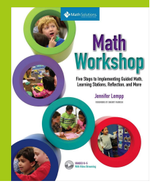
TRADITIONAL MATH LESSON STRUCTURE

5 minutes	**Warm Up**
20 minutes	**Student Independent Practice** Students attempt to solve problems in the same way the teacher solved them. The teacher walks around the room monitoring the students.
5 minutes	**Assign Homework**

MATH WORKSHOP STRUCTURES



<table>
<tr><th>TASK AND SHARE</th><th colspan="2">FOCUS LESSON,
SMALL GROUP INSTRUCTION,
AND LEARNING STATIONS</th><th colspan="2">SMALL GROUP INSTRUCTION AND LEARNING STATIONS</th></tr>
<tr><td>REASONING ROUTINE (5-10 minutes)
An engaging, accessible, purposeful routine to begin your math class that promotes a community of positive mathematics discussion and thinking.</td><td colspan="2">REASONING ROUTINE (5-10 minutes)
An engaging, accessible, purposeful routine to begin your math class that promotes a community of positive mathematics discussion and thinking.</td><td colspan="2">REASONING ROUTINE (5-10 minutes)
An engaging, accessible, purposeful routine to begin your math class that promotes a community of positive mathematics discussion and thinking.</td></tr>
<tr><td rowspan="2">MATH TASK
A problem-solving task that students work on in small groups. The teacher circulates and probes student thinking through questions. The task typically has multiple entry points, allowing for all students to have access to the problem.</td><td colspan="2">FOCUS LESSON (15 minutes)
A well-planned, whole-group lesson focused on the day's learning target and accessible to all levels of learners.</td><td rowspan="2">SMALL GROUP INSTRUCTION
Small-group instruction that allows the teacher to support and learn more about students' understandings and misconceptions.
In this structure, the focus lesson is addressed in guided math groups.</td><td rowspan="2">LEARNING STATIONS
Activities in which students engage in meaningful mathematics and are provided with purposeful choices.</td></tr>
<tr><td>SMALL GROUP INSTRUCTION
Small-group instruction that allows the teacher to support and learn more about students' understandings and misconceptions.</td><td>LEARNING STATIONS
Activities in which students engage in meaningful mathematics and are provided with purposeful choices.</td></tr>
<tr><td>TASK SHARE WITH STUDENT REFLECTION
A math share in which students come together as a whole class and discuss the various strategies they used to solve the problem. Students ask questions, clarify their thinking, modify their work, and add to their collection of strategies.</td><td colspan="2">STUDENT REFLECTION
A deliberate and meaningful time for students to consider new learning.</td><td colspan="2">STUDENT REFLECTION
A deliberate and meaningful time for students to consider new learning.</td></tr>
</table>

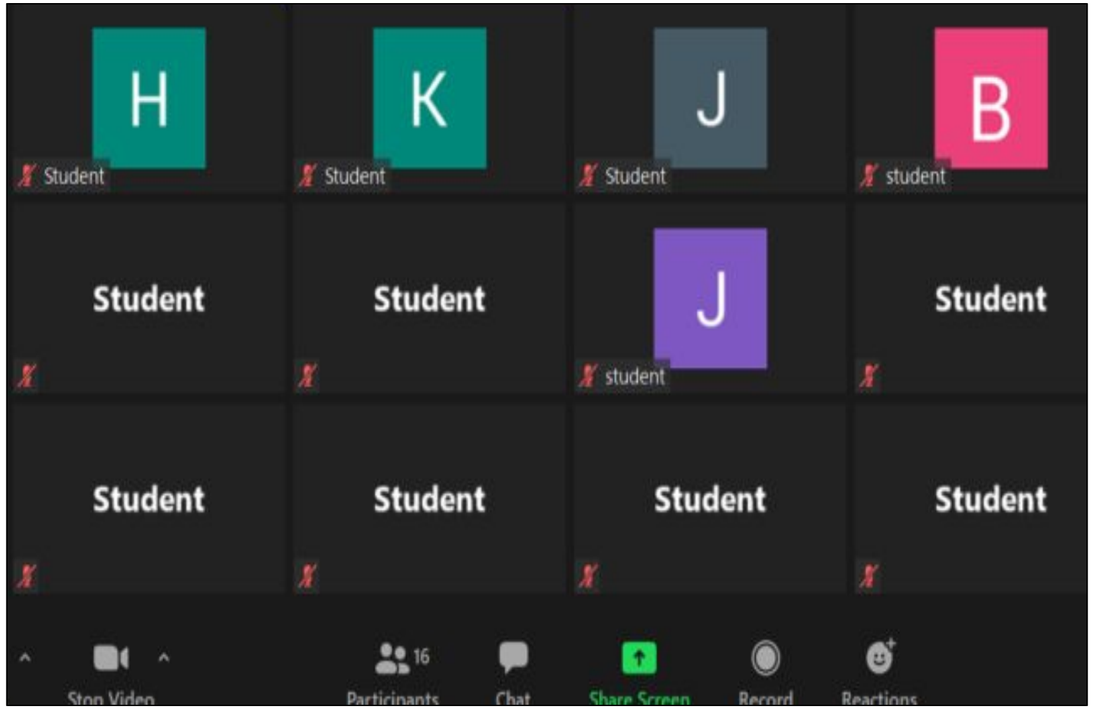
Adapted from *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp, 2017

REASONING ROUTINE

Alike and Different

Same or Different?

MATHEMATICS COMMUNITY



How would you rate STUDENT DISCOURSE after the last few years?

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If I could represent the last 24 months as a TikTok video, this would be it.

THREE TYPES OF CLASSROOM DISCOURSE

Silent

Tennis

Volleyball

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HAND SIGNALS & MATH TALK

When you come up with the same solution or strategy as another mathematician, silently signal **"Me too!"** to let other mathematicians know that you agree with them!

When you're solving a math equation in your brain, and you've already thought of two ways to find the solution, silently signal for **"I have the solution and one strategy!"** while other mathematicians continue to think!

When you're solving a math equation in your brain, and you've already thought of two ways to find the solution, silently signal for **"I have the solution and two strategies!"** then continue to think of additional strategies while other mathematicians also continue to think!

..... You can always add additional fingers as you come up with more and more strategies to find the solution! You're an amazing mathematician! .....

@SkipTylerMath

Math Talk Moves

Revoicing
"So you're saying that _____. Do I have that right?"

Repeating
"Can you restate or rephrase what _____ just said?"

Reasoning
"Do you agree or disagree, and why?"

Adding On
"Would someone like to add on?"

Waiting
"Take your time...we'll wait..."

Turn & Talk
"Partner turn and talk or think-pair-share"

Math Solutions. | mathsolutions.com

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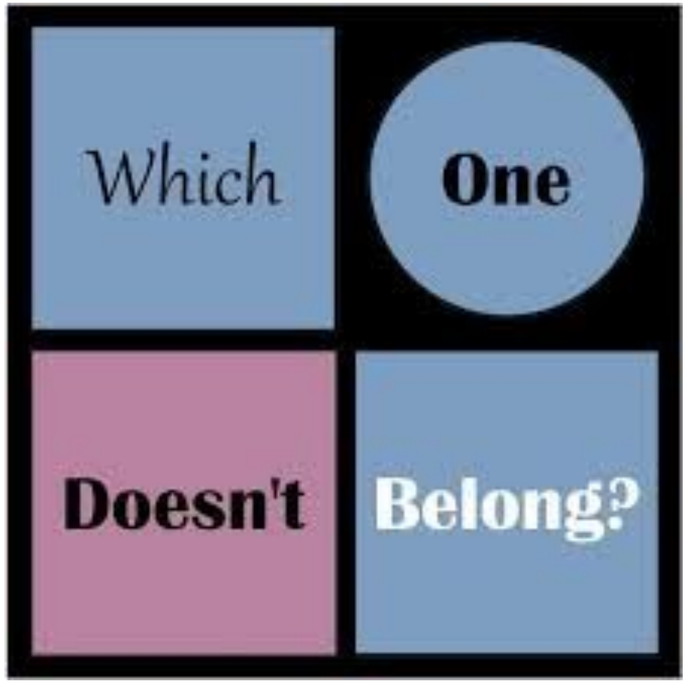
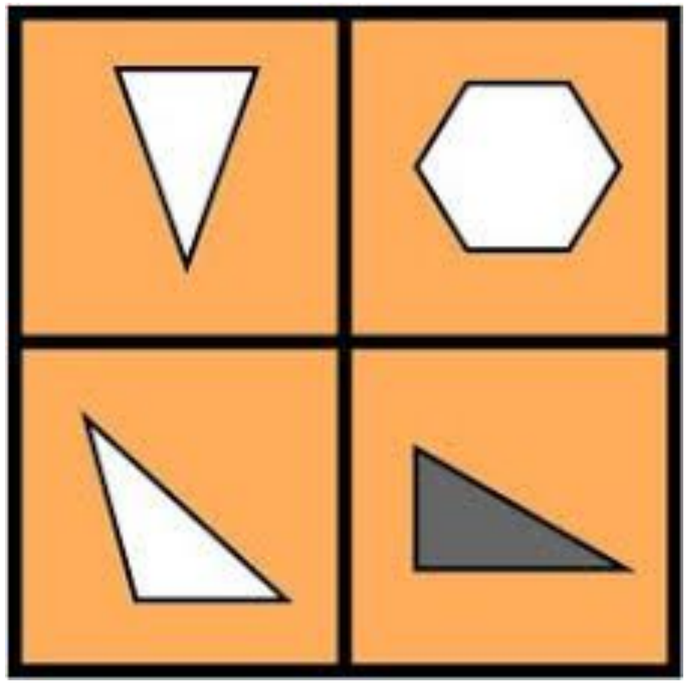
SENTENCE STARTERS

Another idea I had was...	I was confused (wondering) about...	How or why did you…?	I agree with _____ because...
I have a different way to explain...	I have the same answer, but my explanation/strategy is...	Your answer/strategy reminds me of...	I disagree with _____ because...
Can you explain more about...	I have a different answer because...	One thing that I like about your answer is...	Your idea and my idea are similar because...
Your idea and my idea are different because...	I like how you used the math vocab, _____to explain it.	Instead of _____ , you can use the math word _____ to explain.	I would like to add on to that idea...

WHICH ONE DOESN'T BELONG



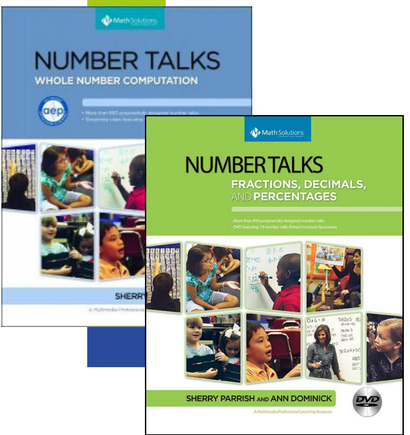
9	25
16	43



http://wodb.ca

NUMBER TALKS

14 x 12



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NUMBER TALKS & NUMBER STRINGS

8 + 2

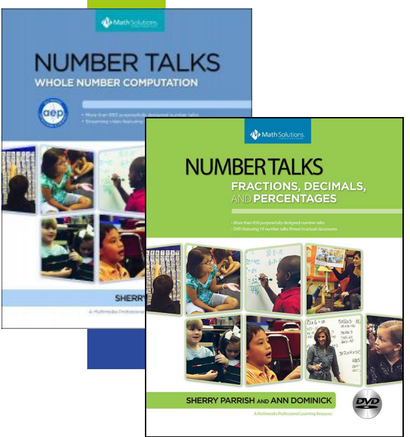
8 + 2 + 11

8 + 13

6 x 10

6 x 5

6 x 15



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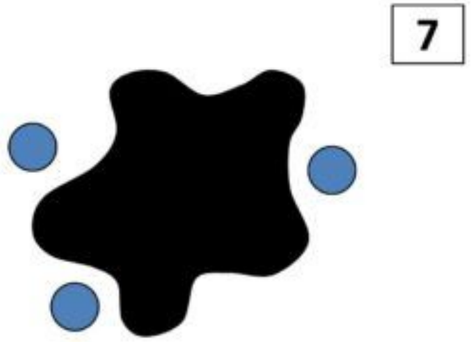
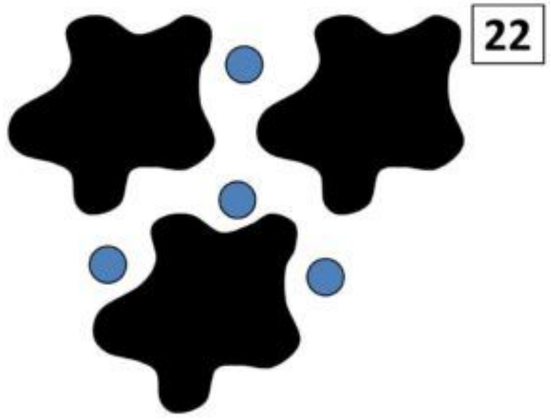
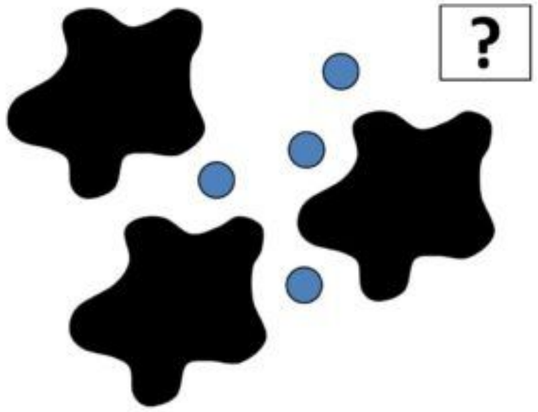
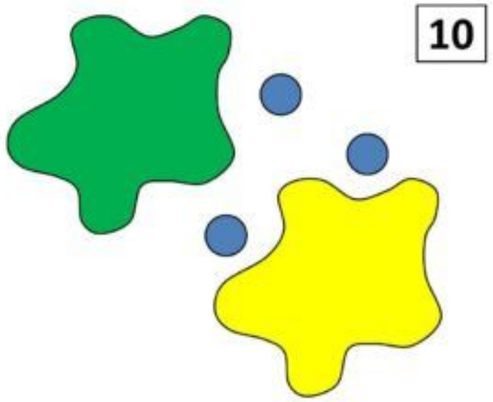
NUMBER TALKS & NUMBER STRINGS









SPLAT!
https://stevewyborney.com/

TODAY'S NUMBER

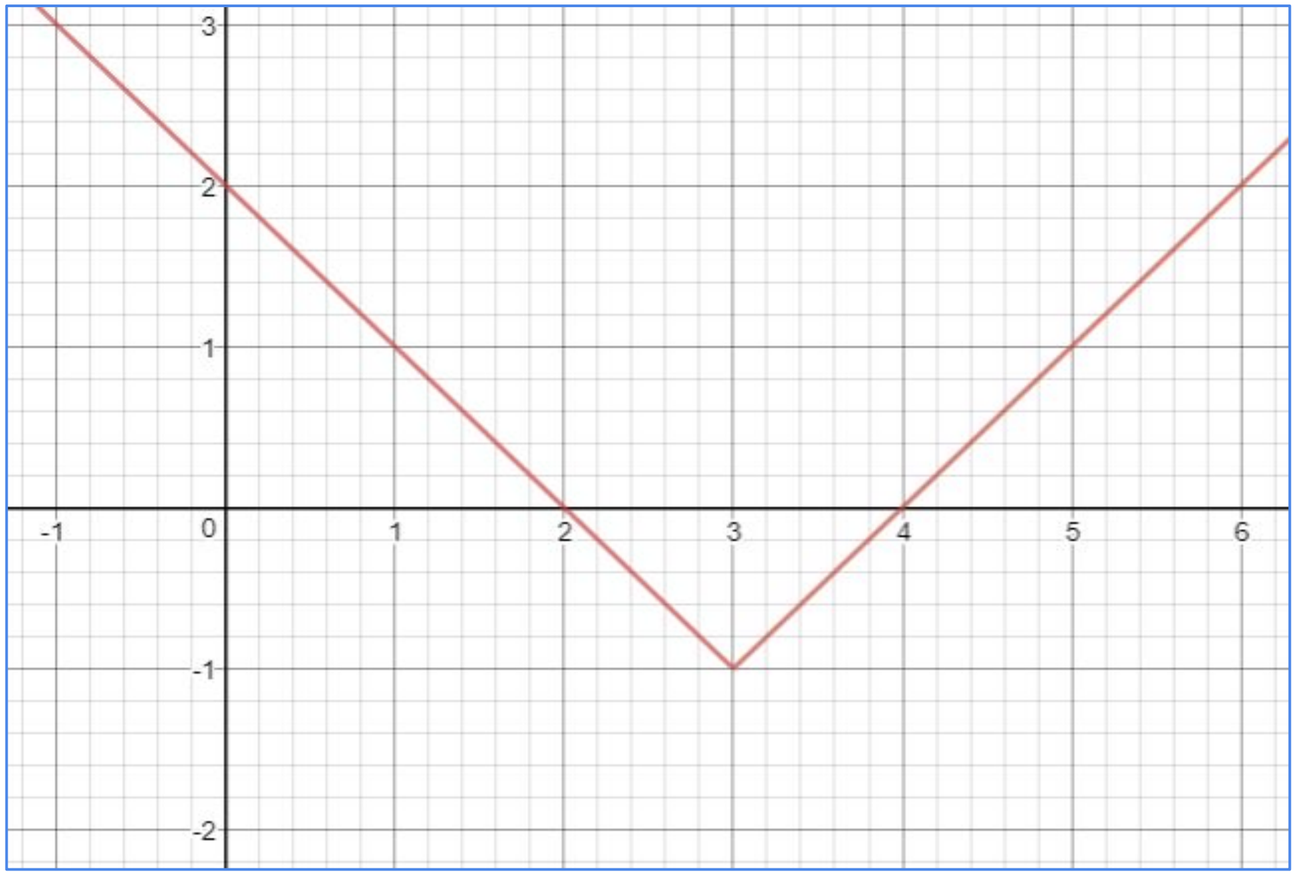
Today's Number

TODAY'S NUMBER

Four consistent types of representations used across grade levels

- Composing/decomposing
- Representing relationships to other numbers
- Representing mathematics in the world
- Using models

TODAY'S ~~NUMBER~~ GRAPH



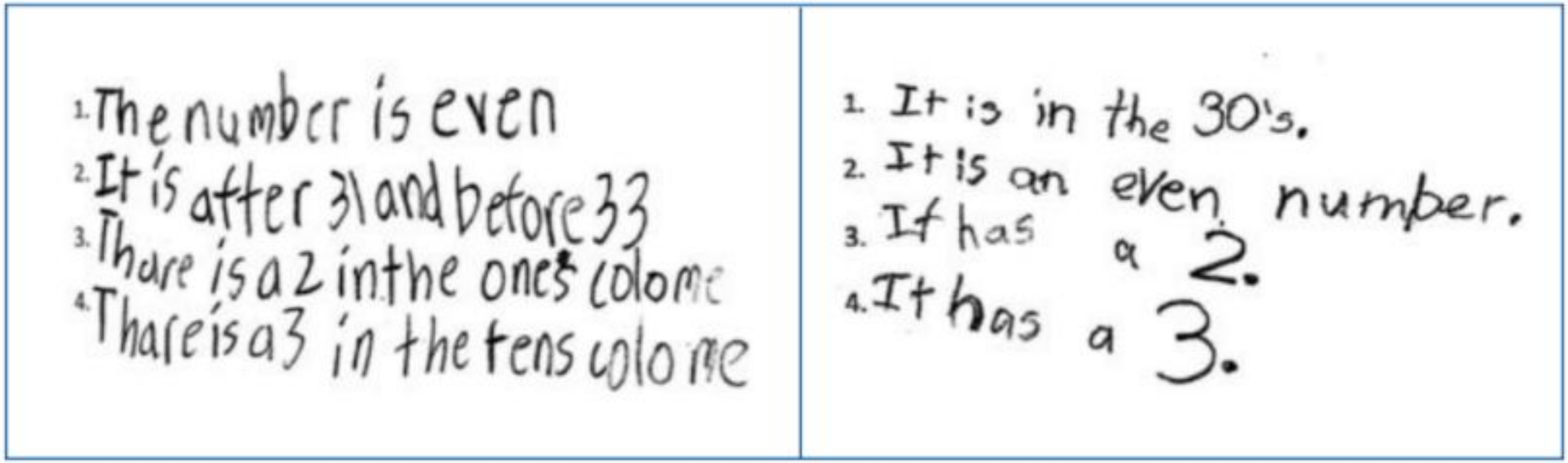
MYSTERY NUMBER

- My number is a multiple of 6.
- My number has six factors.
- My number is less than 5 x 5.
- When the digits of my number are added, they have a sum of 9.

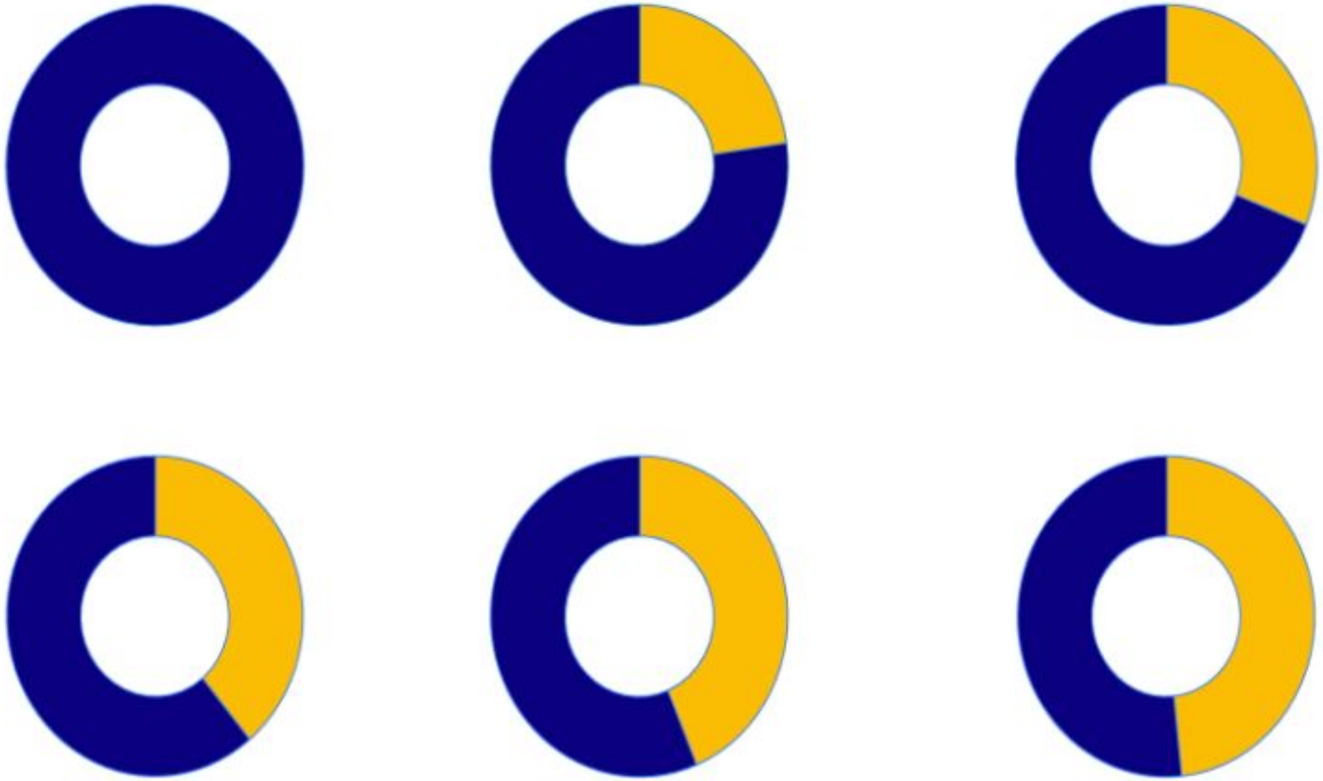
MYSTERY ~~NUMBER~~ ANGLE

- I am an acute angle
- The sum of my digits is 7
- My vertical angle is a multiple of 5
- My supplementary angle is 110 degrees

CLUES FOR 32

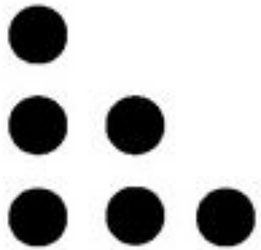


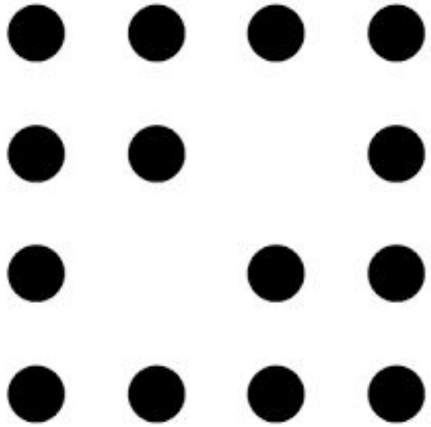
MYSTERY GRAPHS – SLOW REVEAL

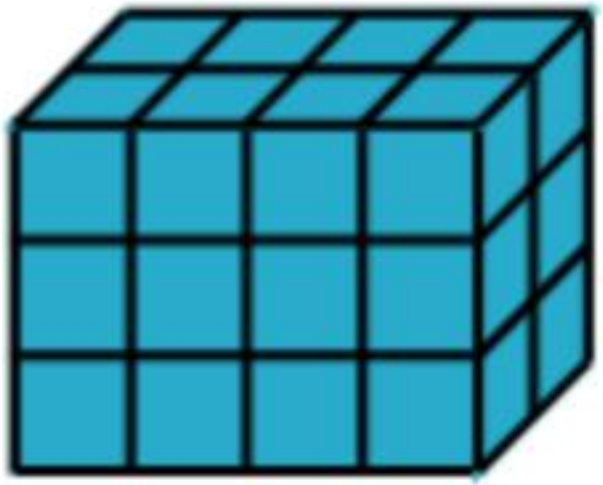


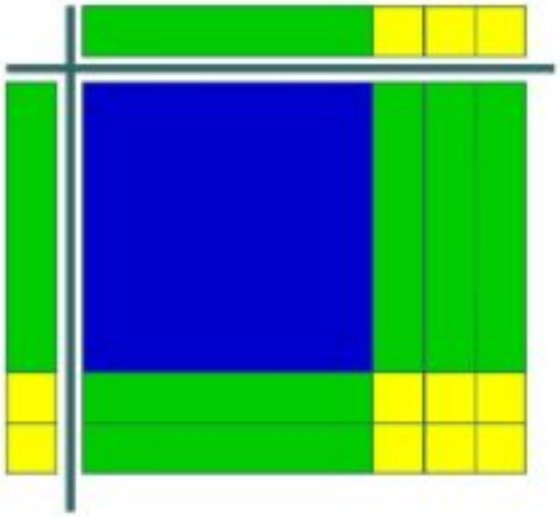
Slow Reveal Graphs

QUICK IMAGE



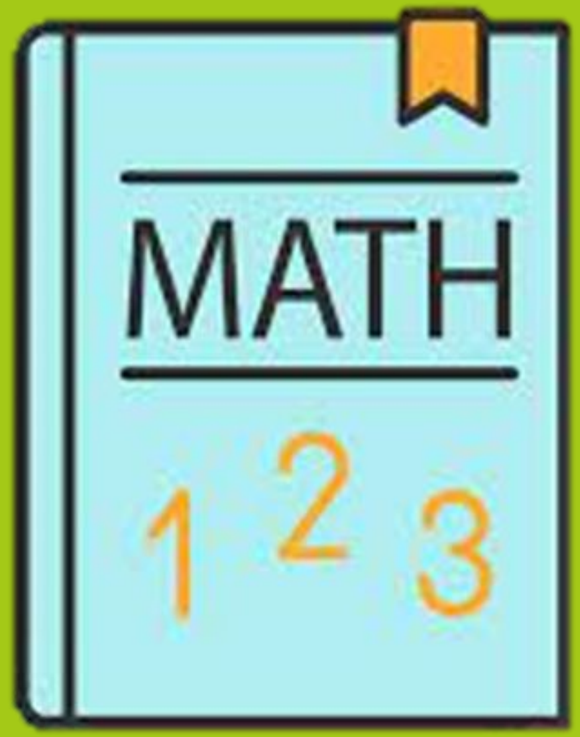






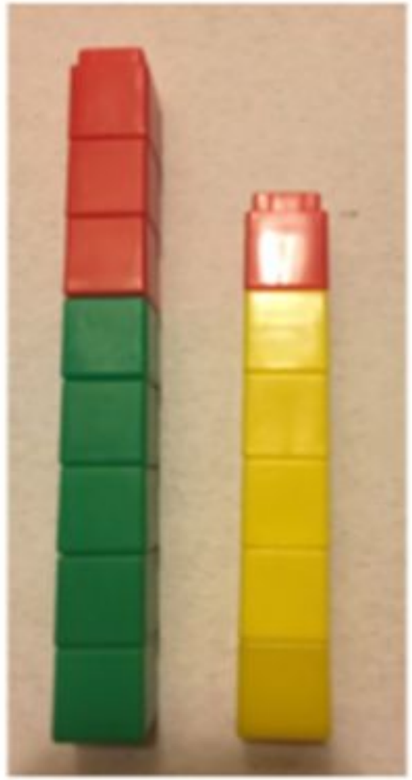
[Number Talk Images]

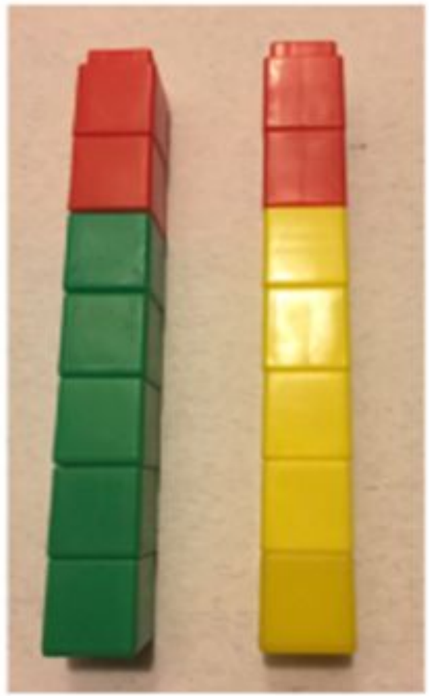
ALIKE AND DIFFERENT



ALIKE AND DIFFERENT

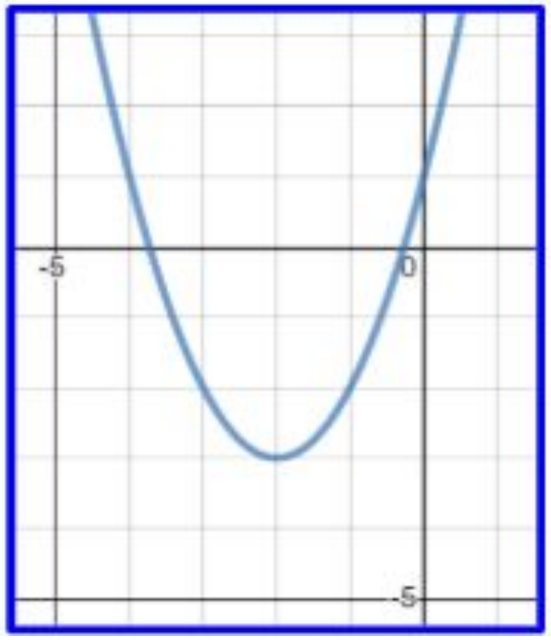
ALIKE AND DIFFERENT



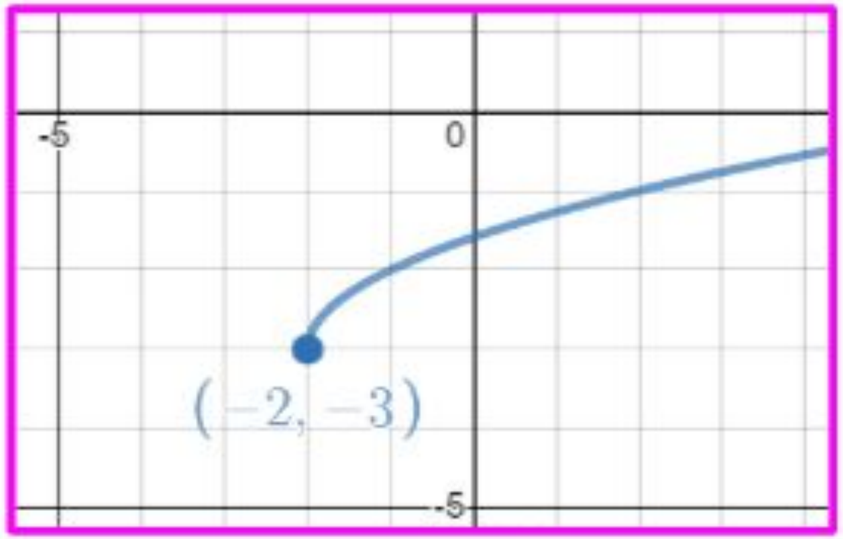


ALIKE AND DIFFERENT

$$y = (x+2)^2 - 3$$



$$y = \sqrt{x+2} - 3$$

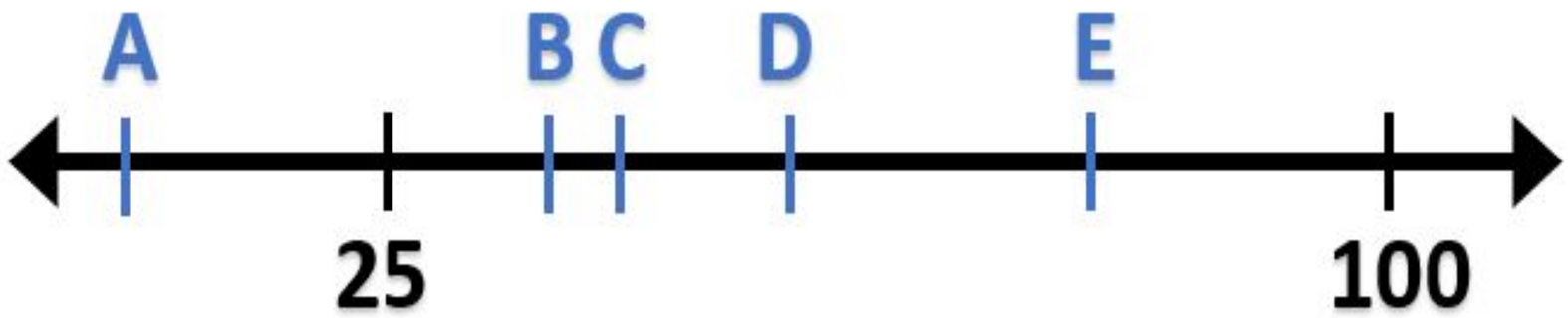


www.wodb.ca/graphs.html

NUMBER LINES

What numbers could represent each of the letters and why?

Where is 75? Where is 400? How far apart are A and B?

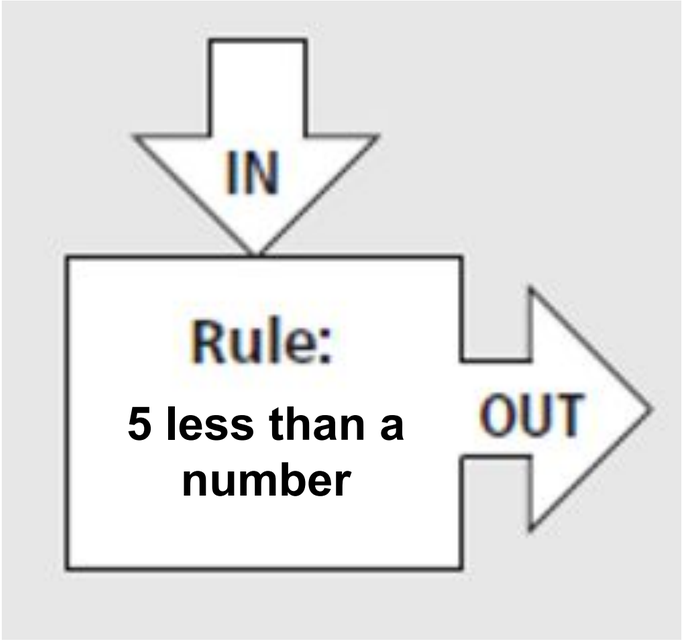


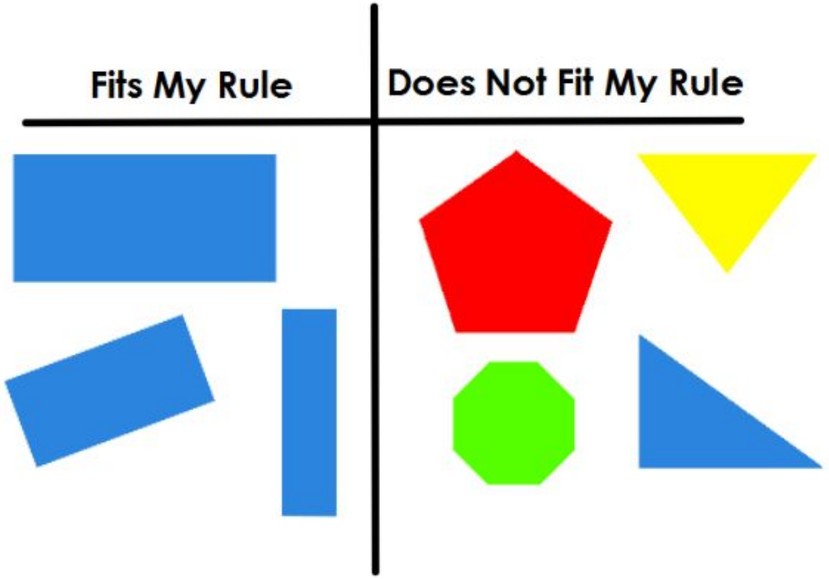
NUMBER LINES

Solving Equations

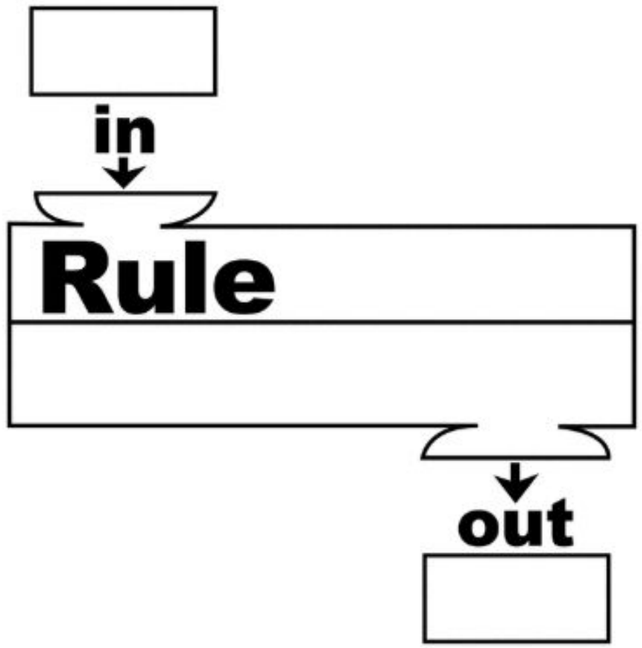
$2x + 3 = 11$

GUESS MY RULE





GUESS MY RULE



x	f(x)
1	-3
9	-1
25	1
64	4

HOW DO YOU KNOW?

- How do you know that 2 is the slope of $y = 2x - 1$?
- How do you know that 8/10 and 12/15 are equivalent?
- How do you know that $5 \div \frac{1}{2} = 5 \times 2$?
- How do you know this is a rectangle?

HOW DO YOU KNOW?

The systems are grouped with the most efficient method to solve.

Graphing	Substitution	Elimination
$y = 2x - 1$ $y = -1/2x + 3$	$4x + 5y = 10$ $x = 6y - 8$	$2x + 4y = 8$ $7x - 4y = 12$

CONVINCE ME!

Cereal box B is the better buy.

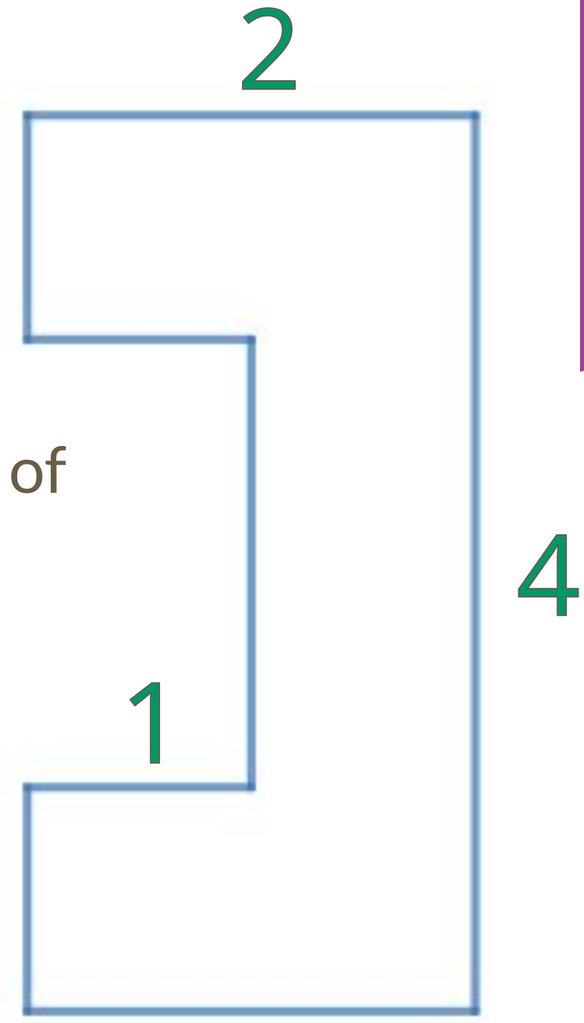
$3.79 ea.

Rice Krispies Cereal, Toasted Rice (12 oz)

$4.29 ea.

Rice Krispies Cereal, Toasted Rice (18 oz)

The perimeter of the shape is 14 units.



Convince Me That

WOULD YOU RATHER

Would you rather have this many pennies or a nickel?

WOULD YOU RATHER

sell Option A or Option B?

Option A:
Sell 3 dozen cookies for $0.50 each and cost $6.00 to make.

Option B:
Sell 36 cookies (the entire batch) for $18.00 and cost $8.00 to make.

WOULD YOU RATHER

BE GIVEN

- $5 A DAY

  OR

- A PENNY THE FIRST DAY, TWO PENNIES THE SECOND DAY, FOUR ON THE THIRD DAY, EIGHT ON THE FOURTH DAY AND SO ON?

www.Wouldyourathermath.com

WOULD YOU RATHER

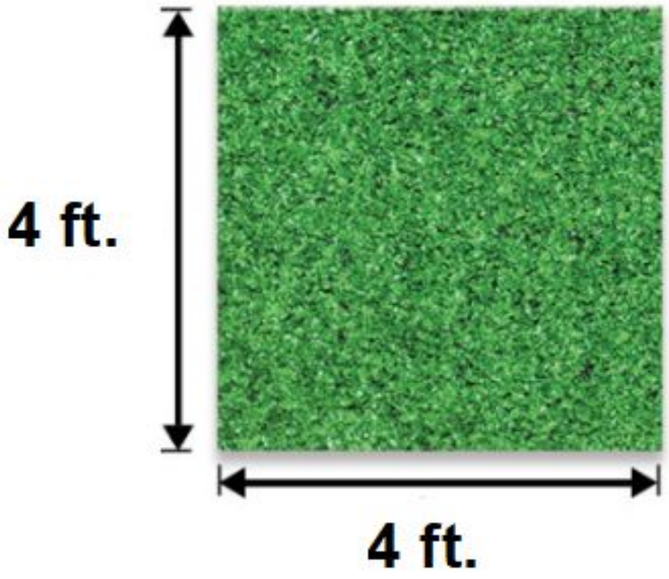
Run the circumference of the circle OR perimeter of the rectangle?

WOULD YOU RATHER

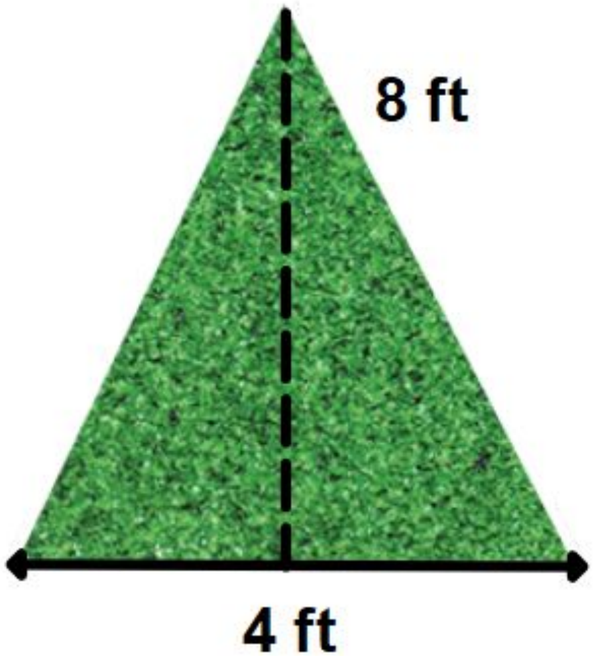
Your yard needs 1600 sq. feet of sod.

Would you rather use Sample A or Sample B?

SAMPLE A



SAMPLE B



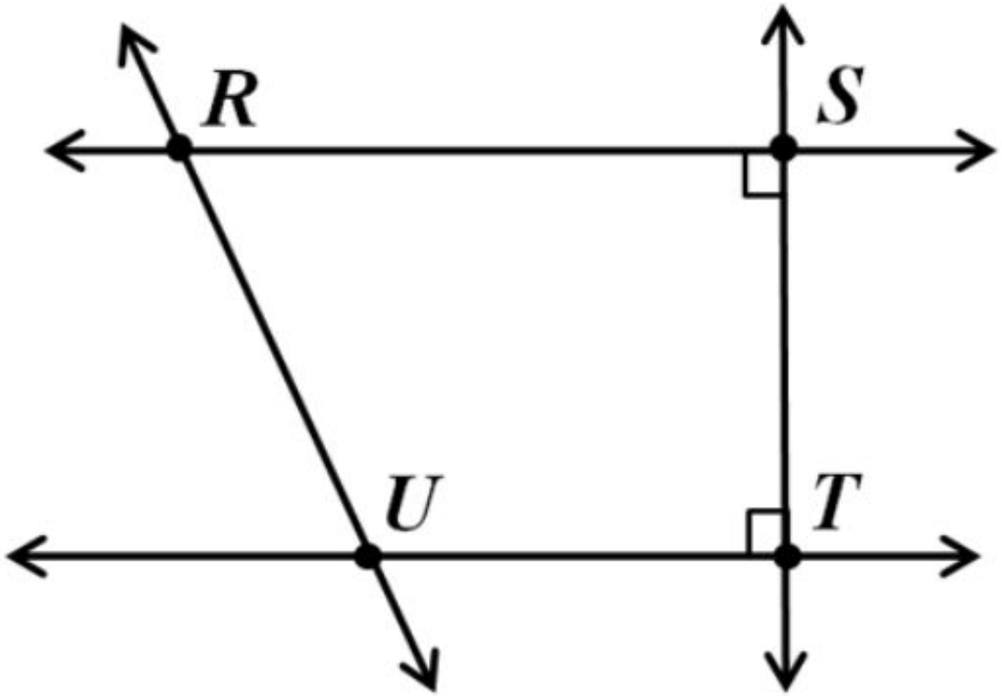
OPEN MIDDLE

HIGHEST DEGREE POLYNOMIALS

Directions: Make a polynomial of the highest degree by using the whole numbers 1 through 9 at most one time each.

$$(\square x^{\square}+\square)^{\square}\cdot(\square x^{\square}+\square)^{\square}$$

TWO TRUTHS AND A LIE

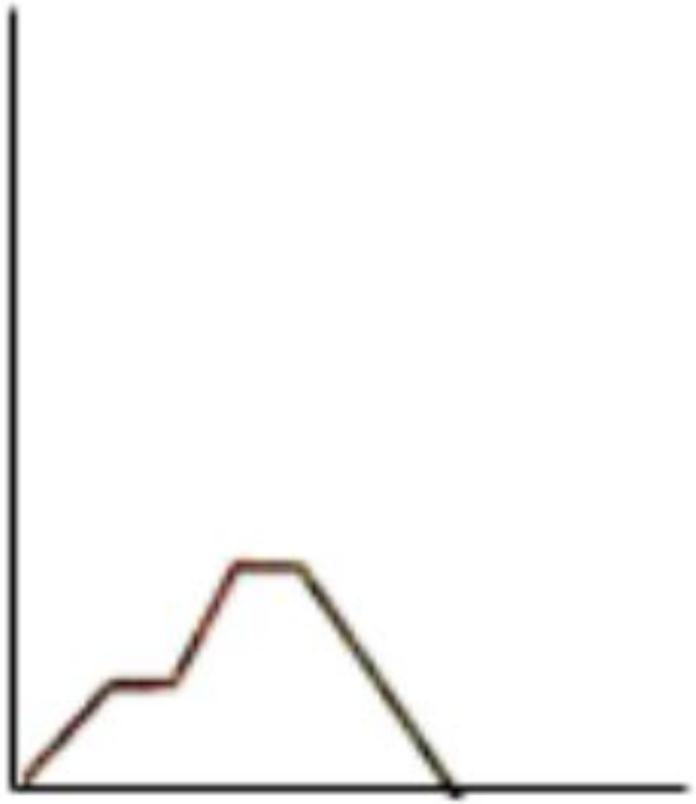


$\overleftrightarrow{RS} \perp \overleftrightarrow{ST}$

$\overleftrightarrow{UT} \perp \overleftrightarrow{ST}$

$\overleftrightarrow{RS} \perp \overleftrightarrow{UT}$

GRAPHING STORIES



WHAT'S NEXT?

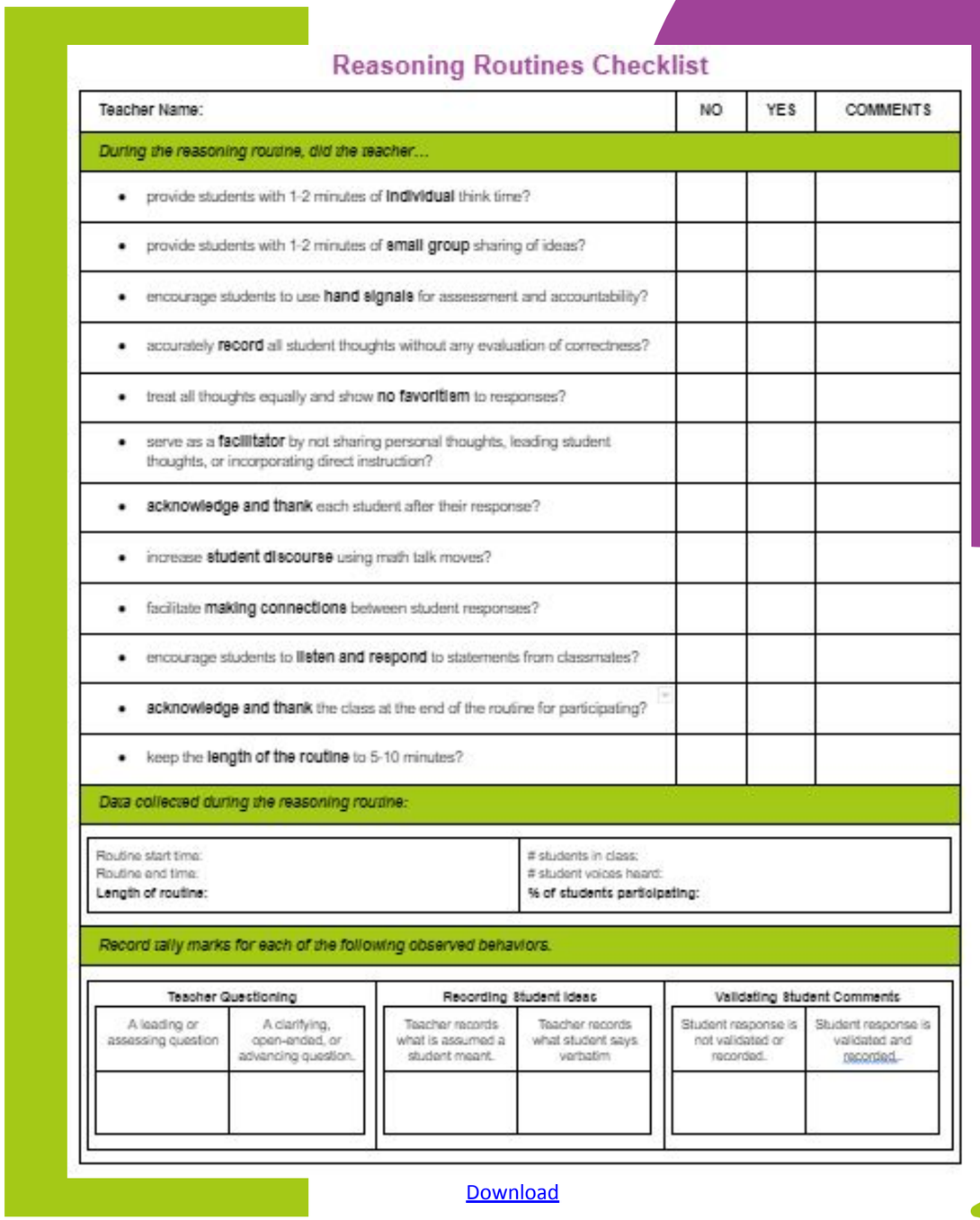
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

⬇➡⬆⬇➡⬆⬇➡⬆⬇➡⬆

48, 53, 58, 63, 68, __, __, __

BEST PRACTICES

- Length is around 5-10 minutes at the beginning of class
- Hand signals are used during routines (and throughout the class!)
- Students are given 1-2 minutes of independent and small group think time
- Teacher encourages math talk moves to build class community
- All student responses are recorded without teacher comments on correctness
- All student responses are treated equally
- Teacher does not interject own thoughts or direct instruction
- Students are thanked for their participation



Reasoning Routines Checklist

Teacher Name:	NO	YES	COMMENTS
During the reasoning routine, did the teacher…			
• provide students with 1-2 minutes of **individual** think time?			
• provide students with 1-2 minutes of **small group** sharing of ideas?			
• encourage students to use **hand signals** for assessment and accountability?			
• accurately **record** all student thoughts without any evaluation of correctness?			
• treat all thoughts equally and show **no favoritism** to responses?			
• serve as a **facilitator** by not sharing personal thoughts, leading student thoughts, or incorporating direct instruction?			
• **acknowledge and thank** each student after their response?			
• increase **student discourse** using math talk moves?			
• facilitate **making connections** between student responses?			
• encourage students to **listen and respond** to statements from classmates?			
• **acknowledge and thank** the class at the end of the routine for participating?			
• keep the **length of the routine** to 5-10 minutes?			

Data collected during the reasoning routine:

Routine start time: Routine end time: **Length of routine:**	# students in class: # student voices heard: **% of students participating:**

Record tally marks for each of the following observed behaviors.

Teacher Questioning		Recording Student Ideas		Validating Student Comments	
A leading or assessing question	A clarifying, open-ended, or advancing question.	Teacher records what is assumed a student meant.	Teacher records what student says verbatim	Student response is not validated or recorded.	Student response is validated and recorded.

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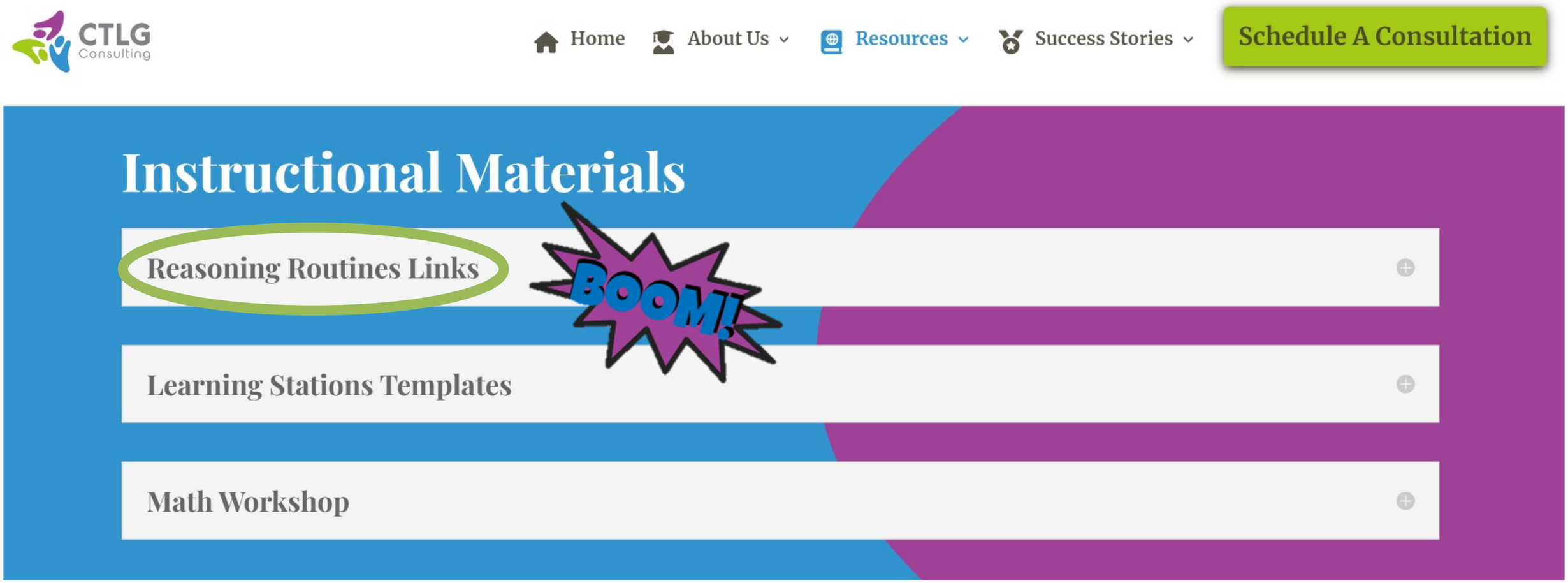
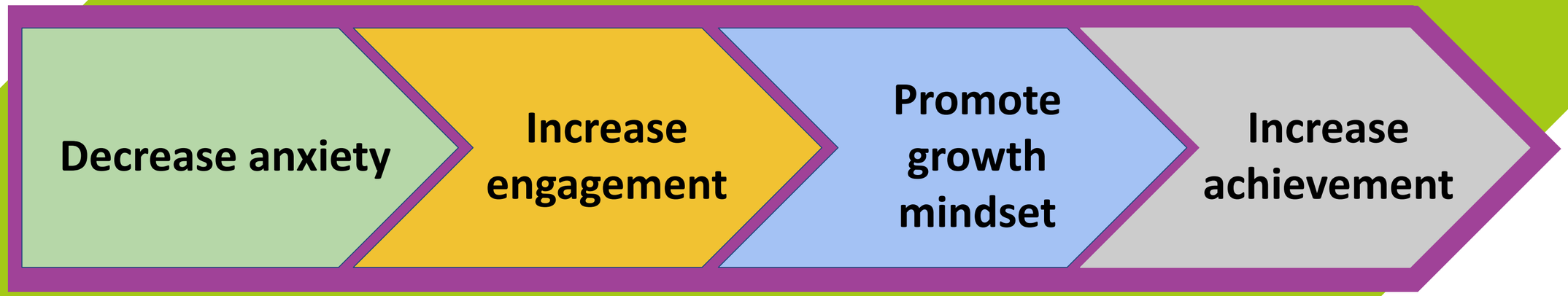
WHERE CAN I FIND THESE RESOURCES?



MOVING STUDENTS FORWARD



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LET'S REFLECT!

Summarize Reasoning Routines in 5 words!

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#ChangeTheStory

Who wants a sticker?

Please share a photo of your sticker and how you are changing the story and tag me @SkipTylerMath

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SUCCESS CRITERIA

- I will be able to identify best practices for implementing High-Yield Reasoning Routines in my classroom
- I will be able to use math talk moves to increase student discourse

WHAT RESONATED MOST WITH YOU?

Go to

www.menti.com

Enter the code

6620 1357

Or use QR code

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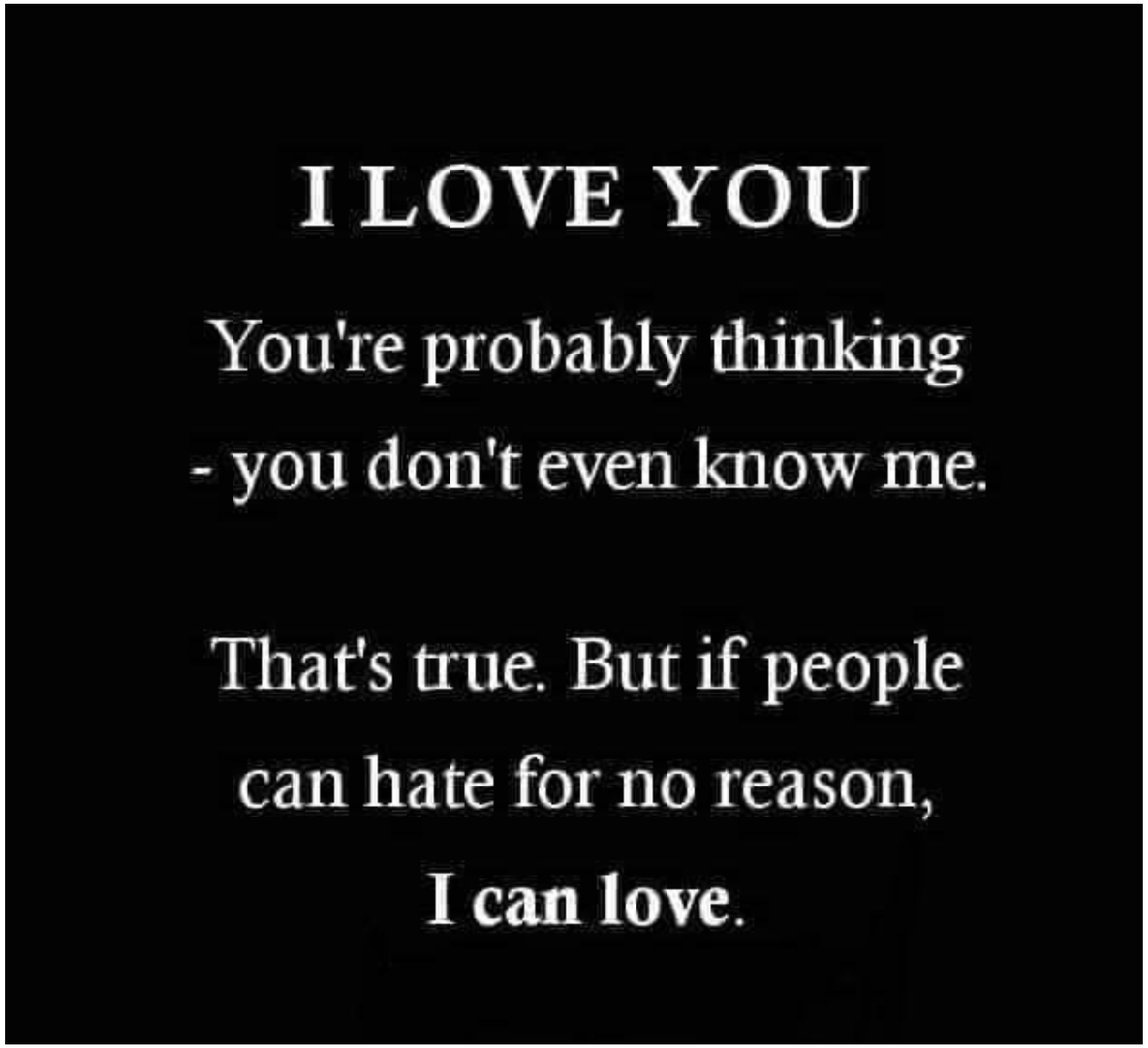
I LOVE YOU AND APPRECIATE YOU!



CONTACT ME

BUILDING CLASSROOM COMMUNITIES WITH REASONING ROUTINES & STUDENT DISCOURSE

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Scan for a copy of the slides and resources!
or Click Here!

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