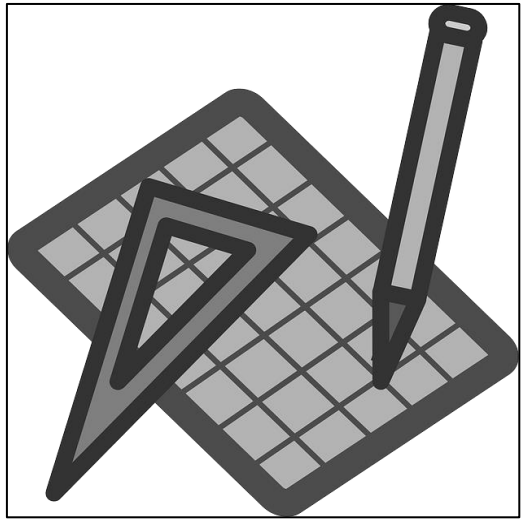


Math Workstations K-12-Final &Mathematical Practices *

Fall 2023

Macon Piatt Regional Office of Education 39

Barbara Preston

This Training

- Please make sure that you have registered at https://www.maconpiattroe.org/ on the ABC sign up registration site.
- **This training requires answers to TASKS that are inside the training. They will always be in RED so not to miss them.** These need to be sent back to me prestonb@roe39.org
- Please send them in a ppt. form or a WORD document. No GOOGLE DOCS or One Drives, please.
- Please view all slides and videos embedded in the training.
- If you need support, please email me. Thank you.

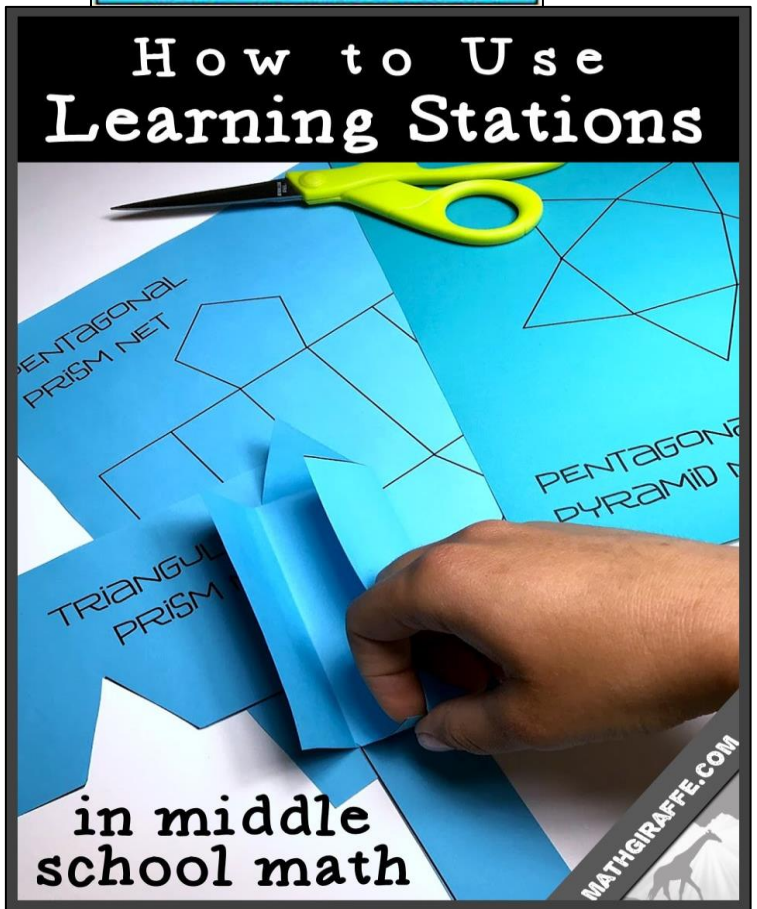
Task One -Pre/Post Test for MATH PRACTICES AND CENTERS --- Online Training

The following statements related to the targets of this training session. Please indicate your comfort level with the following:
4 = I am confident in my knowledge
3 = I am on the right track
2 = I am not sure I am doing it right or with the right amount of consistency
1 = I need more information in this area
Copy the pre and post tests and send to me with all of your tasks.

MATH PRACTICES AND CENTERS Statements	Pre	Post
I understand that the Math Curriculum is the Standards that Revolve around the Math Practices.		
I can identify all 8 Math Practices and know how to use them inside my classroom with math and other contents. (the Practices overlap all contents)		
I can identify students who need leveled questions to feel successful throughout their learning and I can identify students who are beyond the learning and need extensions.		
I can locate resources to support my efforts in assessment, asking leveled questions, changing a lesson if needed, differentiating when needed, and reflecting on what is working and what is not in my math instruction.		
I am able to provide students with instruction on how to find evidence to support their answers and why that is so important to critical thinking and critical calculations.		
I am aware of the connection of the 8 practices to real world issues and realize that students need to discuss and talk about math in order to understand it and be able to do it.		

Task Two Please watch this video to begin the training.

https://vimeo.com/220749837 Click on this and watch 4.05 min video on the shift in mathematics and teaching.
Tell me one thing you learned from it.



8 Math Practices –Common Core Statement

The Eight Mathematical Practices

1	I can solve problems without giving up.	
2	I can think about numbers in many ways.	
3	I can explain my thinking and try to understand others.	
4	I can show my work in many ways.	
5	I can use math tools and tell why I chose them.	
6	I can work carefully and check my work.	
7	I can use what I know to solve new problems.	
8	I can solve problems by looking for rules and patterns.	

6 Math Terms to Know {in primary grades}

Here are a group of terms and phrases you'll hear throughout the year. These five mathematical concepts (ten frame, subitizing, 120s chart, number sense, place value) are integrated throughout each unit we teach and are year-long skills we will hone.

Common Core

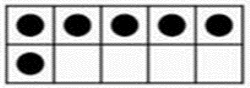
www.corestandards.org

The Common Core State Standards are expectations our state has adopted to provide a framework for teaching, answering the question - what should our students know by the end of the year? As a school, we have chosen to use specific mathematical processes to teach the Common Core Standards.

Ten Frame

a structured way to work with numbers within 10

WHY? { Develops mental-math abilities and sets foundation for regrouping }



____ + 6 = 10

10 = 6 + ____

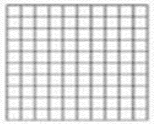
Subitizing

the ability to quickly identify the number of items in a small set without counting

WHY? { Subitizing helps students create a mental picture & builds number sense. }

120s Chart

a number line formatted so students can easily identify number patterns



{ Understanding the 120s Chart allows students to see patterns within number sequences, as well as, easily work with 10 more/less, 1 more/less. Creates automaticity with numbers. }

Number Sense

an understanding of number relationships that allows students to work mathematical problems without a traditional algorithm

WHY? { A solid understanding of numbers allows students to conceptualize numbers – What is 10 less/more? Which number is greater/less than? What happens if I double a number? What does a ten look like? }

Place Value

numerical value of a digit based on its position

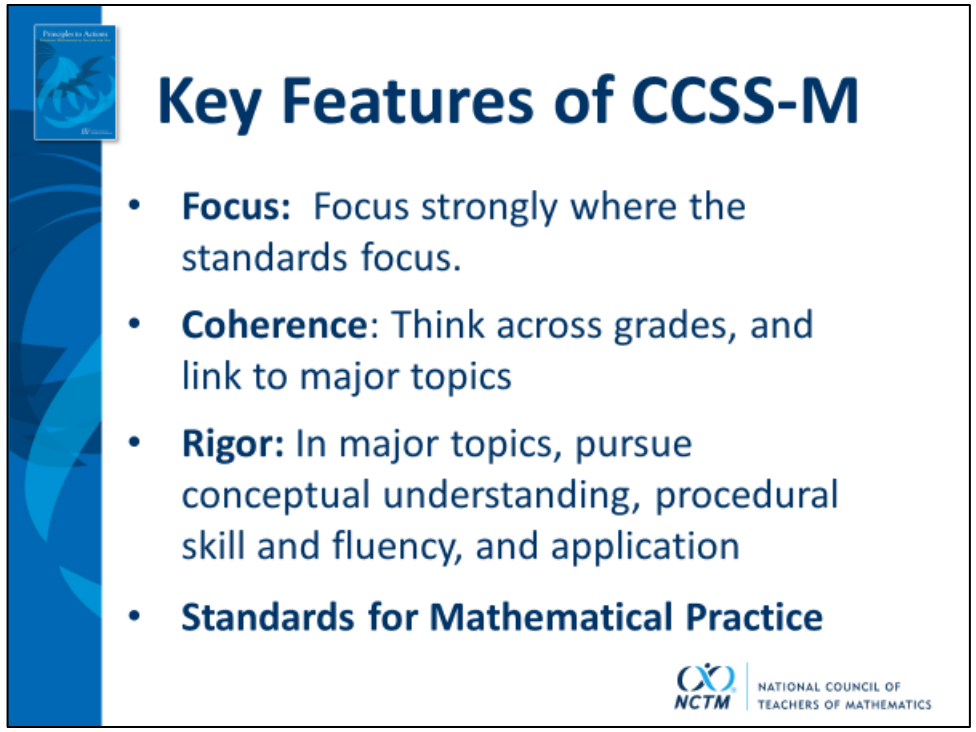
WHY? { Place value allows students to understand that 15 is not a "1" and a "5"; rather, it is a group of 10 and 5 ones. }

H	T	O
0	6	5

} 65

The Brown Bag Teacher, 2014

Math Has New Emphasis on It…..



From emphasis on:

How to get answers

Key Shift

To emphasis on:

Understanding mathematics

Mathematical tasks should:

- Provide opportunities for students to engage in exploration or encourage students to use procedures in ways that are connected to concepts and understanding;
- Build on students' current understanding; and
- Have multiple entry points.

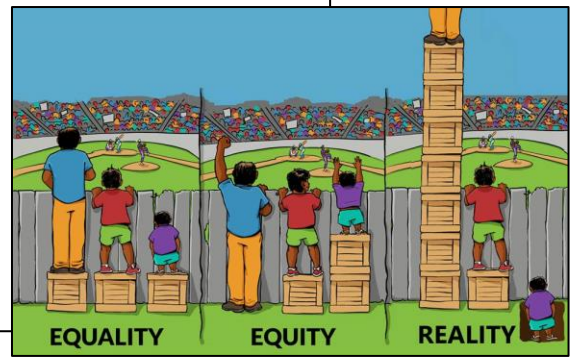
- Tasks form the basis for students' opportunities to learn what mathematics is and how one does it;
- Tasks influence learners by directing their attention to particular aspects of content and by specifying ways to process information;
- The level and kind of thinking required by mathematical instructional tasks influences what students learn; and
- Differences in the level and kind of thinking of tasks used by different teachers, schools, and districts, is a major source of inequity in students' opportunities to learn mathematics.

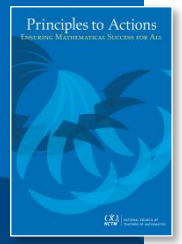
Implement tasks that promote reasoning & problem solving.

What are teachers doing?	What are students doing?
Motivating the learning of mathematics	Persevering in exploration and reasoning through tasks
Give opportunities for exploring and solving problems that build on and extend their understanding.	Using drawing and making connections to prior knowledge and standards to responsibly make sense of a task.
Provide multiple entry point tasks through the use of varied tools and representations.	Knowing how to use the tools and representations for thinking and problem solving.
Supporting students without taking their thought processes away.	Accepting and expecting that their classmates will use a variety of solution approaches and tat will discuss and justify their strategies in collaborative discussions.
Mode and encourage students to use varied approaches and strategies to make sense of tasks. PROVIDE TIME FOR STUDENTS TO COLLABORATE AND DISCUSS MATH AND THEIR THINKING.	

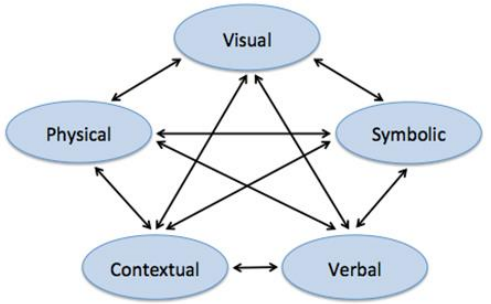
Essential Elements of Effective Math Programs

1. **Teaching and Learning**
2. **Access and Equity**
3. **Curriculum**
4. **Tools and Technology**
5. **Assessment**
6. **Professionalism**





Use and Connect Mathematical Representations

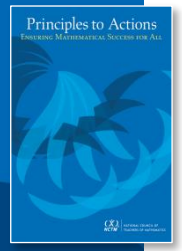


Different Representations should:

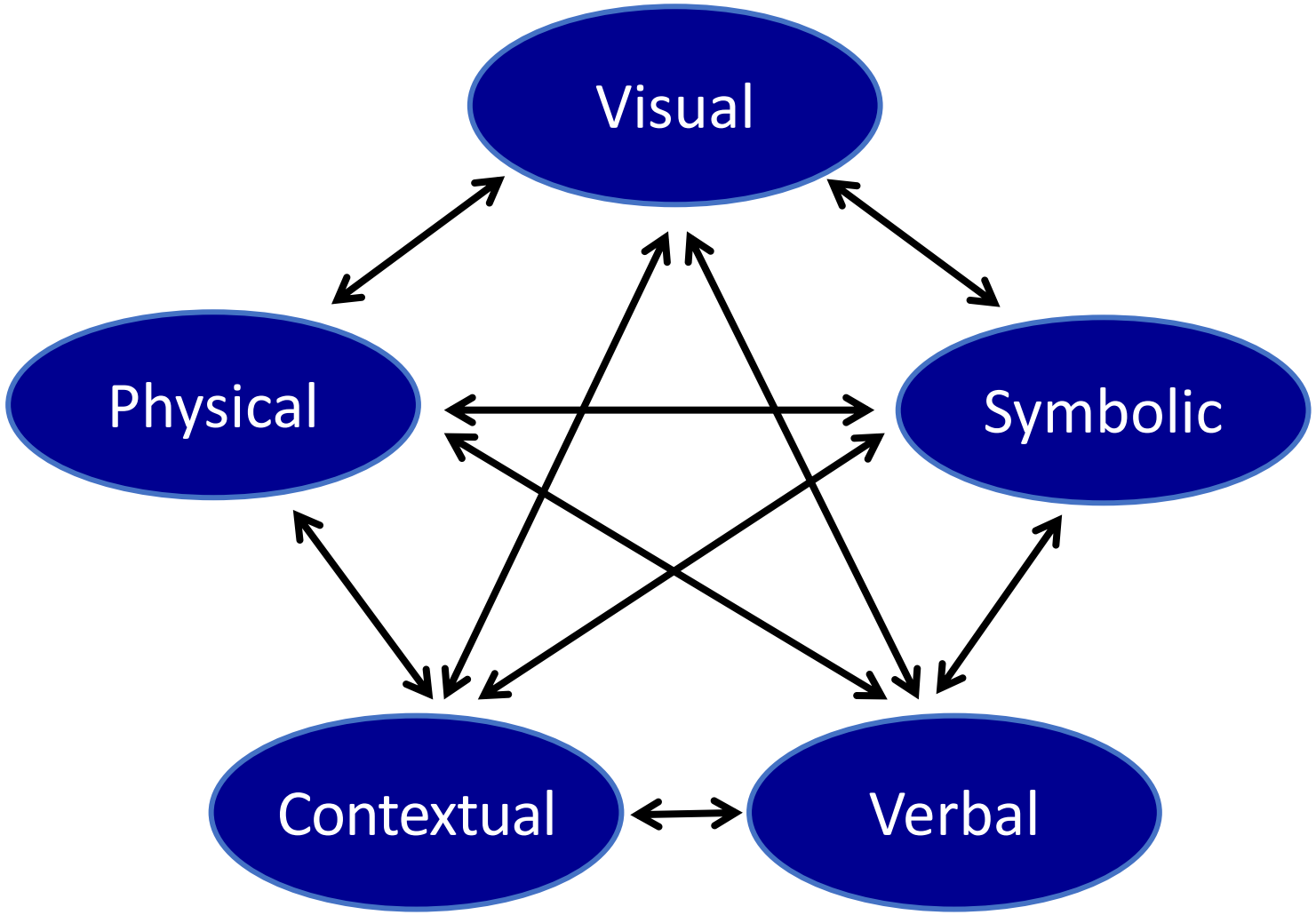
- Be introduced, discussed, and connected;
- Focus students' attention on the structure or essential features of mathematical ideas; and
- Support students' ability to justify and explain their reasoning.

Strengthening the ability to move between and among these representations improves the growth of children's concepts.

Lesh, Post, Behr, 1987



Important Mathematical Connections between and within different types of representations



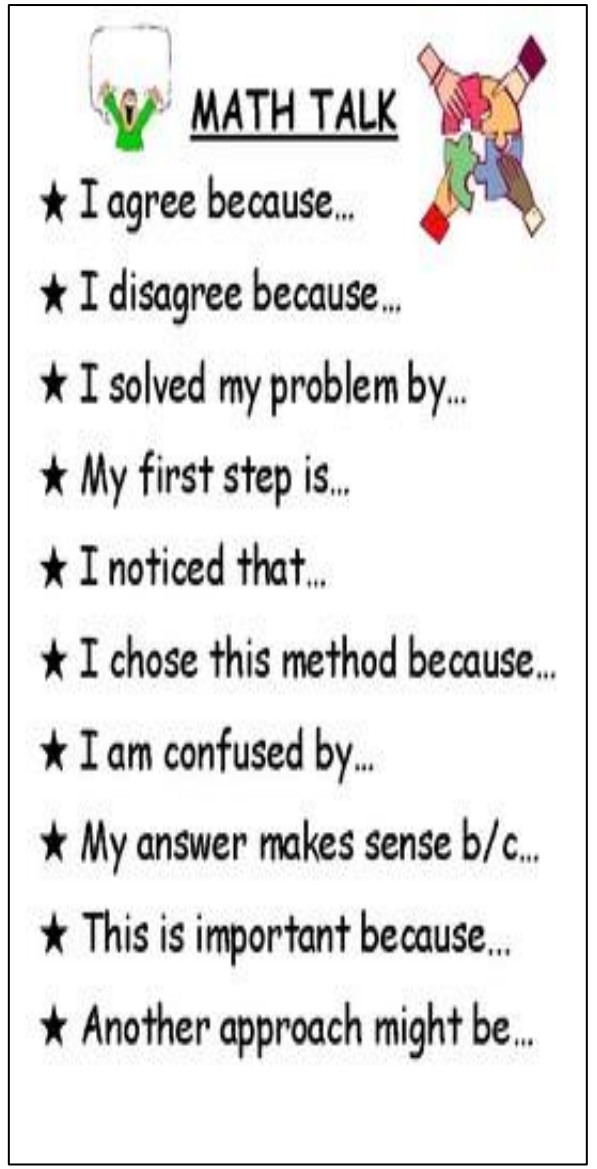
Principles to Actions (NCTM, 2014, p. 25)
(Adapted from Lesh, Post, & Behr, 1987)

NCTM® NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Facilitate Meaningful Mathematical Discourse

Mathematical Discourse should:

- Build on and honor students' thinking.
- Let students share ideas, clarify understandings, and develop convincing arguments.
- Engage students in analyzing and comparing student approaches.
- Advance the math learning of the whole class.



1. **Anticipating**
2. **Monitoring**
3. **Selecting**
4. **Sequencing**
5. **Connecting**

5 Practices for Orchestrating Productive Mathematics Discussions

(Smith & Stein, 2011)

Planning with the Student in Mind

- Anticipate solutions, thoughts, and responses that students might develop as they struggle with the problem
- Generate questions that could be asked to promote student thinking during the lesson, and consider the kinds of guidance that could be given to students who showed one or another types of misconception in their thinking
- Determine how to end the lesson so as to advance students' understanding

Stigler & Hiebert, 1997

Effective Questions should:

- Reveal students' current understandings;
- Encourage students to explain, elaborate, or clarify their thinking; and
- Make the mathematics more visible and accessible for student examination and discussion.

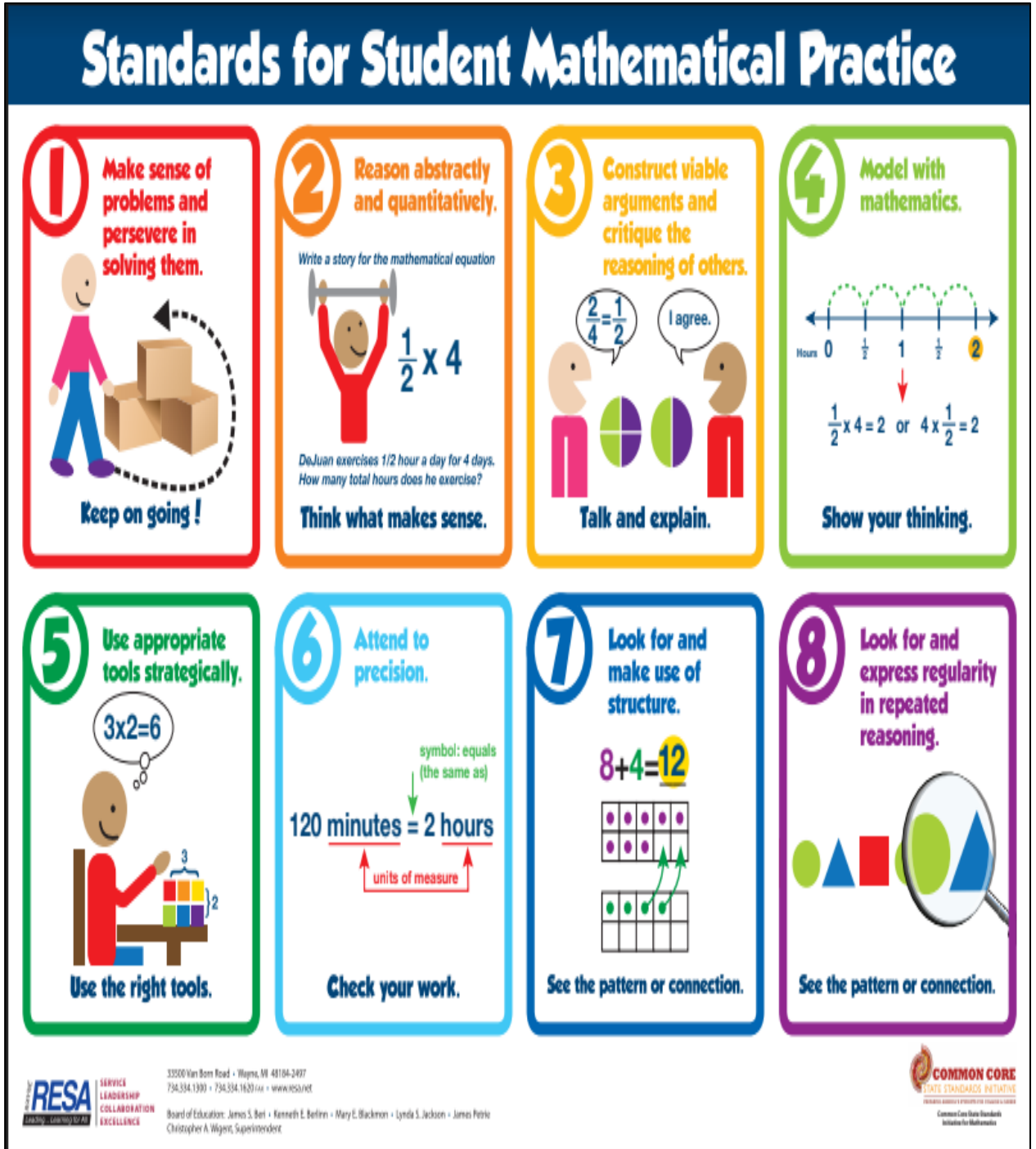
- How did you get that?
- How do you know that?
- Can you explain your idea?
- Why?
- Can you convince us?
- Did anyone get something else?
- Can someone tell me or share with me another way?
- Do you think that means the same things?
- Is there another opinion about this?
- Why did you say that, Justin?

Task Three -Fluency is Needed in Math

- "Fluency builds from initial exploration and discussion of number concepts to using informal reasoning strategies based on meanings and properties of the operations to the eventual use of general methods as tools in solving problems." *Principles to Actions* (NCTM, 2014, p. 42)

TASK TWO-Slides 4-15 give you many ideas and strategies for building stations or centers around Math.

1. Tell me about 2 slides that made you think about what you need to change in your math classroom.
2. Tell me why you chose those two slides.

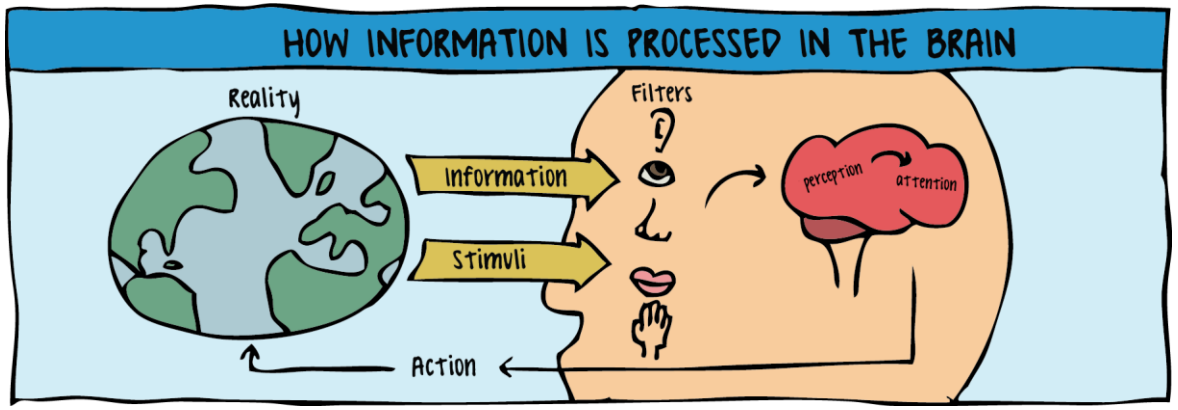


Give priority to the mathematical practices, including:

- problem solving, reasoning, and constructing viable arguments in every aspect of classroom practice—
- including teaching, assessment, curriculum decisions, and the use of tools and technology.
- Plan and implement units and lessons that promote positive dispositions toward the study of mathematics, including curiosity, self-confidence, flexibility, and perseverance.

Productive Struggle should:

- Be considered essential to learning mathematics with understanding;
- Develop students' capacity to persevere in the face of challenge; and
- Help students realize that they are capable of doing well in mathematics with effort.



***Evidence** should:*

- Provide a window into students' thinking;
- Help the teacher determine the extent to which students are reaching the math learning goals; and
- Make instructional decisions during the lesson and to prepare for subsequent lessons.

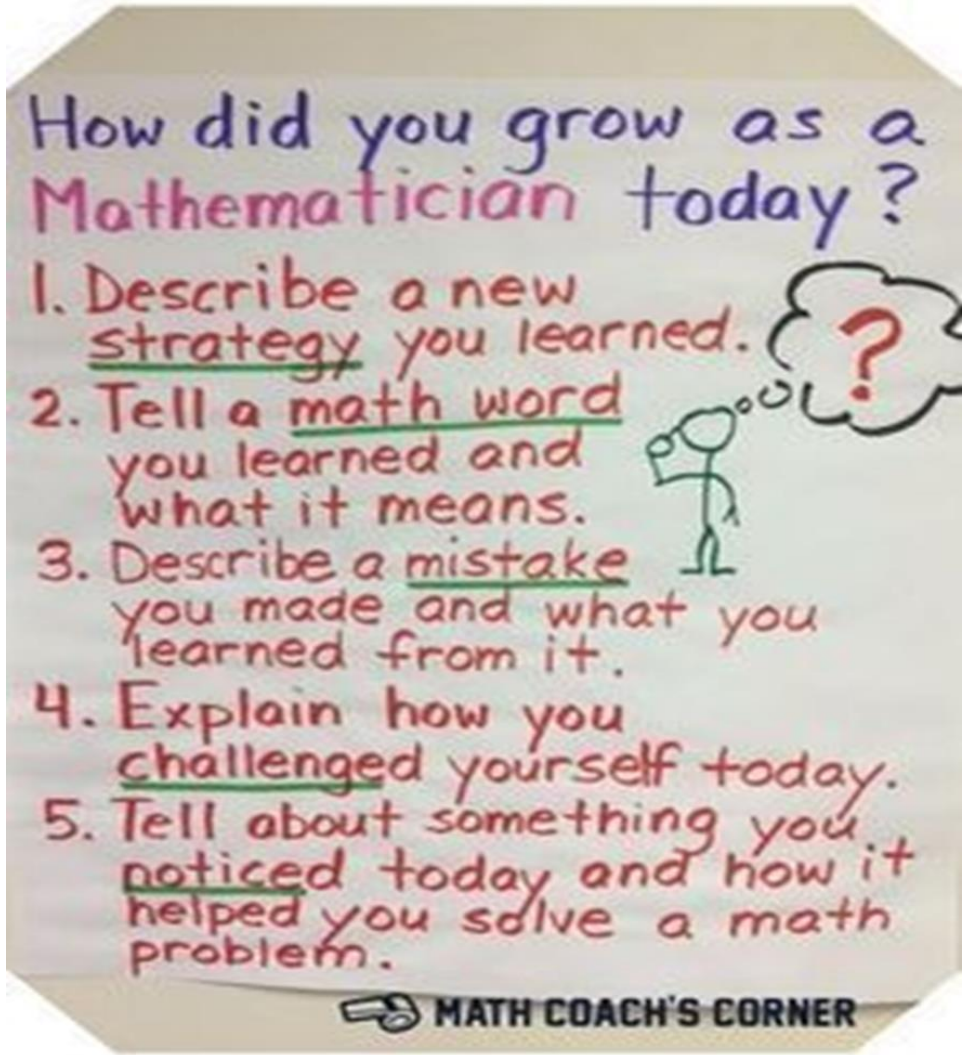
Principals, Coaches, Specialists, and Other School Leaders

- Make the eight Mathematics Teaching Practices a schoolwide focus that is expected for all teachers to
- Strengthen learning and teaching for all students, and provide professional development, training, and coaching to make the implementation of these practices a priority;
- Maintain a schoolwide culture with high expectations and a growth mindset; allocate time for teachers to collaborate in professional learning communities;
- Support improvement with multifaceted assessments used to monitor progress and inform changes to instruction;
- Make the mathematical success of every student a nonnegotiable priority.

Task Four -NEED TO KNOWS

- The last two slides have a lot of information on them.
- What did you read on the slides that you needed to know or be reminded of?
- Tell me why that NEED TO KNOW or REMINDER was important to you.

Question charts and Anchor Charts are helpful to students? Refer to them during math class.



Handout/Printable or file to use on projector/overhead to teach/review decimal operations

Rules of Decimals

Addition

> Find the decimal
> Line up the decimals
> Fill in empty spots with zero
> Add
> Bring down the decimal in your answer

EXAMPLE

10.5 + 11.74

Rewritten with decimals lined up...

$$\begin{array}{r} 10.50 \\ +\ 11.74 \\ \hline 22.24 \end{array}$$

Subtraction

> Find the decimal
> Line up the decimals
> Fill in empty spots with zero
> Subtract
> Bring down the decimal in your answer

EXAMPLE

12.7 - 9.23

Rewritten with decimals lined up...

$$\begin{array}{r} {\scriptstyle 6\ 10} \\ 12.\not{7}\not{0} \\ -\ 9.23 \\ \hline 3.47 \end{array}$$

Multiplication

> The number with most digits goes on top
> Decimals do not have to line up
> Multiply like normal
> Count how many places in first number the decimal is moved over
> Count how many places in 2nd number the decimal is moved over
> This is how many places you move the decimal in your answer

EXAMPLE

$$\begin{array}{r} 1.201 \quad \text{< 3 DECIMAL PLACES} \\ \times\ .25 \quad \text{< 2 DECIMAL PLACES} \\ \hline 6005 \\ 24020 \\ \hline .30025 \quad \text{< 5 DECIMAL PLACES} \end{array}$$

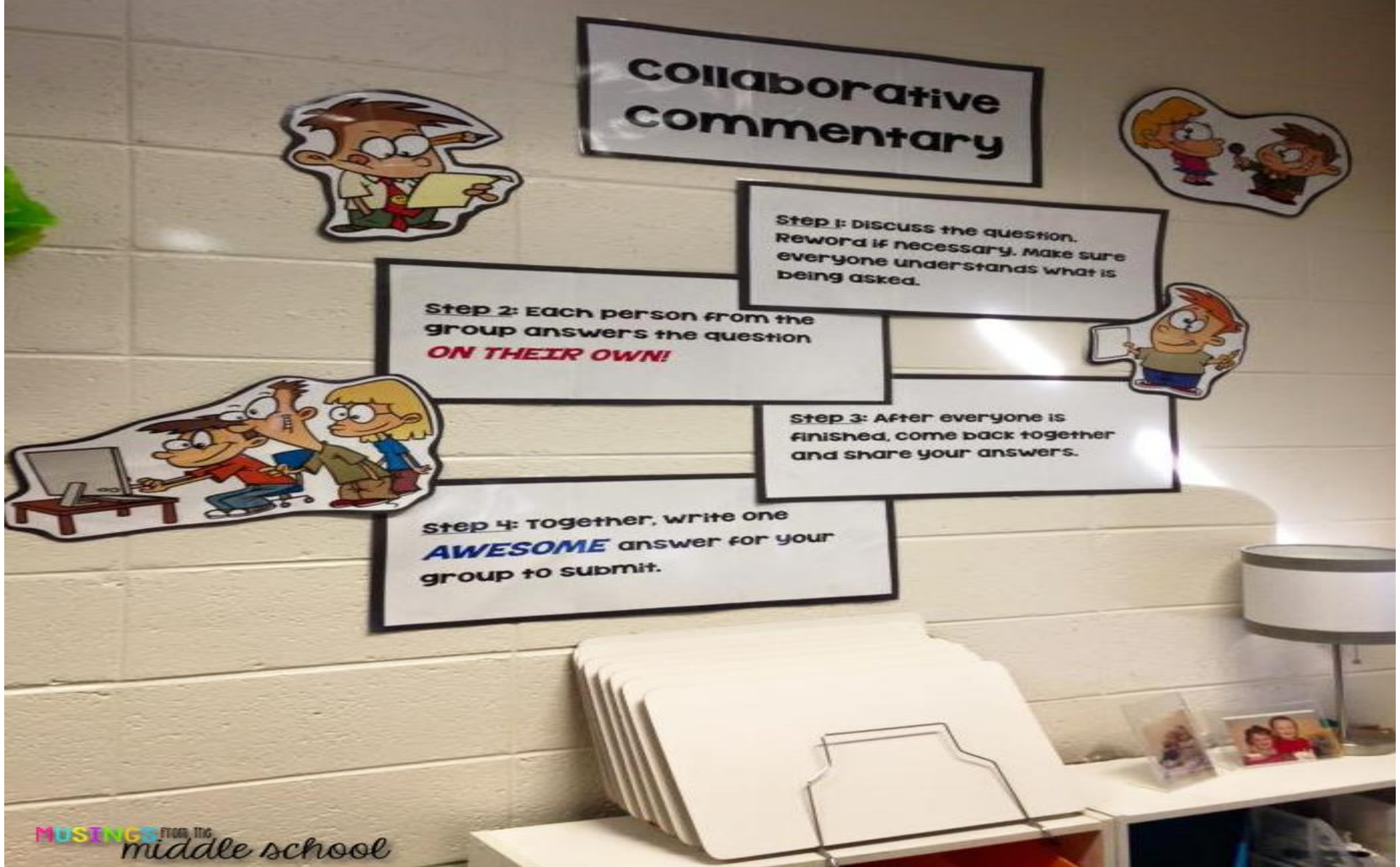
Division

> Divisor can not have a decimal
> Move the divisor decimal so it is a whole number
> Move the same amount of places in dividend
> Place a decimal straight up where you write your answer, rewrite problem
> Divide like normal

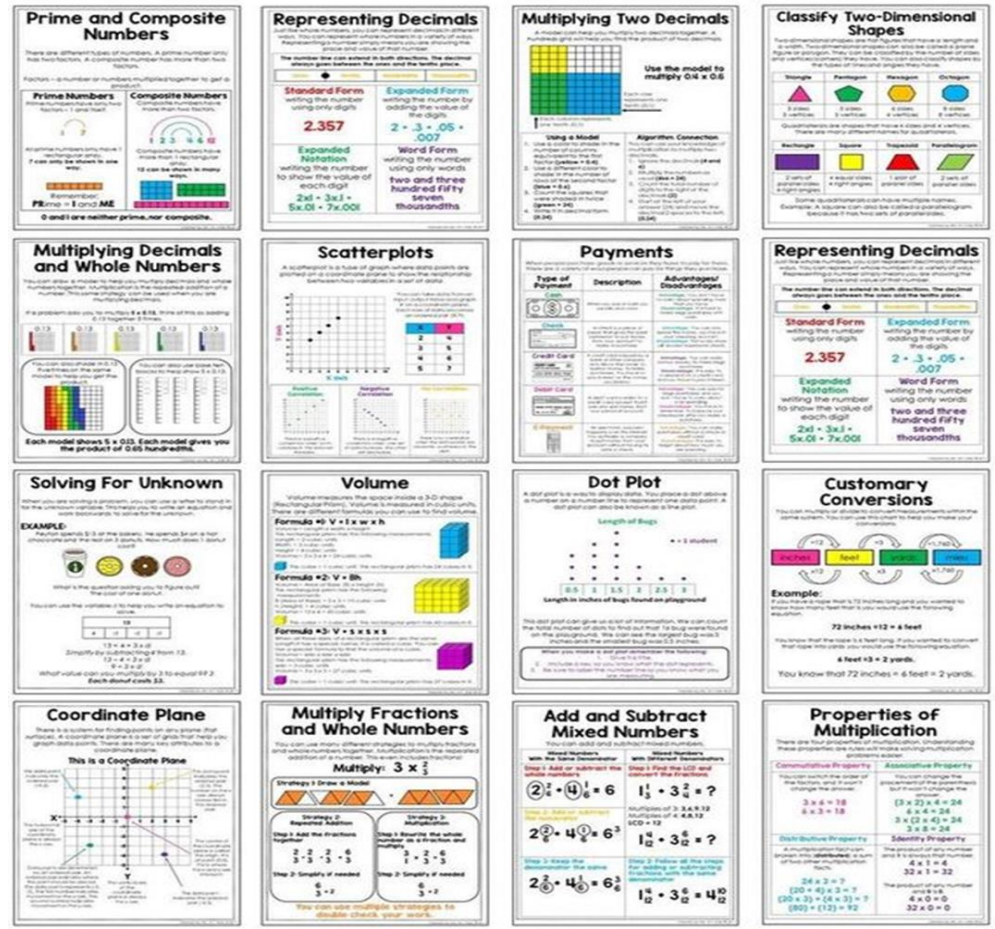
EXAMPLE

DIVISOR > $0.3\overline{)1.41}$

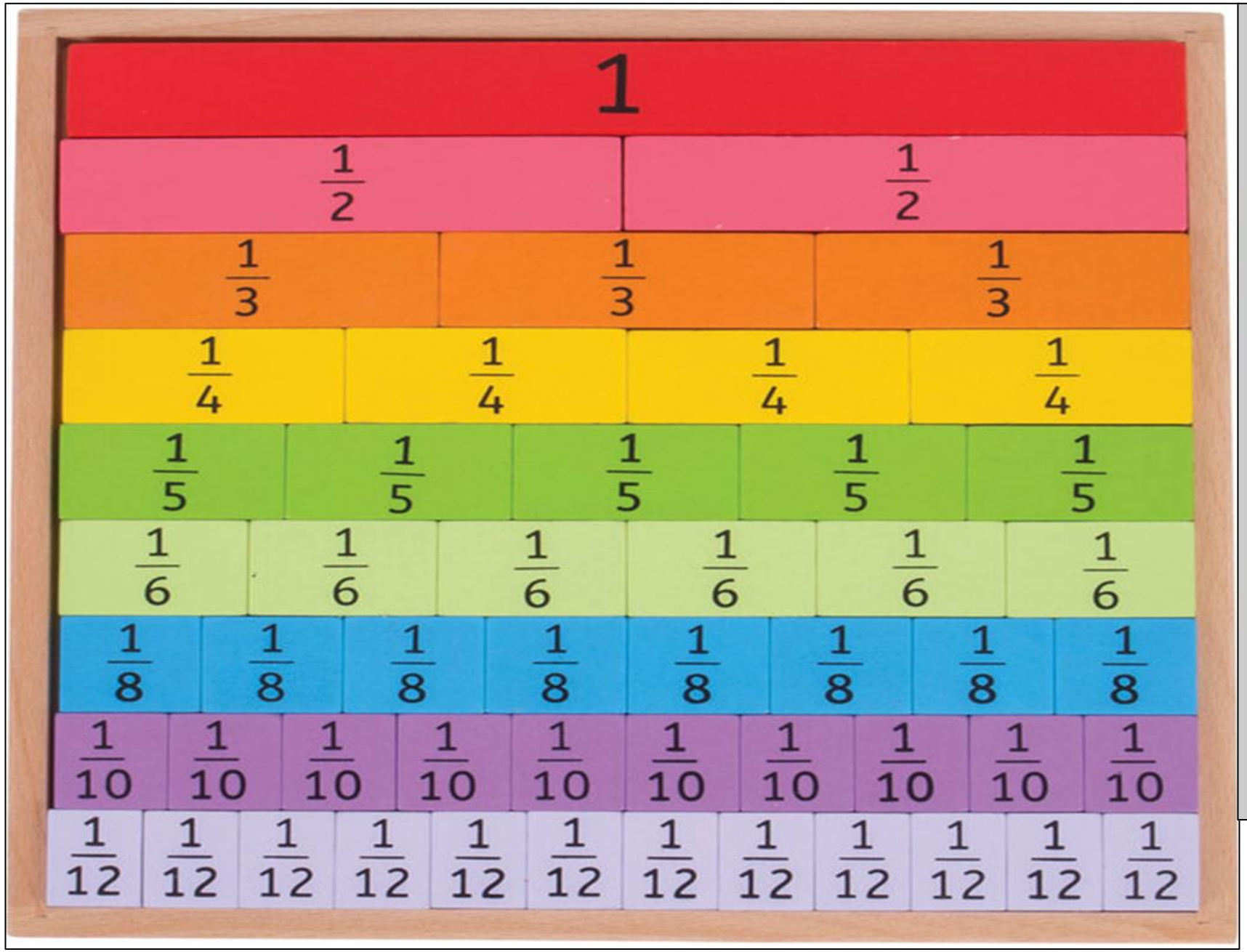
$$\begin{array}{r} 4.7 \\ 3\overline{)14.1} \\ -12 \\ \hline 21 \\ -21 \\ \hline 0 \end{array}$$


Collaborative Commentary
Step 1: Discuss the question. Reword if necessary. Make sure everyone understands what is being asked.
Step 2: Each person from the group answers the question ON THEIR OWN!
Step 3: After everyone is finished, come back together and share your answers.
Step 4: Together, write one AWESOME answer for your group to submit.
MUSINGS from the middle school

5th GRADE



MATH POSTERS


1
1/2 1/2
1/3 1/3 1/3
1/4 1/4 1/4 1/4
1/5 1/5 1/5 1/5 1/5
1/6 1/6 1/6 1/6 1/6 1/6
1/8 1/8 1/8 1/8 1/8 1/8 1/8 1/8
1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10 1/10
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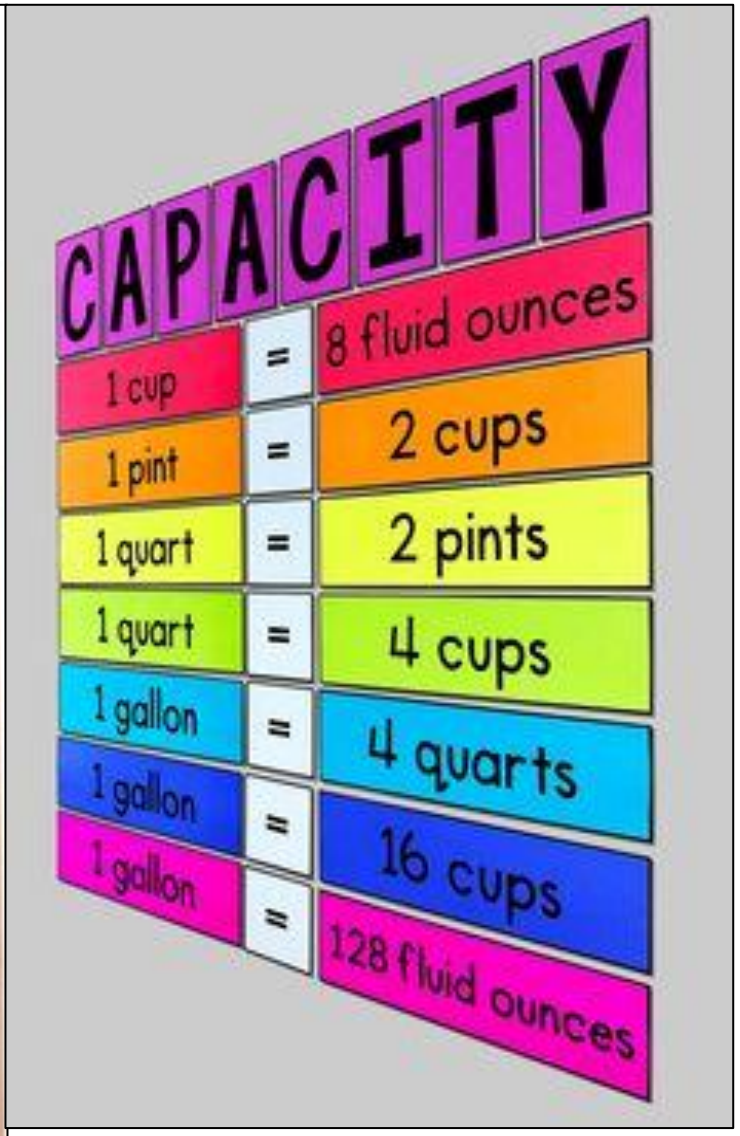
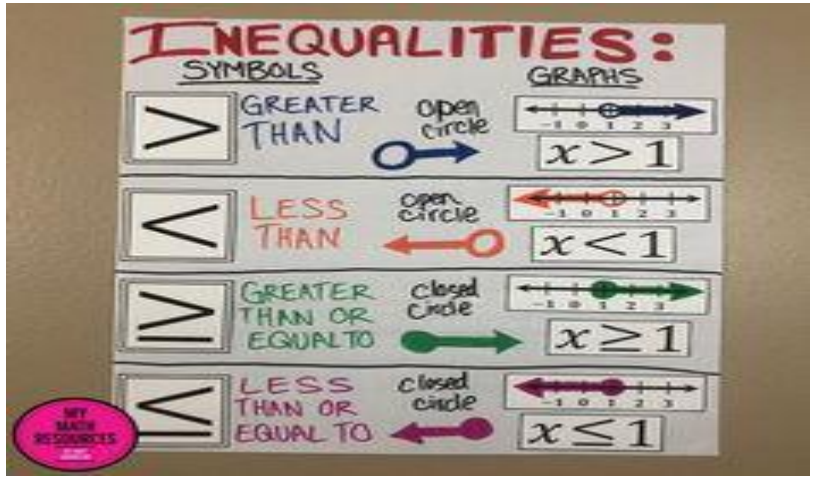
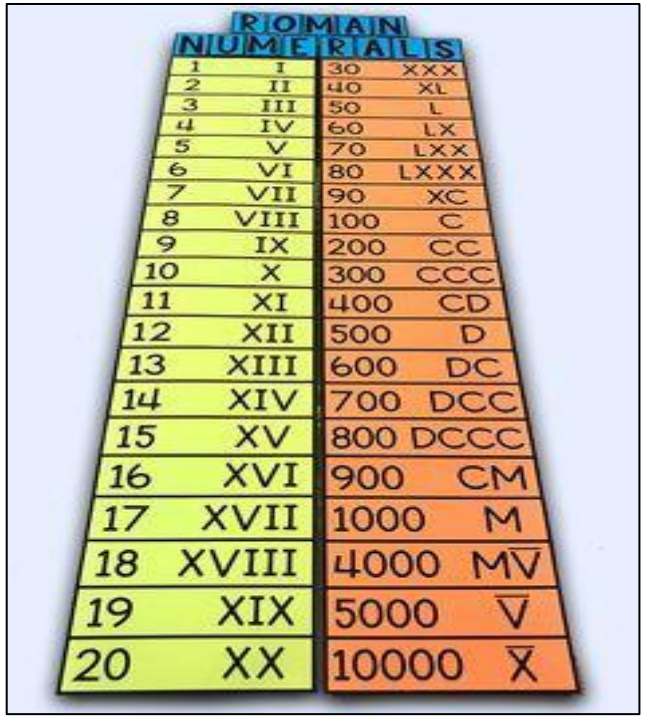
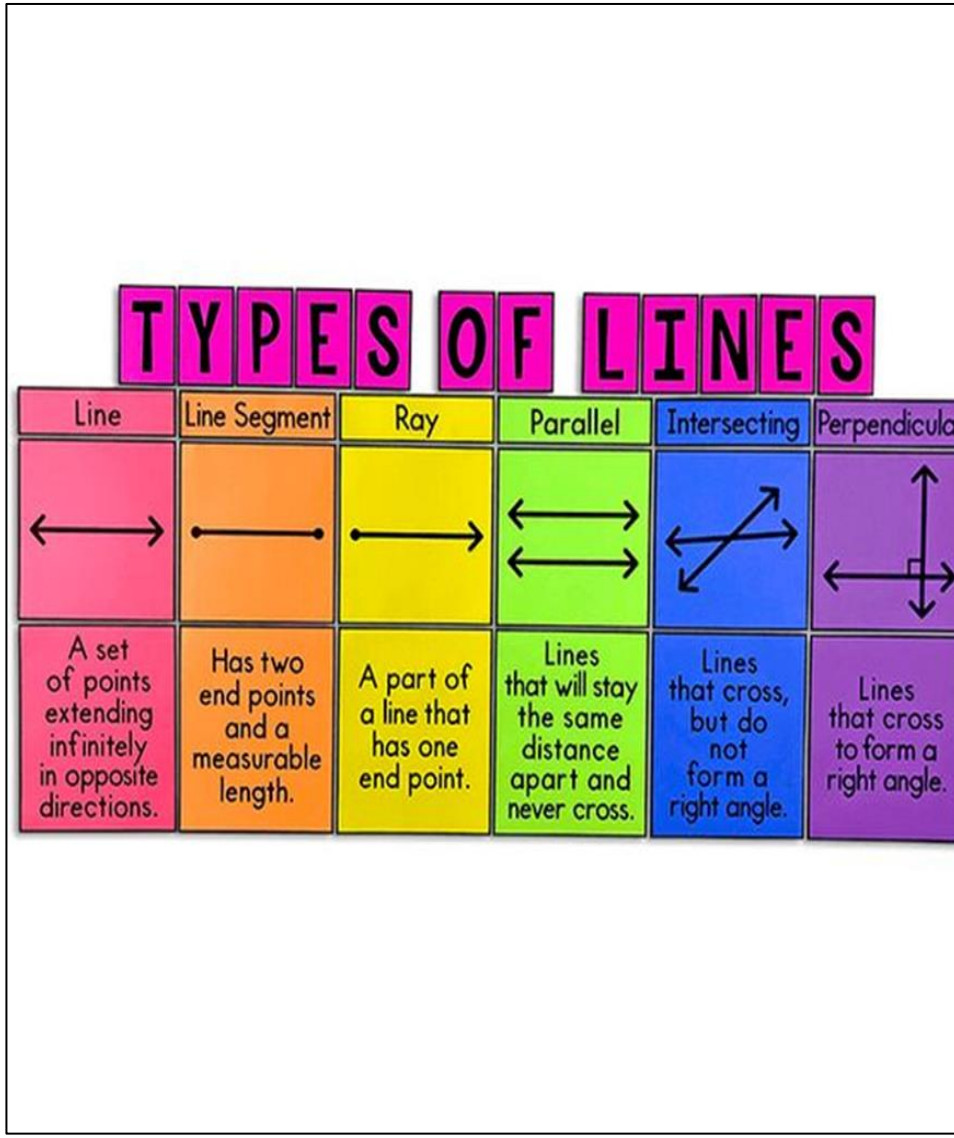
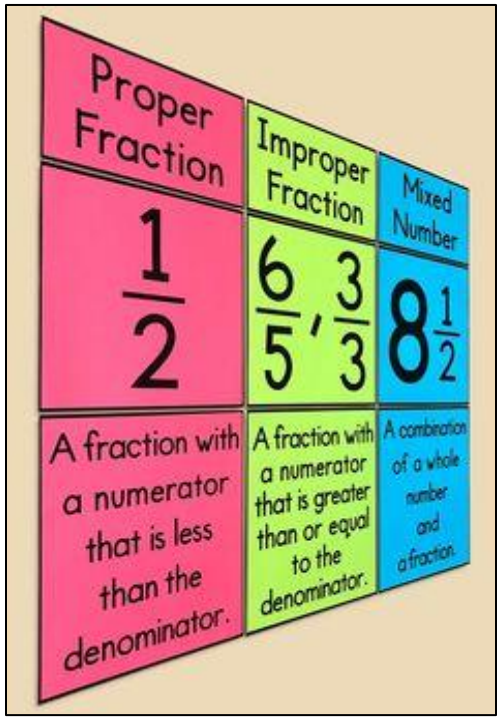

CAPACITY
1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 quart = 4 cups
1 gallon = 4 quarts
1 gallon = 16 cups
1 gallon = 128 fluid ounces

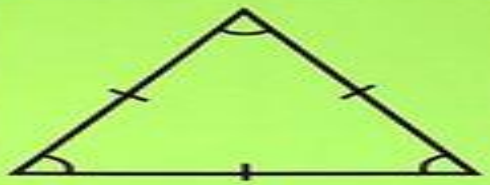
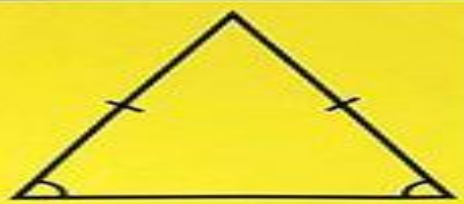

INEQUALITIES:
SYMBOLS
GRAPHS
GREATER THAN
open circle
$x > 1$
LESS THAN
open circle
$x < 1$
GREATER THAN OR EQUAL TO
closed circle
$x \geq 1$
LESS THAN OR EQUAL TO
closed circle
$x \leq 1$

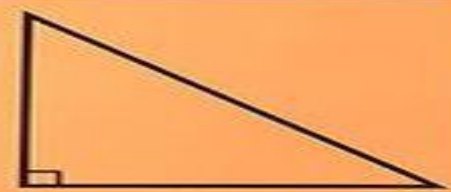

ROMAN NUMERALS
1 I
2 II
3 III
4 IV
5 V
6 VI
7 VII
8 VIII
9 IX
10 X
11 XI
12 XII
13 XIII
14 XIV
15 XV
16 XVI
17 XVII
18 XVIII
19 XIX
20 XX
30 XXX
40 XL
50 L
60 LX
70 LXX
80 LXXX
90 XC
100 C
200 CC
300 CCC
400 CD
500 D
600 DC
700 DCC
800 DCCC
900 CM
1000 M
4000 MV
5000 V
10000 X


TYPES OF LINES
Line
A set of points extending infinitely in opposite directions.
Line Segment
Has two end points and a measurable length.
Ray
A part of a line that has one end point.
Parallel
Lines that will stay the same distance apart and never cross.
Intersecting
Lines that cross, but do not form a right angle.
Perpendicular
Lines that cross to form a right angle.


Proper Fraction
$\frac{1}{2}$
A fraction with a numerator that is less than the denominator.
Improper Fraction
$\frac{6}{5}, \frac{3}{3}$
A fraction with a numerator that is greater than or equal to the denominator.
Mixed Number
$8\frac{1}{2}$
A combination of a whole number and a fraction.


COORDINATE PLANE
(x, y)
START AT THE ORIGIN (0,0)
CRAWL BEFORE YOU CLIMB
FIRST MOVE RIGHT
THEN MOVE UP
QUADRANT I
y-axis
x-axis
origin (0,0)
E(2,10)
H (7,9)
B(9,8)
J(0,7)
K (4,6)
D(6,6)
I (7,4)
A(2,4)
G (10,3)
F(3,1)
C(6,0)

Equilateral Triangle	Isosceles Triangle	Scalene Triangle
		
All three sides have the same length.	At least two sides have the same length.	All three sides have different lengths.

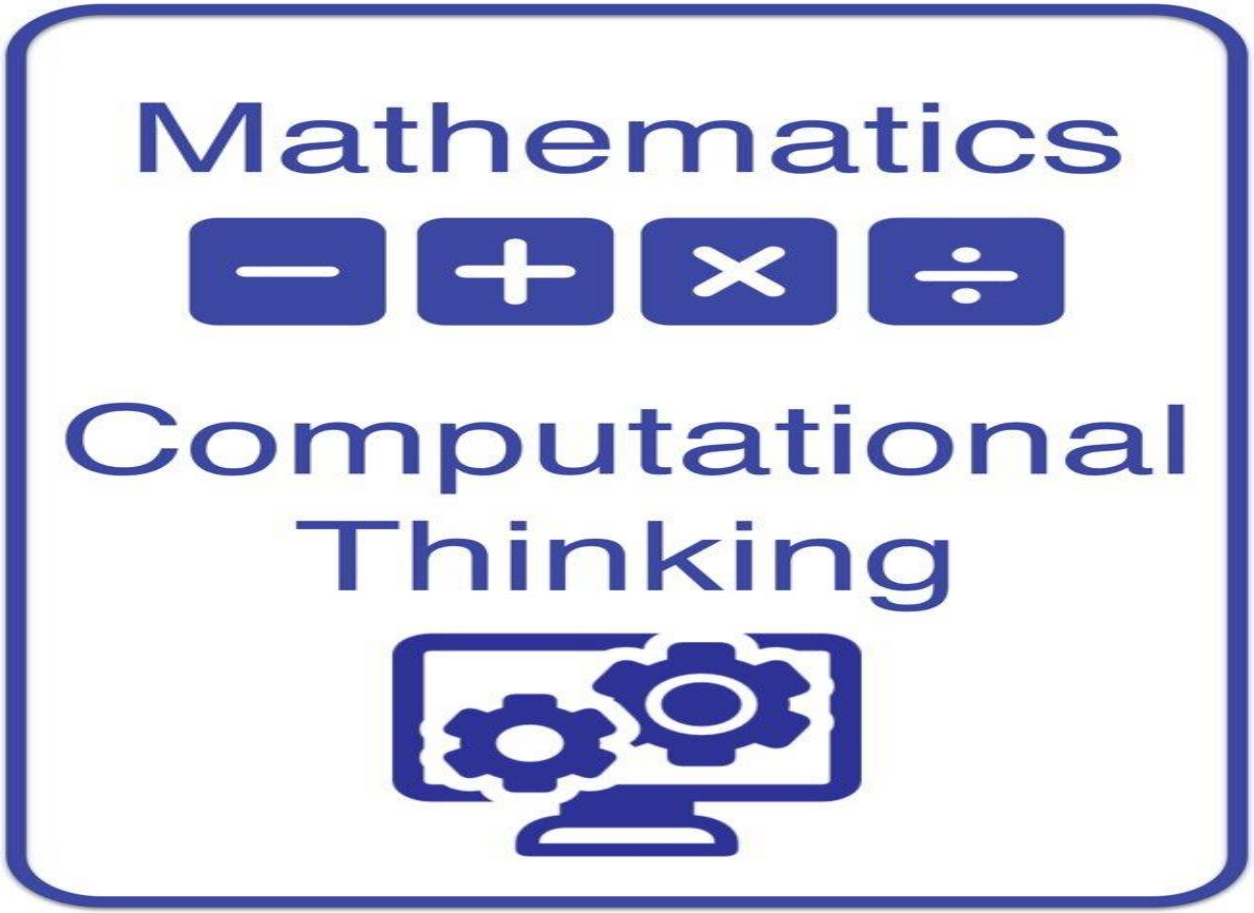
Acute Triangle	Right Triangle	Obtuse Triangle
		
All three angles measure less than 90°.	One angle measures exactly 90°.	One angle measures more than 90°.

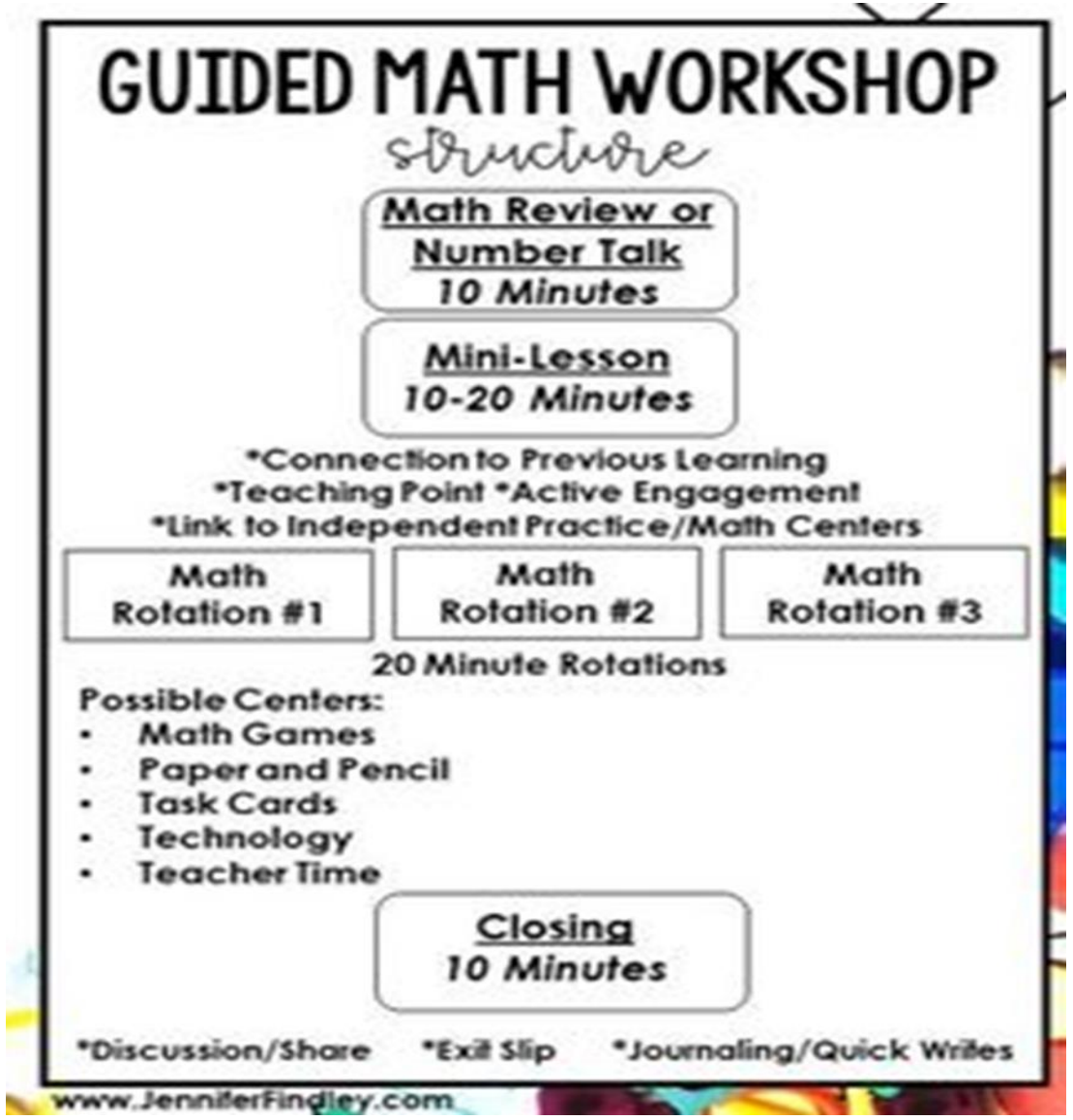
MEAN	MEDIAN	MODE	RANGE	OUTLIER
Average	Middle #	Most Often	Big – Small	Out There
Add all items. Then, divide by the total # of items.	Order #s from least to greatest. Identify the middle # (or the average of the 2 middle #s.)	Identify the number(s) that occur the most often.	Subtract the smallest value from the greatest value.	A value in a set that is very far away from the other values.
EXAMPLE:	EXAMPLE:	EXAMPLE:	EXAMPLE:	EXAMPLE:
3,6,2,8,2,3	1,7,9,3,8,5	2,6,2,9,2,6	1,1,7,6,9,4	1,1,3,11,3,1
3+6+2+8+2+3 = 24 $\frac{24}{6} = 4$	1, 3, 5, 7, 8, 9 6 $\frac{5+7}{2} = \frac{12}{2}$	2,2,2 6,6 9 3 times	Largest: 9 Smallest: 1 9 – 1 = 8	
Mean: 4	Median: 6	Mode: 2	Range: 8	Outlier: 11

3-Dimensional Geometric Shapes

Name	We See…	It looks like a….
 Cone	• Circle Base • A Point • Curve to connect	
 Cube	• 6 square faces • 8 vertices (corners)	
 Cylinder	• 2 circle bases • Big curve wrapped around	
 Sphere	• No flat areas • A ball	
 Pyramid	• 4 square base • 4 triangle faces	
 Rectangular Prism	• 2 sqare faces • 4 rectangle faces	

Planning is the Key to Successful Stations.

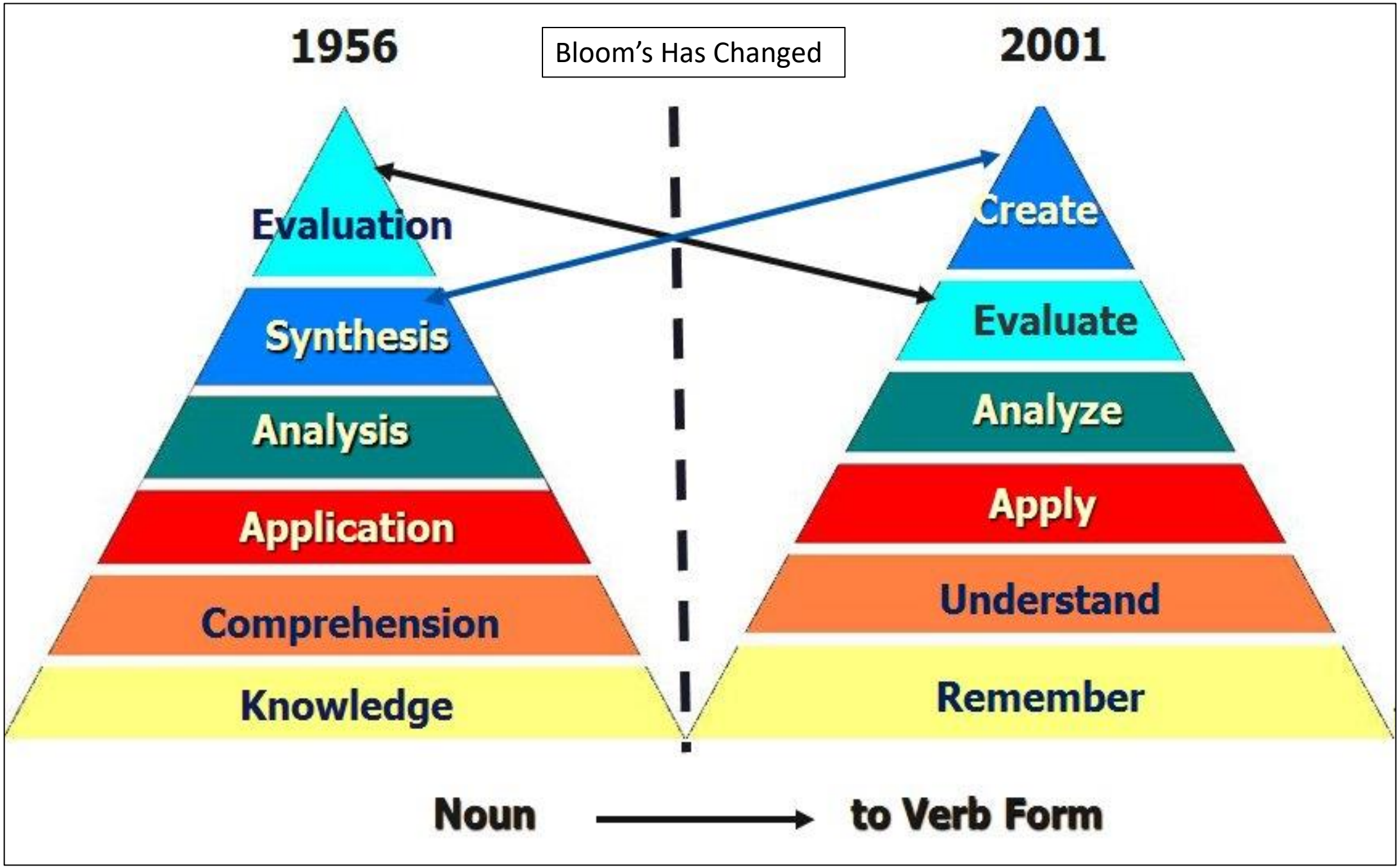




As you plan, think how you will ask the task questions.

Blooms, Webb's Depth of Knowledge, Costa's, Hess?????

- ❑ You can make tasks simpler or more challenging by how you ask the questions.
- ❑ Next slides will show you Blooms and Depth of Knowledge.
- ❑ Blooms you use within your instructional time.
- ❑ Depth of Knowledge you use when assessing if students are getting the gist of the standard.

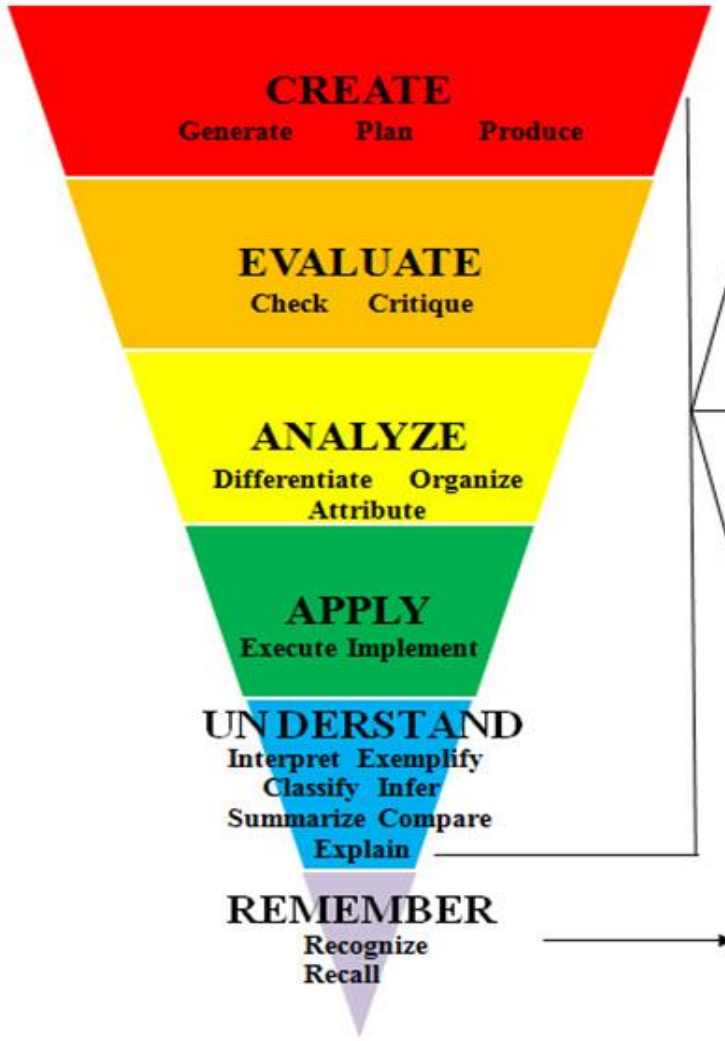

1956
Bloom's Has Changed
2001
Evaluation
Synthesis
Analysis
Application
Comprehension
Knowledge
Create
Evaluate
Analyze
Apply
Understand
Remember
Noun
to Verb Form

Leveling Questions
Is a part of Differentiation.

We want students to be successful and that may mean leveling questions and moving students up the inverted pyramid of Blooms or Using Webb's Depth Of Knowledge with Blooms.

Asking better questions inside small groups and in individual or group work makes a difference in learning.

BLOOMS for Instruction



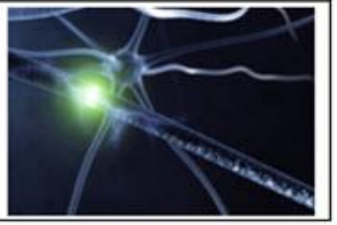
DOK for Assessment

Level 4: Extended Reasoning
More than 1 answer is possible
Time is required to process the response
Applying information in a new context
Complex reasoning and planning
Multiple steps
Cross-curricular
Real-world connection
GENERALIZE

Level 3: Strategic Reasoning
More than 1 answer is possible
Applying information in a new context
Reasoning is necessary
Planning is involved
Complex thinking
Abstract thinking
Support provided to explain or defend response
CONCLUDE - PRESENT EVIDENCE - EXPLAIN
ARGUE A POSITION - JUSTIFY

Level 2: Skill or Conceptual Understanding
1 right answer
Apply the skill or concept
Focus on relationships by comparing or cause-effect
Explain how or why
Make a decision – estimate
Interpret information
CLASSIFY – ORGANIZE – ESTIMATE – OBSERVE
EXPLAIN – DESCRIBE – INTERPRET – COLLECT
DISPLAY DATA – COMPARE DATA

Level 1: Recall
1 right answer
Definitions
Details
Facts
Routine
IDENTIFY – RECALL – RECOGNIZE – USE -
CALCULATE – MEASURE (describe, explain)



The Hess Cognitive Rigor Matrix: Applies Webb's DOK to Bloom's Cognitive Process Dimensions

Depth + thinking	Level 1 Recall & Reproduction	Level 2 Skills & Concepts	Level 3 Strategic Thinking/ Reasoning	Level 4 Extended Thinking
Remember	-Recall, locate basic facts, details, events	Not appropriate at this level		
Understand	-Select appropriate words to use when intended meaning is clearly evident	-Specify or explain relationships -summarize -identify central idea	-Explain, generalize, or connect ideas using supporting evidence (quote, example…)	-Explain how concepts or ideas specifically relate to other content domains or concepts
Apply	-Use language structure (pre/suffix) or word relationships (synonym/antonym) to determine meaning	-Use context to identify meaning of word -Obtain and interpret information using text features	-Use concepts to solve non-routine problems	-Devise an approach among many alternatives to research a novel problem
Analyze	-Identify whether information is contained in a graph, table, etc.	-Compare literary elements, terms, facts, events -analyze format, organization, & text structures	-Analyze or interpret author's craft (literary devices, viewpoint, or potential bias) to critique a text	-Analyze multiple sources -Analyze complex/abstract themes
Evaluate			-Cite evidence and develop a logical argument for conjectures	-Evaluate relevancy, accuracy, & completeness of information
Create	-Brainstorm ideas about a topic	-Generate conjectures based on observations or prior knowledge	-Synthesize information within one source or text	-Synthesize information across multiple sources or texts

What questions are you asking inside your classrooms?
What questions will you put inside the stations or centers?

LEVELED Math Questions

No matter what level your student is currently on, help guide him/her by using these questions:

CHECK FOR ACCURACY
You KNOW the student understands

1. Would that work if you didn't use that method?
2. Can you create and solve a problem similar to this one?
3. Can you make a model to show that?
4. Can you use a different method to show your thinking?

CHECK FOR UNDERSTANDING
You THINK the student may be confused

1. What do you need to find out?
2. How would you describe this problem in your own words?
3. What pieces of this problem make sense and which pieces are you confused by?
4. Could you try this with simpler numbers?
5. Have you tried blocks or pictures?

GIVING CLARITY
You KNOW the student is confused

1. Which words are important?
2. Where do you think we should start?
3. What is the goal of this problem?
4. Can you explain the steps you think we should take?
5. How can your group members help you? Drawing it? Talking it out?

PROVE IT Questions

Ok, so your student got an answer – ask these questions to push his/her thinking:

Can you explain that?
What is the support for your thinking?
What are the mathematical concepts here?
How can you prove that...?
Can you give evidence that supports that?

What are some big ideas shown here?
Make that more clear to me.
Tell me how you arrived at that conclusion.
Why would you do that?
What did you do to find yourself doing that?

EVEN MORE QUICK, EASY, CHEAP AND FUN STUDENT ENGAGEMENT

IDEAS ARE ON MY WEBSITE: @teachheath

QUALITY QUESTIONS

3rd Grade - 5th Grade

INSTEAD OF ASKING...	CONSIDER ASKING...
Topic: Place Value What place does the 4 hold in the number 547?	A three-digit number contains exactly one 4 in the tens place. What might the number be?
Topic: Multiplication Solve: 30 x 5 = ____	Two numbers multiply to make 150. What might the numbers be? Show all possible solutions.
Topic: Addition What is the sum of 359 + 648?	John solved the following question. He believes the sum is correct. Do you agree or disagree? Explain. 359 + 648 = 9,917
Topic: Area What is the area a rectangle with a length of 6 inches and a width of 4 inches?	Draw as many rectangles as you can with an area of 24 square inches. Label the dimensions of each rectangle.
Topic: Fractions Solve the problem below: $\frac{4}{3} - \frac{2}{3} =$	The answer is $\frac{2}{3}$. What is the question?

Leveling Questions is a part of Differentiation

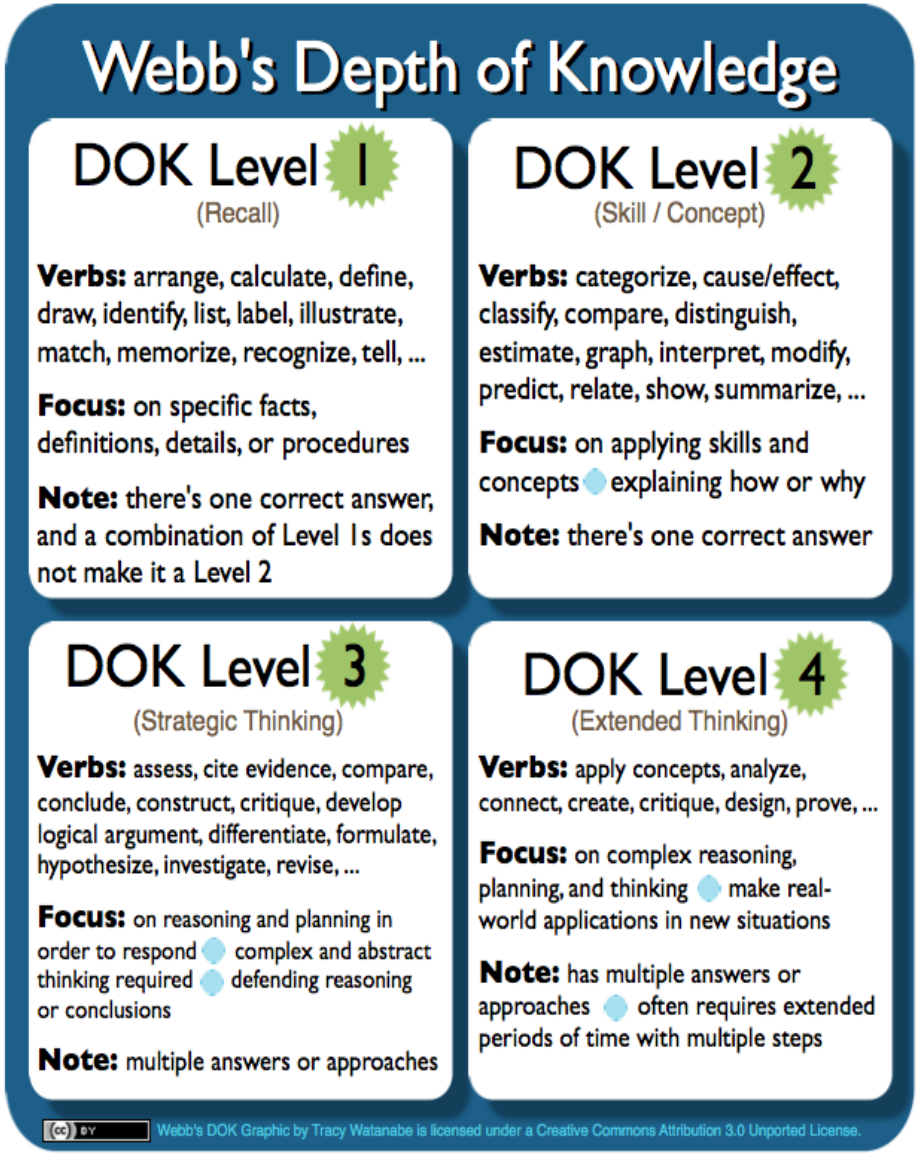
Level 1 –Recall and Remember are a type or Right There Question.

Level 2 - Apply and Analyze are asking students to Use the Content to implement in some way or analyze it in some way.

Level 3 –Evaluate and Create takes the students into using Level 1 and 2 to create or evaluate the content in another way.

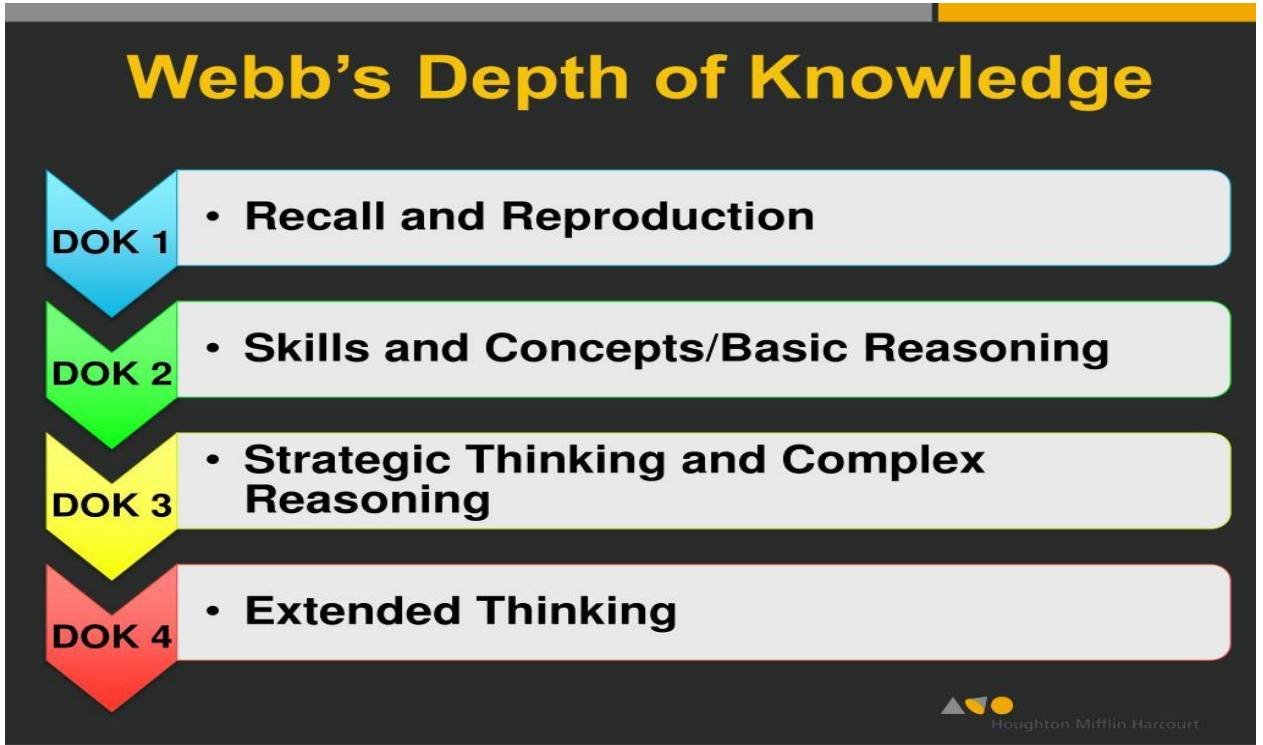
Use them as you formatively assess students and find out where they are at in the learning process of a standard. Struggling students may get to Level 2 quickly and Gifted students may still struggle with Level 2 questions. It depends on the formative data you gather.

Using DOK for Assessment Questions



Using these levels to assess students will be helpful in knowing where they are in the learning process and if reteaching is needed.

These can be leveled also. The goal is to get them to Extended Thinking. Level 4. If they get to that level 3 or 4, they have mastered the standard or are getting close.



Task Five –Questioning and Leveling with ???'s

The previous slides were on questioning.

Was there any new information that you gleaned from those slides?

Tell me what, if any, you took away from the Questioning Part of this training.

Why Workstations????

Data will decide what centers are needed and what levels

- They differentiate for all learners
- They give **authentic practice** for concepts learned
- They allow a teacher time to work with small groups
- They are meaningful, aligned to classroom learning
- They are teacher directed by what data tells the teacher
- They allow students interaction and hands on
- **Stations can provide time for practice, preview, review, collaboration, choice work time, and small group or individual teacher time.**

Workstations must be…

- Explicitly taught and modeled
- Set up for accountability
- **Set up with a purpose**
- Set up for accessibility for all students
- Set up to be interactive
- Set up so the teacher can easily change out pieces for novelty
- Aligned to what is being taught or reviewed.

Tip #1: Set procedures and expectations

Resource/Adapted https://ditchthattextbook.com/learning-stations-in-middle-school/
JamesHunt hyperlink above shows all of these examples.
Just remember, these tips are good for all age groups.

This may seem like a no-brainer, but **clear expectations** should be set, **modeled, and practiced before implementing stations** in the classroom. When students reach **middle school, they crave the same autonomy that teachers do.** Have them **help you set up the expectations that must be followed during stations! This will help develop a more meaningful approach** to implementing stations in the classroom.

- What should we do if we are stuck on a problem or question?
- How should we rotate through our stations? Should we wait for a timer or move on to the next station as each individual is ready?
- How should we treat each other and the materials used in the classroom?
- What should we do if we finish a station early?

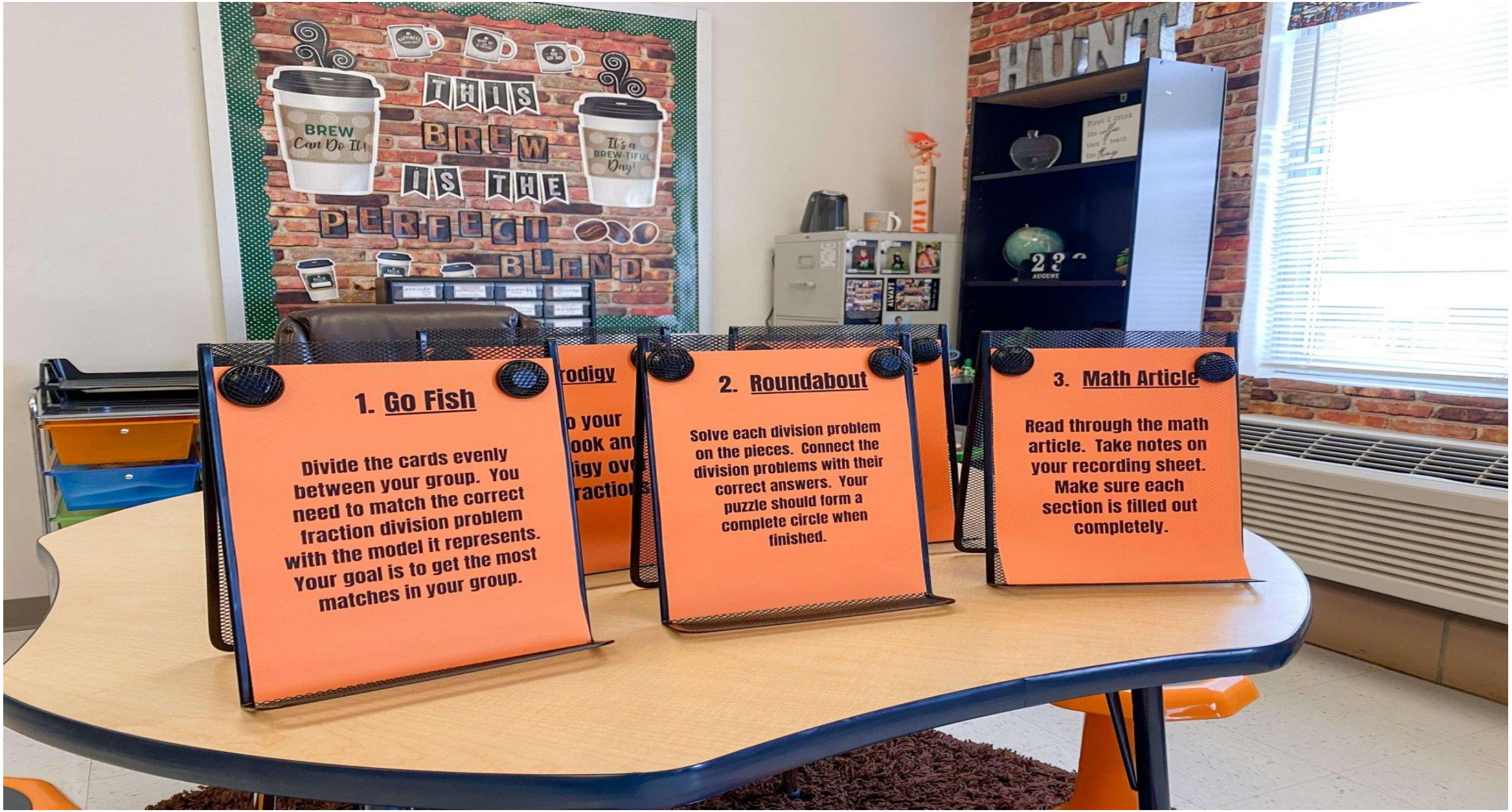
All of these are examples of how to set meaningful boundaries the class must follow during stations to make sure you are getting the most impact out of your time.

Tip #2: Give clear activity instructions

https://ditchthattextbook.com/learning-stations-in-middle-school/

Spend time explaining activity instructions for each station. Your students aren't going to remember what to do by the 3rd, 4th, or 5th station if all of the directions are explained at the beginning. Providing multiple avenues for students to see and hear activity directions will alleviate off-task behaviors at each station.

- Learners may **need visual reminders**. Charts, google slides etc., to give reminders-Group names can be a fun thing!
- **Have the instructions printed out at each station**. These instructions are printed on heavy paper or can be magnetized to paper holders for easy display options. This keeps the, "Now what do I do?" question at bay. Mr. Hunt has a place to order these.



This is how Mr. Hunt uses the paper holders

Tip #3: Be over-prepared

- When preparing stations, it's important to **have a backup plan**. We plan awesome lessons and activities and students can finish quickly. With stations, **students are "on their own" with you as their guide on the side.** End station instructions with, **"If you finish early, get on** _____ until it's time to switch." This way their minds are constantly busy. **This is so important. What do we do when we are through?**

- Supplies that are easily ready……
  - Store worksheets on your whiteboard using magnetic paper holders.
  - Have additional papers needed stored in a folder at that station so they can grab what they need and get started!
  - Keep all supplies needed for each station in a tub or bin that's easy to move and store. Keeps everyone on task.

Tip #4: Assure smooth transitions

Transitions are a major part of stations. Tie in some open-ended questions that students can be solving while moving to the next station.

Make sure **all activities can be completed on one page**. They will **carry the same paper with them throughout the entire rotation; no papers left behind**, easy accountability. Even if nothing can be written down in that section, make sure it's on there!

- **How will your kids move from one activity to another when time to switch? Timer, music, some other sound???**
- **https://www.online-stopwatch.com/ lots of different timers on this page.**

TIP # 5 from Mr. Hunt and Me

Always have a teacher station so students can work with the teacher on areas of weakness.

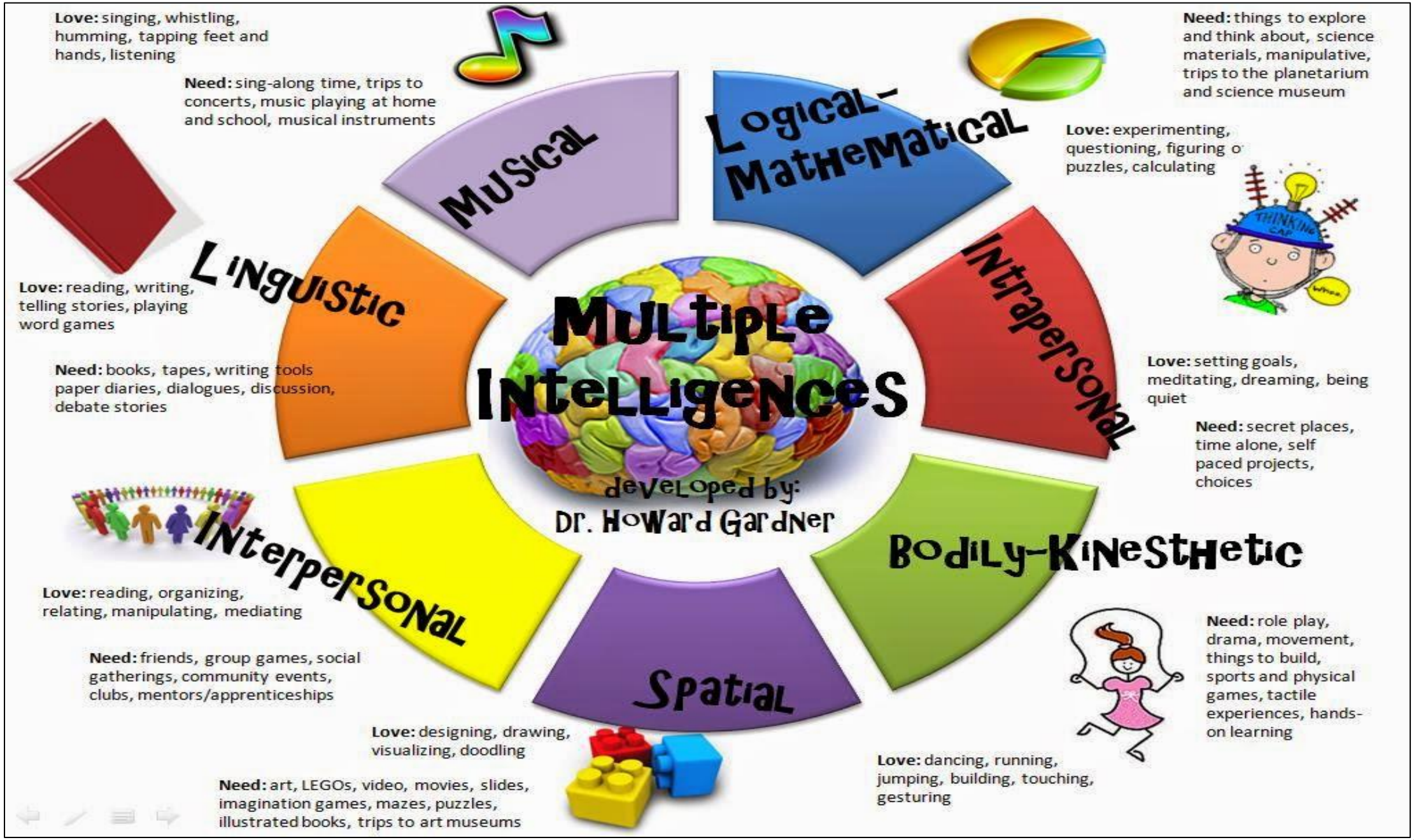
You will Actively seek less chaos

Don't make stations more frustrating for you, otherwise you will never want to use them again! Have a **after station discussion on what went right and what went wrong.**

Know your kids.

What do they need in order to be successful?

If you try something and it doesn't work, gather some feedback and don't give up!



Include some of them in your stations.

Accountability or mastery is what the teacher is going to grade or analyze.

The PRODUCT is what they turn in for feedback.

Products can be set up by the MENU LIST so that all types of learners have a chance to complete something they can have success with.

Products can be set up to challenge the gifted and give extra practice for the at risk student.

Products are showing that you understand what the center is all about and you get the gist of the concept or problem.

Products can be linked to learning styles.

PRODUCTS

KINESTHETIC	ORAL
Demonstration Diorama Display Mobile Model 3D Model Drawing Relief Map	Audio recording Debate Presentation Documentary Lecture Video Commentator Interview Radio/TV show Speech
VISUAL	**WRITTEN**
Brochure Chart Cross section Graph Poster Cartoon Puppet Timeline Power Point	Booklet Critique Summary Essay ABC Thesaurus magazine Newspaper Profile Twitter

Menu Examples

Math Differentiation Menu – Multiplication & Division

Sing Along Create a song or a rap to help your classmates remember the difference between composite and prime numbers.	**Power Point** Create a PowerPoint Presentation that explains how to multiply and divide decimals.	**Story Problem** Create a story problem for each of the following number sentences: .37 x 46 = _____ 62 x 48 = _____ .45 x 6 = _____ 29 x 51 = _____ Include the solution and show your work.
Multiples Using a deck of cards, turn over any card from the deck and write the multiples for that number. Cards 2-10 are their own value. Ace=11, Jack=12, Queen=13, King=14	***Free Choice*** (Create a plan that includes a detailed description of the following: specific idea or topic, product, material's needed. Present it to your teacher and get approval before starting)	**Test It Out** Create 2 division and 2 multiplication word problems to be used on an assessment. One of the division problems must involve interpreting the remainder.
Gardening Array A gardener is trying to plant 60 rose bushes. Using graph paper, show all the ways she could plant the rose bushes. Label and color your array.	**Poster** Design an instructional poster that shows the different strategies for solving multiplication problems. (traditional, bow tie, window/box, partial products)	**Book Cover** Design a book cover for a book about using multiplication and division in our everyday lives.

Tic-Tac-Toe Menu

Name_____ Bell_____ Date_____

Directions: Choose activities in a tic-tac-toe design. When you have completed the activities in a row–horizontally, vertically, or diagonally–you may decide to be finished. Or you may decide to keep going and complete more activities.

I choose activities # _____, # _____, and # _____

Do you have ideas for alternate activities you'd like to do instead? Talk them over with your teacher and write an explanation below.

I prefer to do the following alternate activities:

_____

_____

1. Write activity 1 here. (Knowledge)	2. Write activity 2 here. (Analysis)	3. Write activity 3 here. (Synthesis)
4. Write activity 4 here. (Application)	5. Write activity 5 here. (Evaluation)	6. Write activity 6 here. (Comprehension)

Name _____ Date _____

Place Value, Numbers, and Operations Choice Board

Complete a row, column, diagonal, or the four corners. You may complete this choice board in any order. The "Free Choice" space allows you to submit a suggestion to Ms. Routt for approval.

Create a crossword puzzle using the Discovery Education website on the computer. (See the back for details.)	Complete cards 11-20 of a Marcy Cook Math Tiling Tasks bag. (Attach the tracking sheet to your choice board.)	Create a War-style card game using index cards. (See the back for details.)
Create a colorful board game with word problems to practice a skill. (See the back for details.)	**Free Choice** _____	Complete a puzzle from the puzzle box. (Attach the puzzle to your choice board.)
Complete one set of AIMS Education "Blockout Puzzles". (Attach the puzzles to your choice board.)	Create an "I Have, Who Has" game that allows everyone to participate. (See the back for details.)	Complete cards 1-10 of a Marcy Cook Math Tiling Tasks bag. (Attach the tracking sheet to your choice board.)

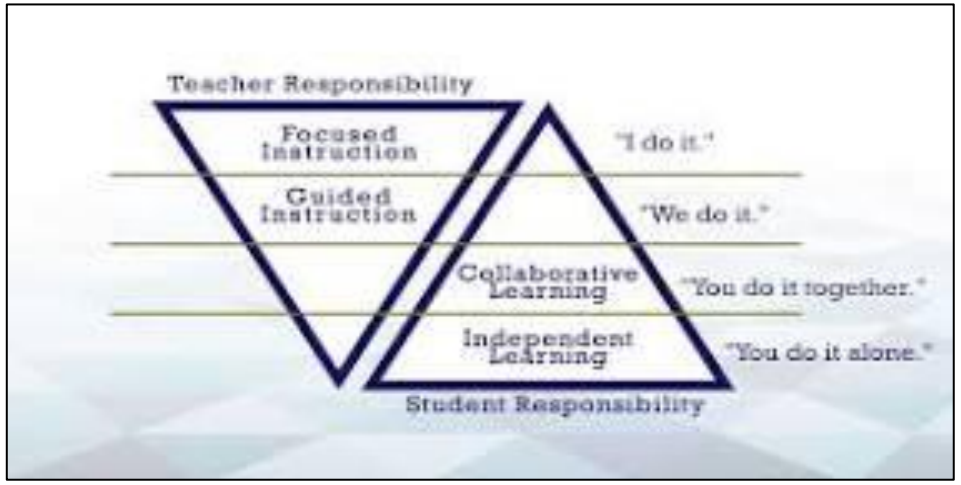
Training For ALL Students

Train by **Modeling the Station**

- Take students through the directions and teacher expectations at the center
- Rubric for reference while working
- Material use and clean up after

Authentic practice that connects to learning or building background knowledge for a new learning experience.

Teacher needs to take time to **have a teacher center where students can be supported in areas of weakness.**



Modeling a Center

- Circle up with students around the center.
- Explain the purpose of the center

Model Behavior

  - Have students come up with the rules they deem appropriate-Let them work with a partner.
  - **Let them choose what a product should look like and <u>then complete a rubric from mastered to not yet</u>..**

- Have 1 or 2 students demonstrate the center inside the circle.
- Observe station in action
- Make adjustments after the debrief circle. This circle asks the question, "How did it go today?" Let students voice their opinions with suggestions. Very Important to Do
- Review Rules and the rubric often.

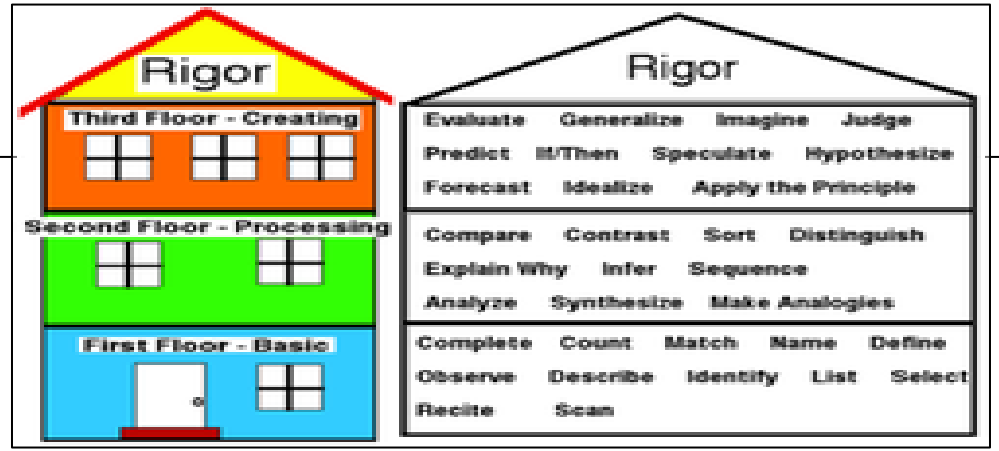
Rubric Template- https://www.teach-nology.com/web_tools/rubrics/math/

Students should build their own rubrics for the products you plan for them.

Description	Good Product 3	Average Product 2	Not Yet 1

When you make a rubric with students it will depend on what the rubric will judge.

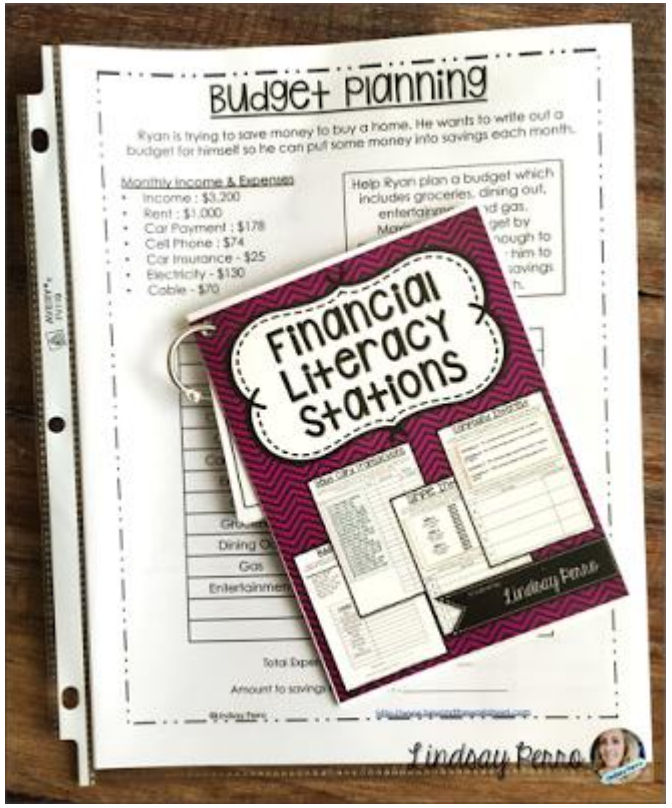
1. If it is a product for a center, it will depend what it the product is.
   - ELA –written, spoken, or performed
   - Tactile Product-Build, Restore, Rework, Create
   - Could use Blooms as criteria :**remembering, understanding, applying, analyzing, evaluating, and creating**
   - **Could use Costas Rigor**

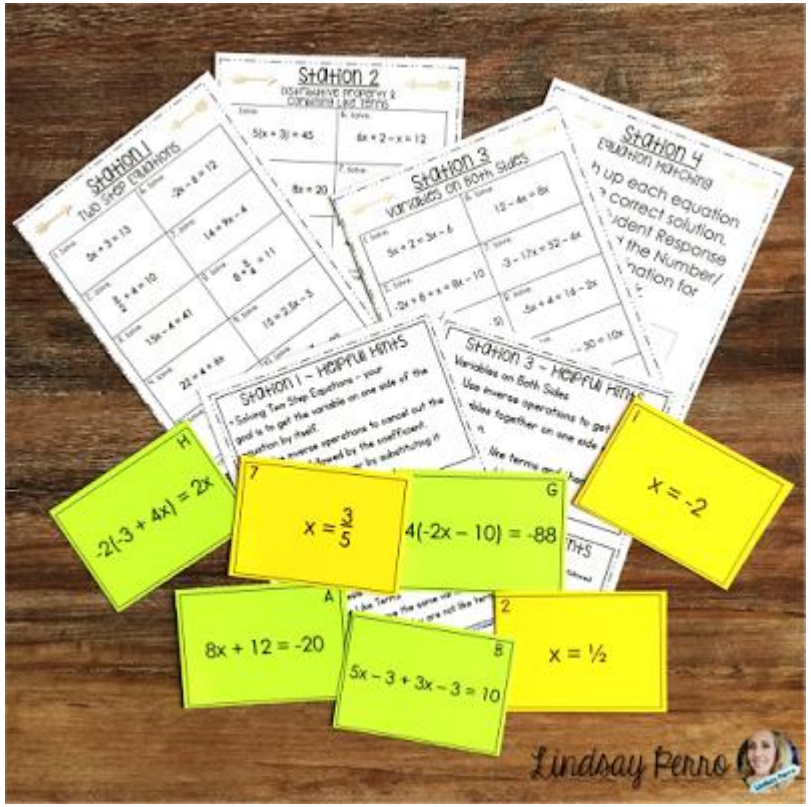


It will depend on what mastery product you choose.

Task Six Why Model?

- Why do we need to model a station instead of just putting it out and seeing what the students do with it?

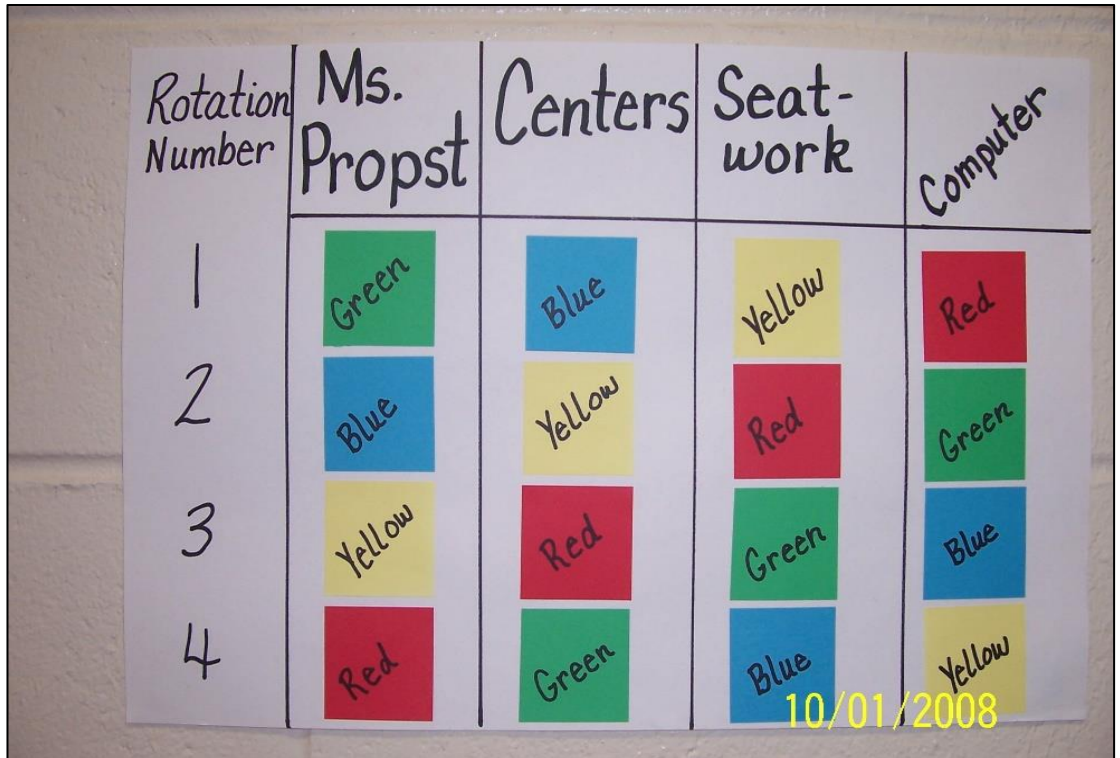




Scheduling the Centers

- **Pocket Chart with Pictures- Elementary**
- **Work Board with Stations with symbols and students names** next to the symbols-elementary or Spec. Ed.
- **Round pie divided into centers** with clothespins names of students attached to the part of the pie they are to go to for their work that day –elementary
- **Pictures of students and Pictures of Centers-** Students put their picture on the center they want to work at-Teacher decides how many times a student can work at each center-Elementary
- **Older students** may be open to **choosing a center or teacher may have sticky notes that have groups of names on them** already for each class or use them for students who finish work quickly.
- **Some MS/HS teachers** have areas that can be set up for students and the sticky notes or group names can be used.

If you use more than one or two centers a day…



CREATING GROUPS
- group by need/skill
- group by interest
- group by learning styles
- group randomly
  (# drawn, colored cards, puzzle pieces, etc.)
- self-selected grouping
  (students select their own groups)
- flexible grouping
  (change groups as needed for any/all of the above)

Group	Rotate 1	Rotate 2	Rotate 3	Rotate 4
1-Red	1	2	3	4
2-Green	2	3	4	1
3-Blue	3	4	1	2
4-Purple	4	1	2	3

Centers
1-Lab
2-Video and Group Discussion
3-Research
4- Teacher Center

Https://ditchthattextbook.com/station-rotation/ 5 min High School –This site gives so much information you may need.

Task Seven Please watch this video. Scroll down to it and play the video

- Station Rotation. The Station Rotation model allows students to rotate through stations on a fixed schedule, where at least one of the stations is an online learning station. ...
  - Lab Rotation. ...
  - Individual Rotation. ...
  - Flipped Classroom. ...
  - Flex. ...
  - A La Carte. ...
  - Enriched Virtual.

Answer these ????

1. **Could you use any of this video in your classroom?**
2. **What parts could you try? If you are in a lower classroom, how could you modify for your age group?**
3. **In the video, Caitlin did something that all of us should be doing to set up new centers. Can you tell me what she did before making a center?**

Task Eight- Look at the link that fits your needs.

- https://playtolearnpreschool.us/preschool-math-center/ prek-k centers
- https://www.youtube.com/watch?v=GXV7F1rmumw Primary Centers for Math 9.05 minutes.. Teacher is showing math ideas to use with the student in Primary grades.
- https://pocketofpreschool.com/how-to-set-up-math-center-in-early/ PreK-K
- https://www.nctm.org/classroomresources/ This is Elementary Site-Games and videos and ideas
- https://www.youtube.com/watch?v=9ZqTPKtyIE0&t=505s Start at 3.38 to see the centers for 4-6 grades at a math camp
- https://www.internet4classrooms.com/math.htm MS/HS

This site has lessons that could be used in centers in Algebra1,2 and Geometry

- https://www.youtube.com/watch?v=YmjfZ76fQPs HS- 3.55 technology in HS math Centers

1. Please tell me what you found that makes you a smarter educator. Hopefully you will all find at least one thing you can use.

Centers that are Planned-Older Students

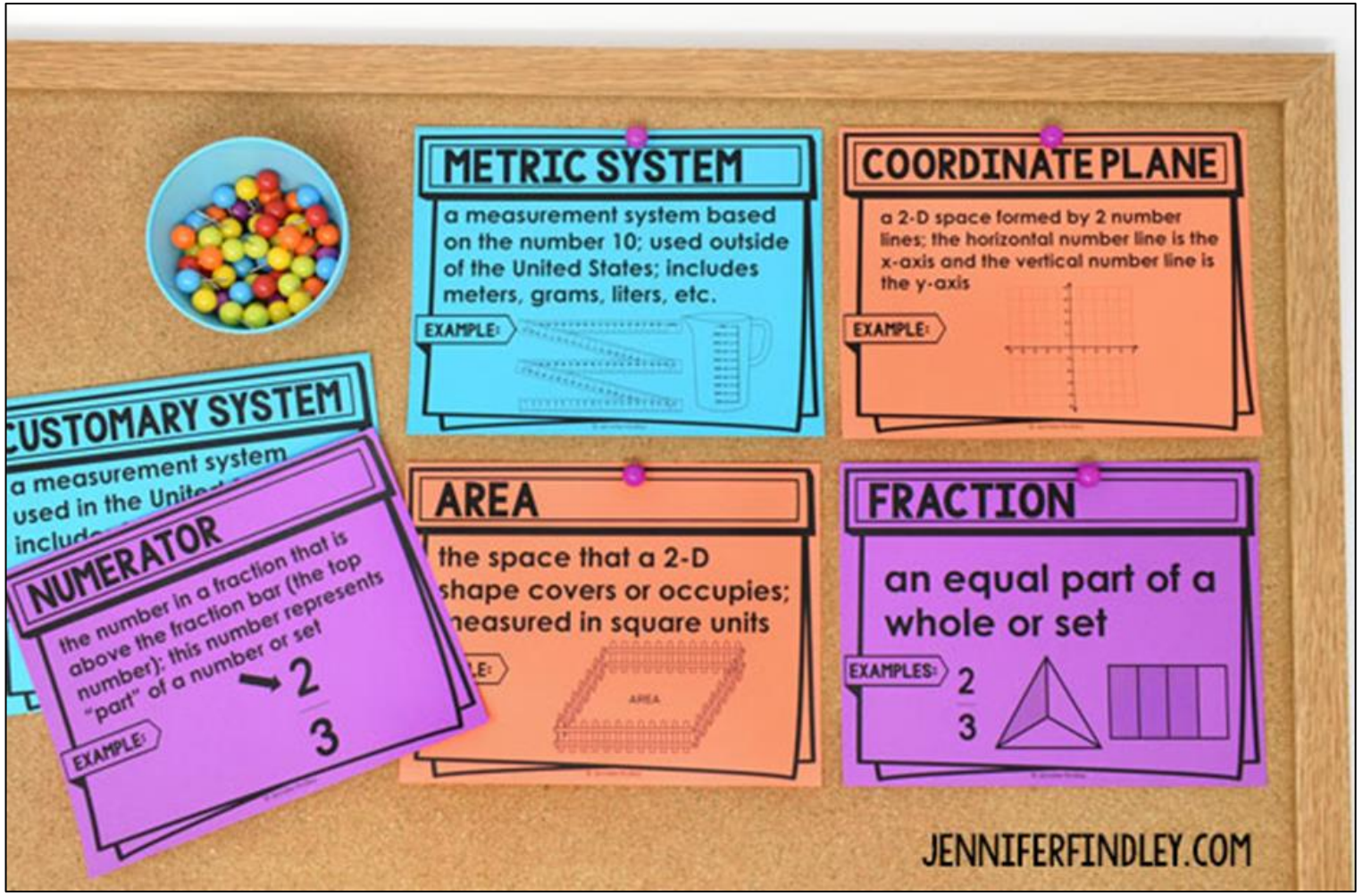
The brain needs movement and novelty-Emotions help students remember. If they are excited about something, they will remember it more.

Centers can look like these…..Need to plan for them.


PARADISE
Allie

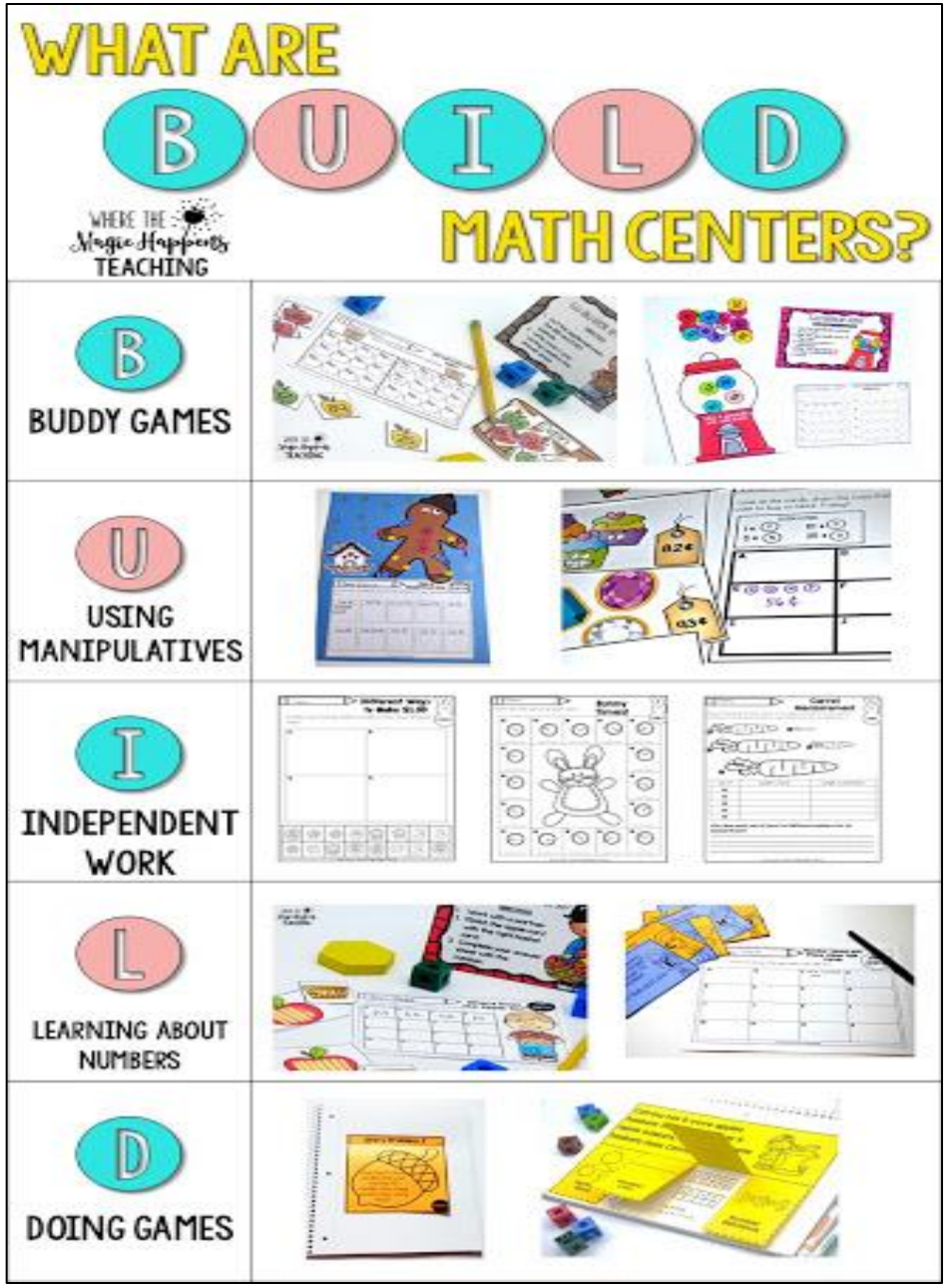

1

MATH CENTER IDEAS

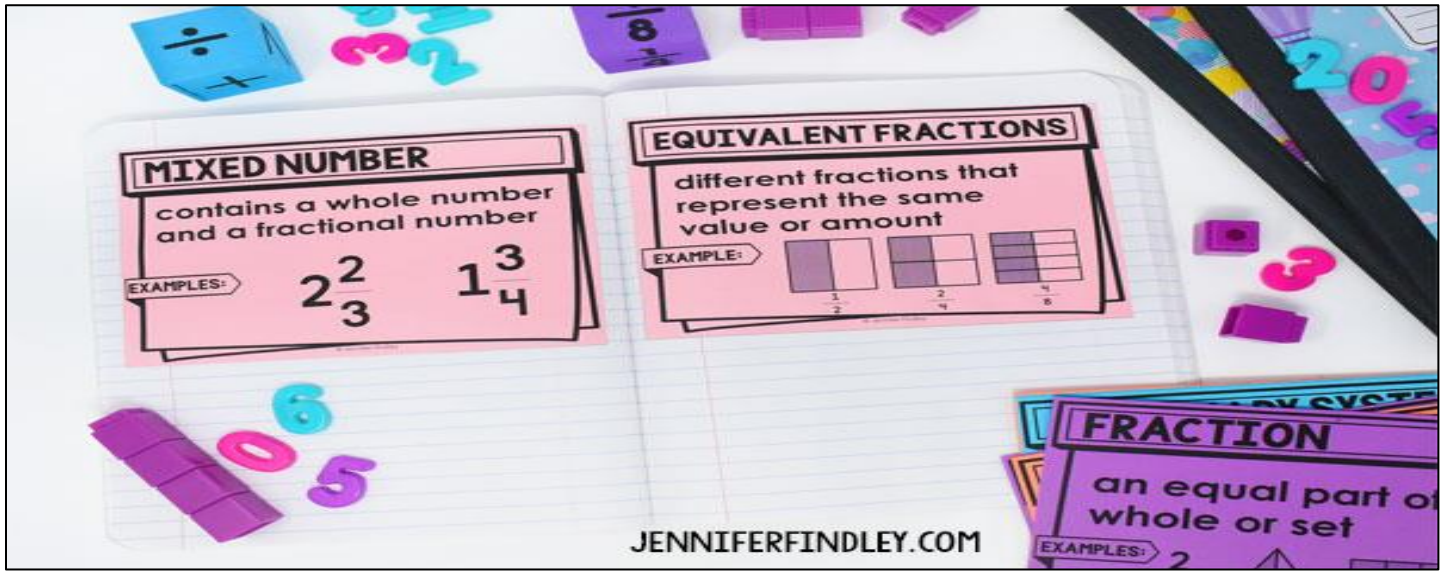



Caterpillar Addition
DIRECTIONS
1. Solve the addition problems in each card.
2. Show your work on the back of the page and write your answer on the answer sheet.

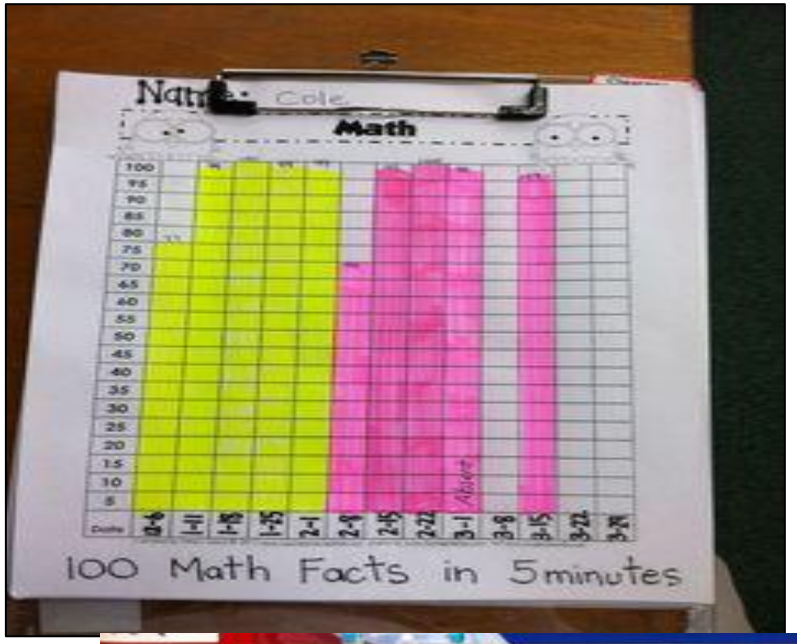

Name Nico ♡
Hundreds as Tens (100-300)
Cut the tiles at the bottom. Match and glue in the right box.
30 tens 300
13 tens 130
16 tens 160
18 tens 180
20 tens 200
1 tens 110
19 tens 190
21 tens 210
27 tens 270


WHAT ARE
B U I L D
MATH CENTERS?
WHERE THE Magic Happens TEACHING
B
BUDDY GAMES
U
USING MANIPULATIVES
I
INDEPENDENT WORK
L
LEARNING ABOUT NUMBERS
D
DOING GAMES


POWER OF 10
NUMERICAL EXPR
EQUATION
TENTHS
DIFFERENCE
ALGEBRAIC EXPRESS
BASE
PLACE VALUE
a location or position of a digit in a number; it gives the value of the digit
EXAMPLE:
JENNIFERFINDLEY.COM


MIXED NUMBER
contains a whole number and a fractional number
EXAMPLES:
EQUIVALENT FRACTIONS
different fractions that represent the same value or amount
EXAMPLE:
FRACTION
an equal part of whole or set
EXAMPLES:
JENNIFERFINDLEY.COM


30
28
18
48
50
64
56
42
10
18
24
35
50
6
22
36
Do you have 2x4?
Rainbow Sky Creations


Math
100 Math Facts in 5minutes

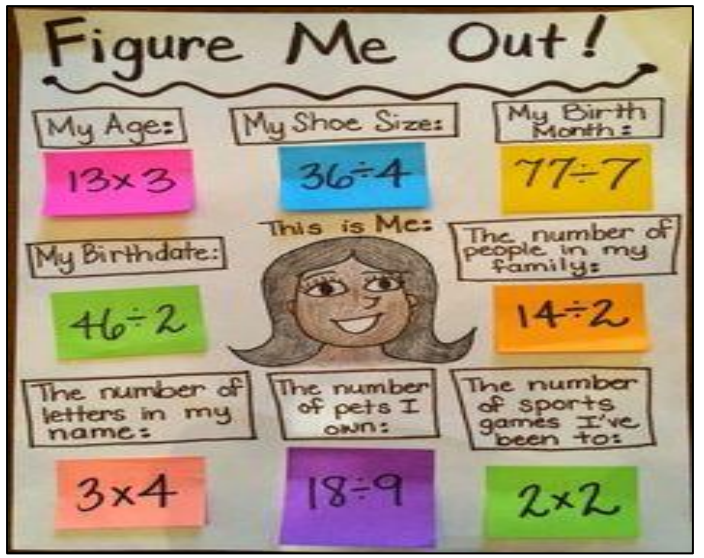
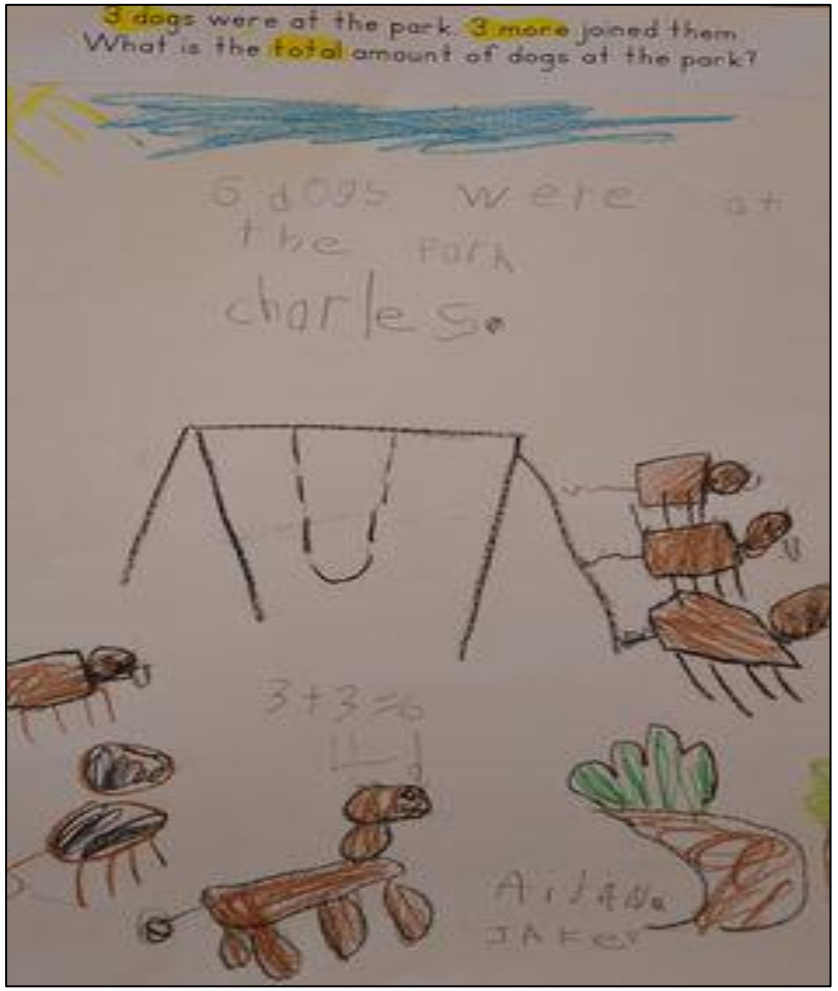
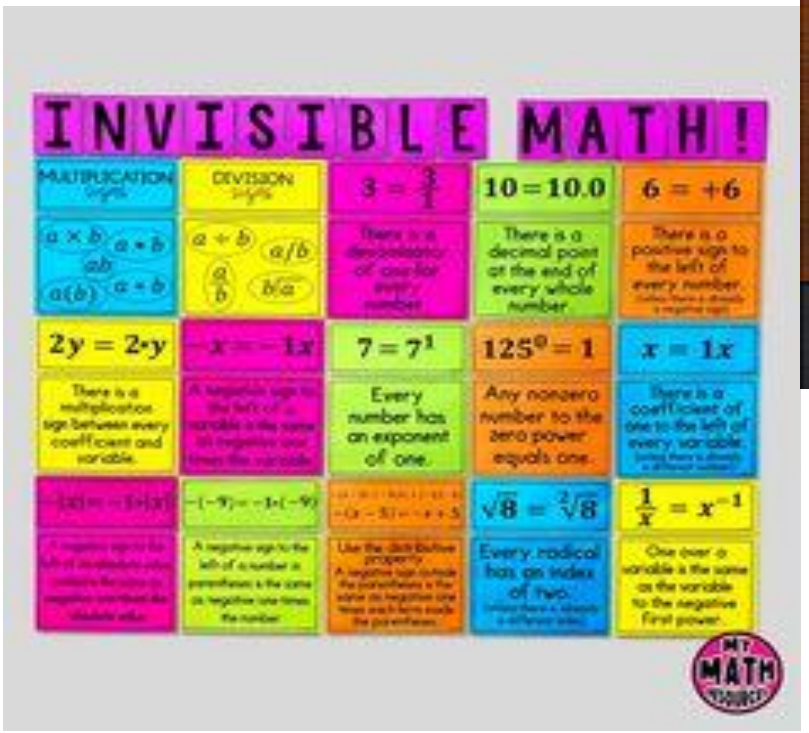
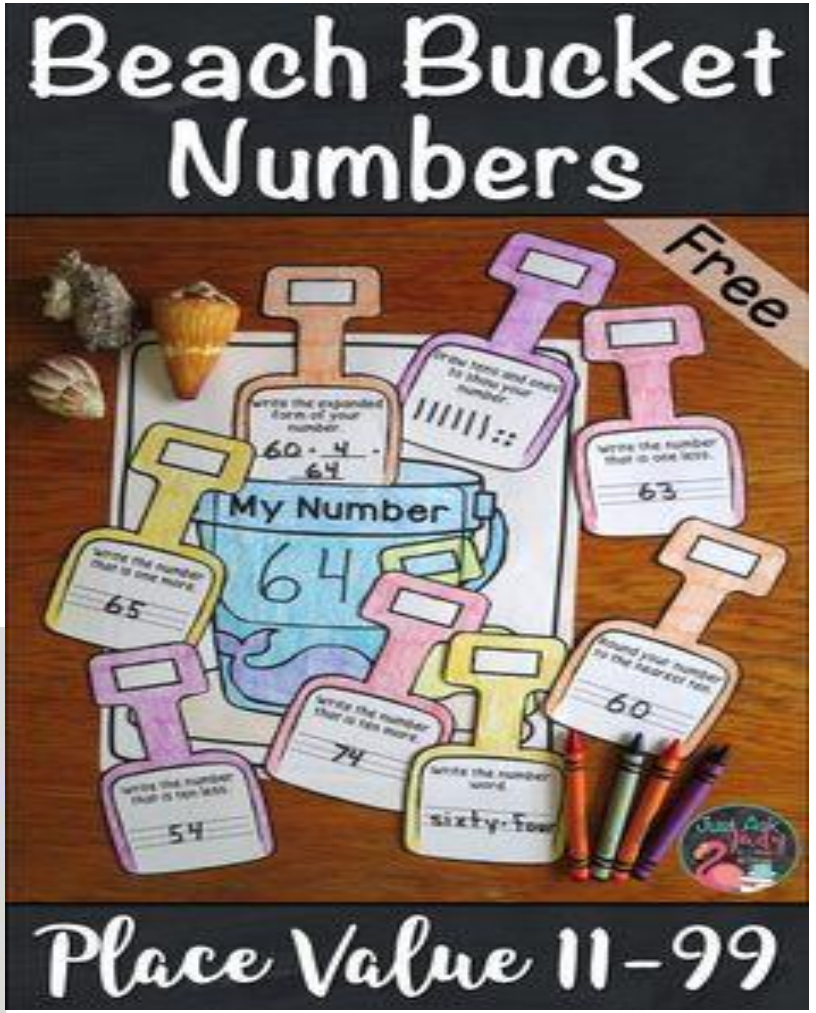


Figure Me Out!
My Age:
13x3
My Shoe Size:
36÷4
My Birth Month:
77÷7
My Birthdate:
46÷2
This is Me:
The number of people in my family:
14÷2
The number of letters in my name:
3x4
The number of pets I own:
18÷9
The number of sports games I've been to:
2x2

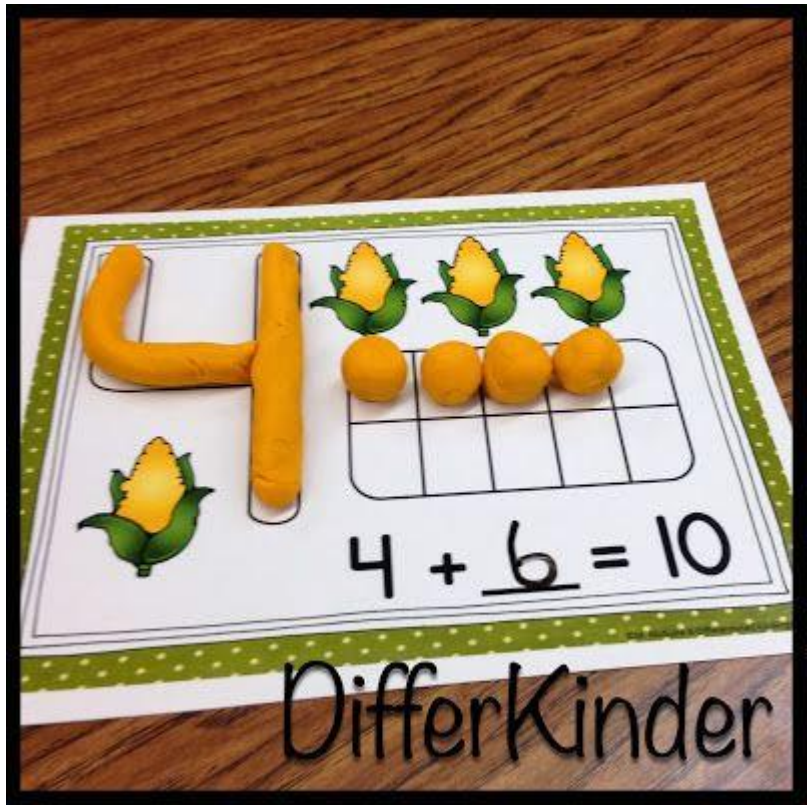

3 dogs were at the park. 3 more joined them. What is the total amount of dogs at the park?
6 dogs were at the park
charles
3+3=6

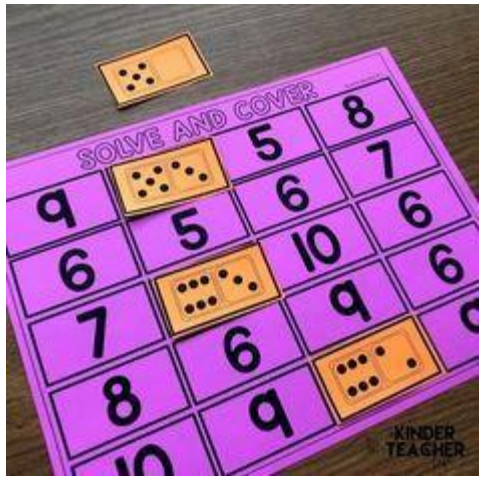

Beat the Calculator
Addition Top-It
Rolling for 50
Time Match
Penny Nickel Exchange
Penny-Nickel-Dime Exchange
Coin Exchange
One Dollar Exchange
Coin Dice
Penny-Dice Game
Penny-Nickel-Dime Grab
Domino Top-It
Penny Grab
Nickel-Penny Grab
Coin Top-It
Quarter-Dime-Nickel-Penny Grab
Bunny Hop
High Roller
Fact Power Game
Shaker Addition Top-It

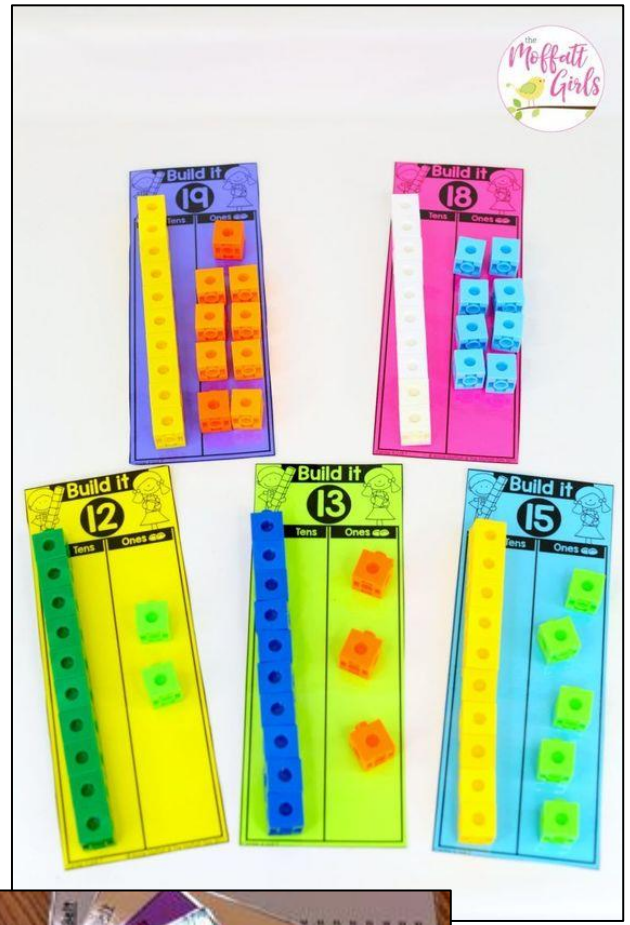

INVISIBLE MATH!
MULTIPLICATION
DIVISION
3 = 3/1
10 = 10.0
6 = +6
2y = 2·y
−x = −1x
7 = 7¹
125⁰ = 1
x = 1x
Every number has an exponent of one.
Any nonzero number to the zero power equals one.
Every radical has an index of two.
MY MATH

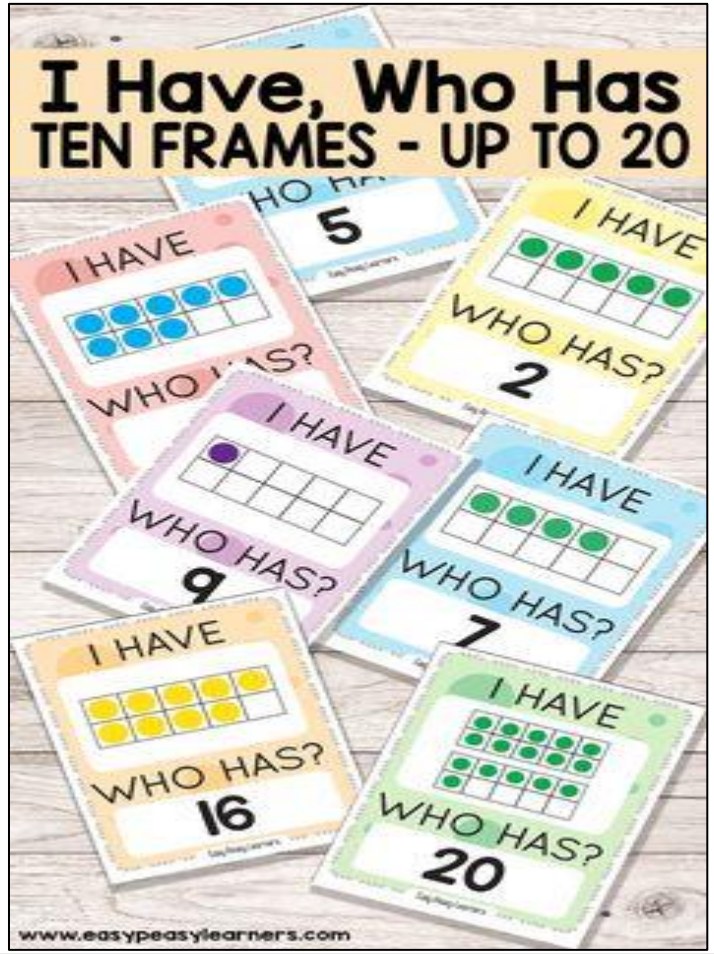

Beach Bucket Numbers
Free
My Number
64
Place Value 11-99

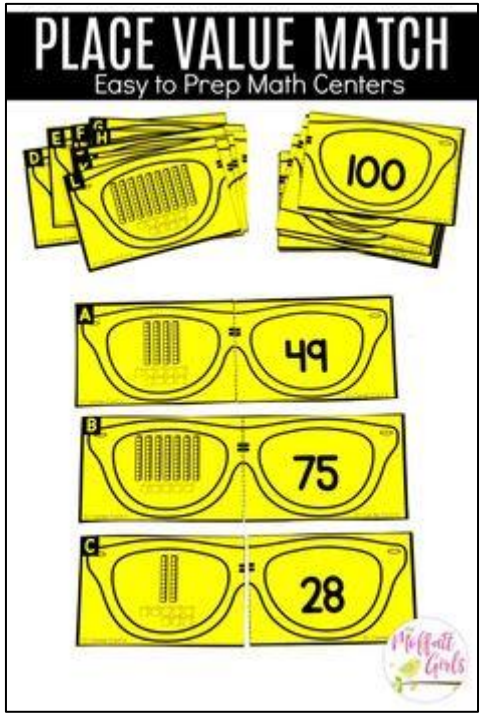
Math Practice Centers that are FUN



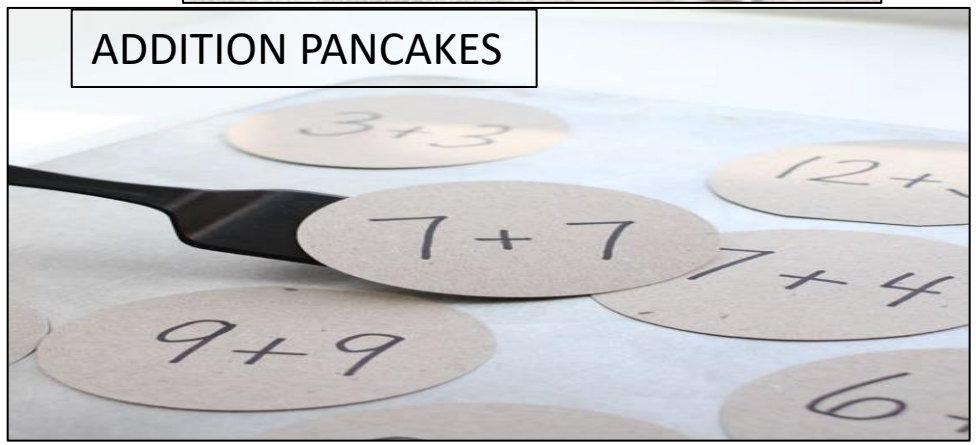




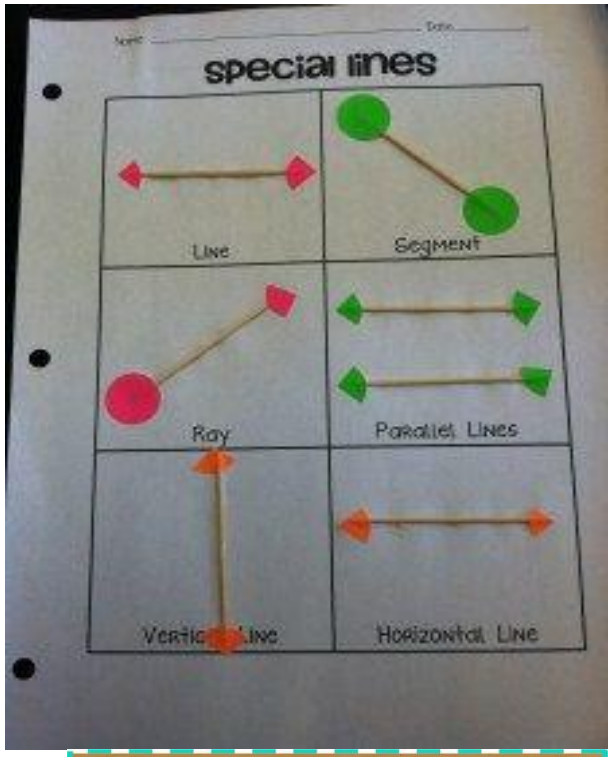




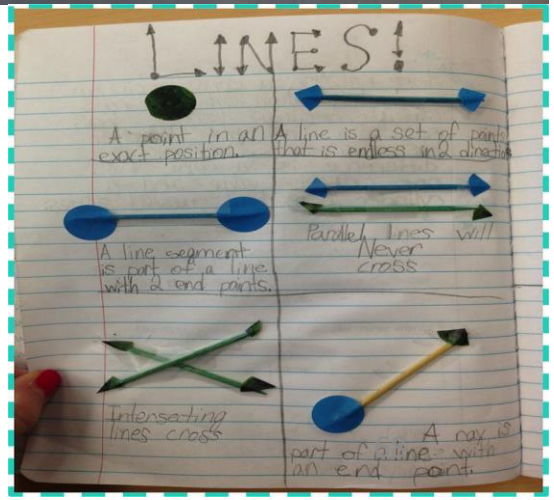
ADDITION PANCAKES



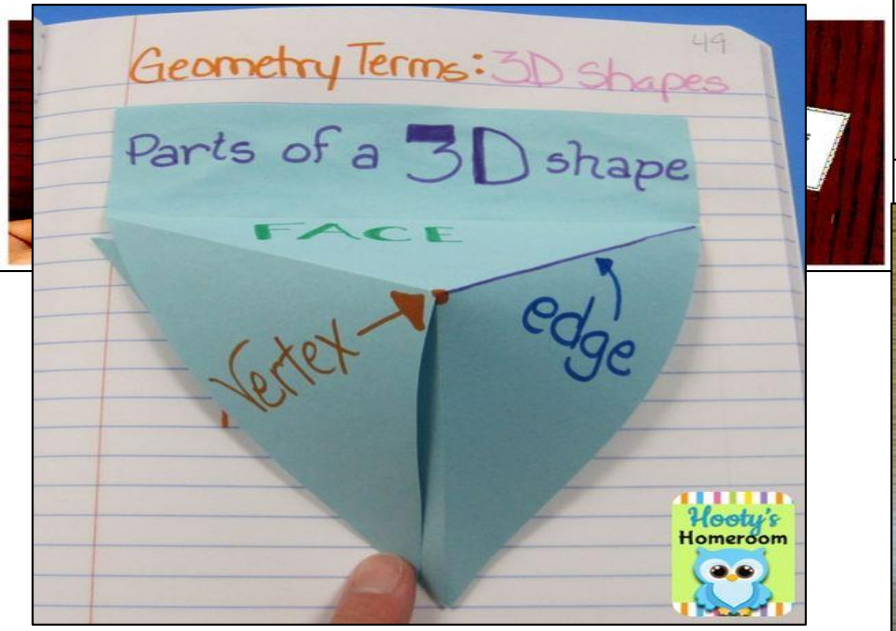
Math Practice Centers that are FUN.

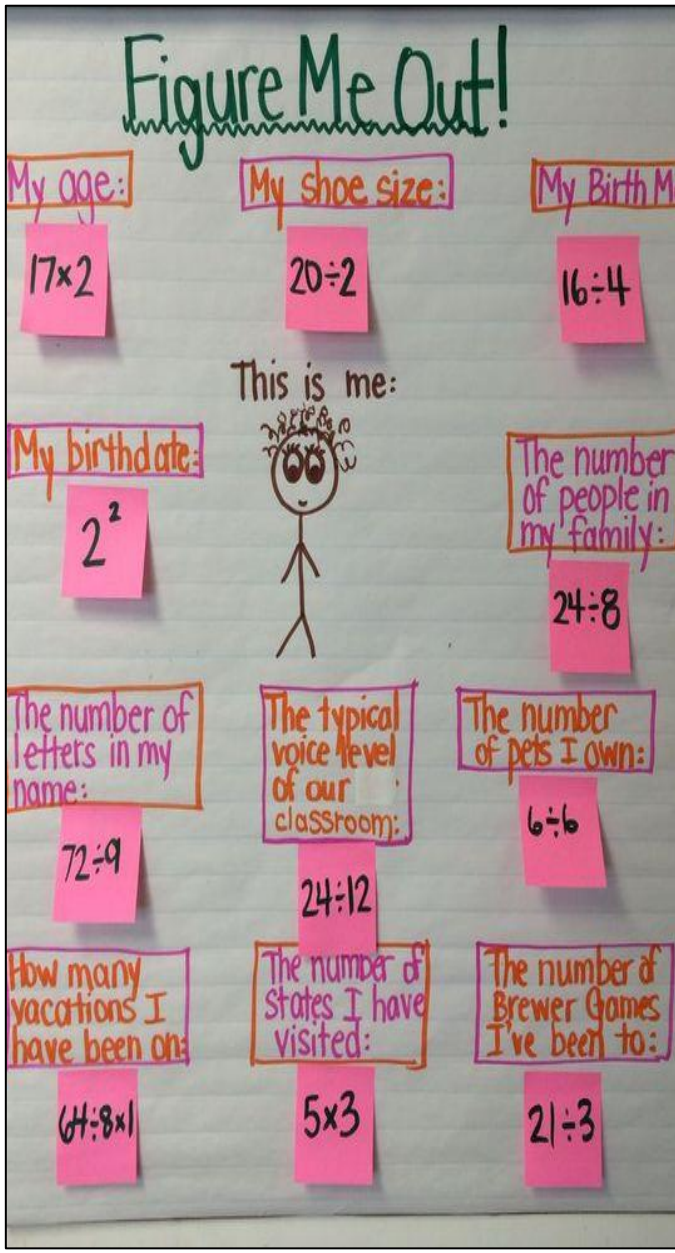


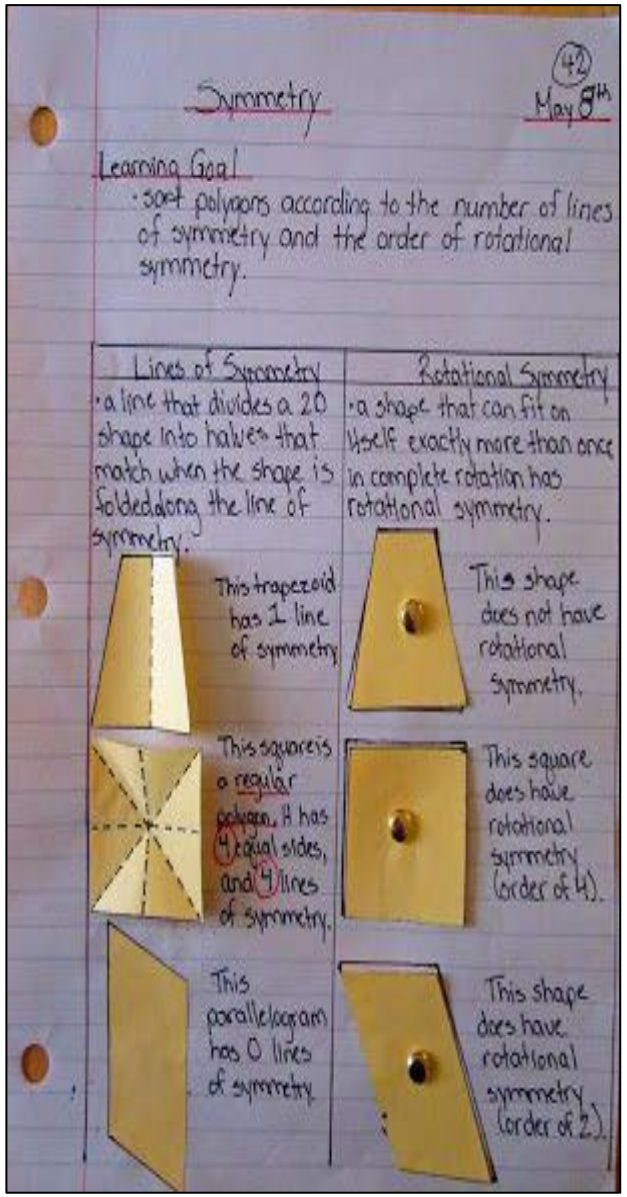
Geometry Vocabulary
BINGO

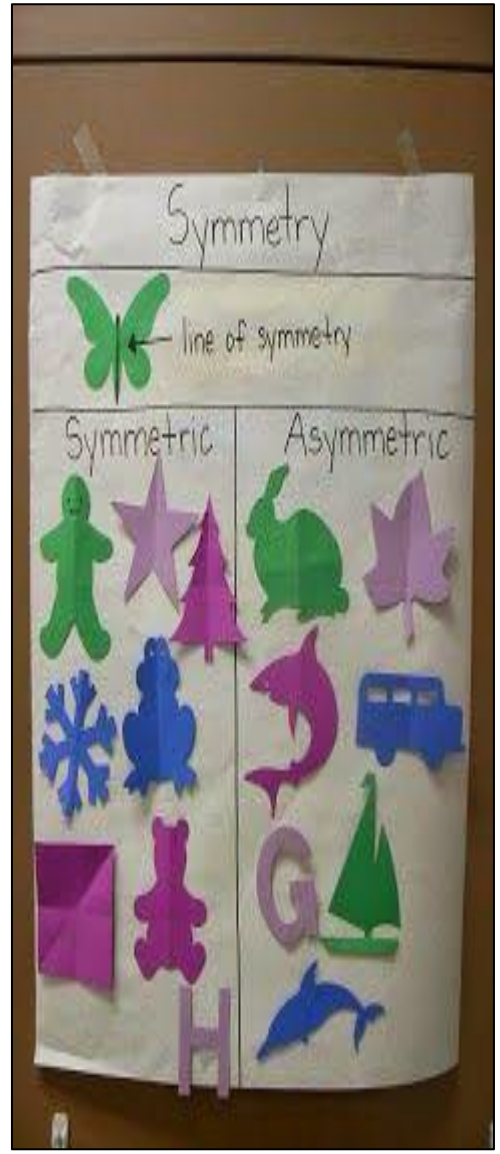


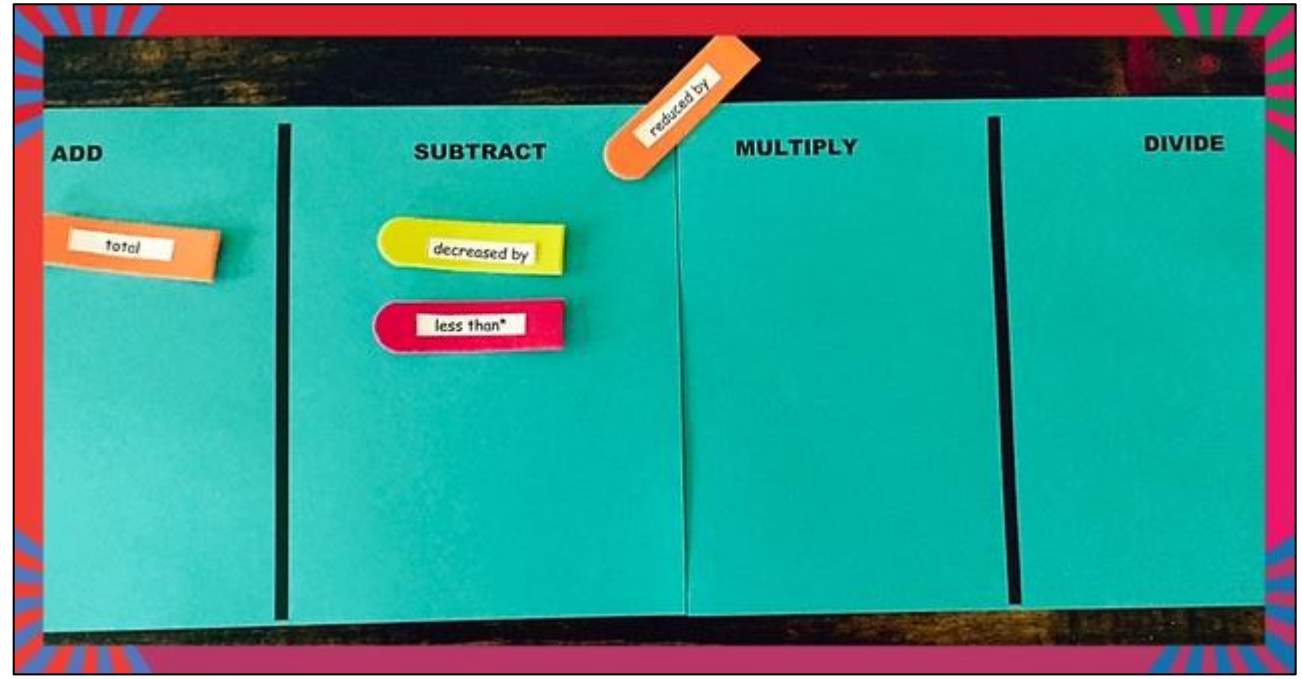
Geometry Vocabulary BINGO

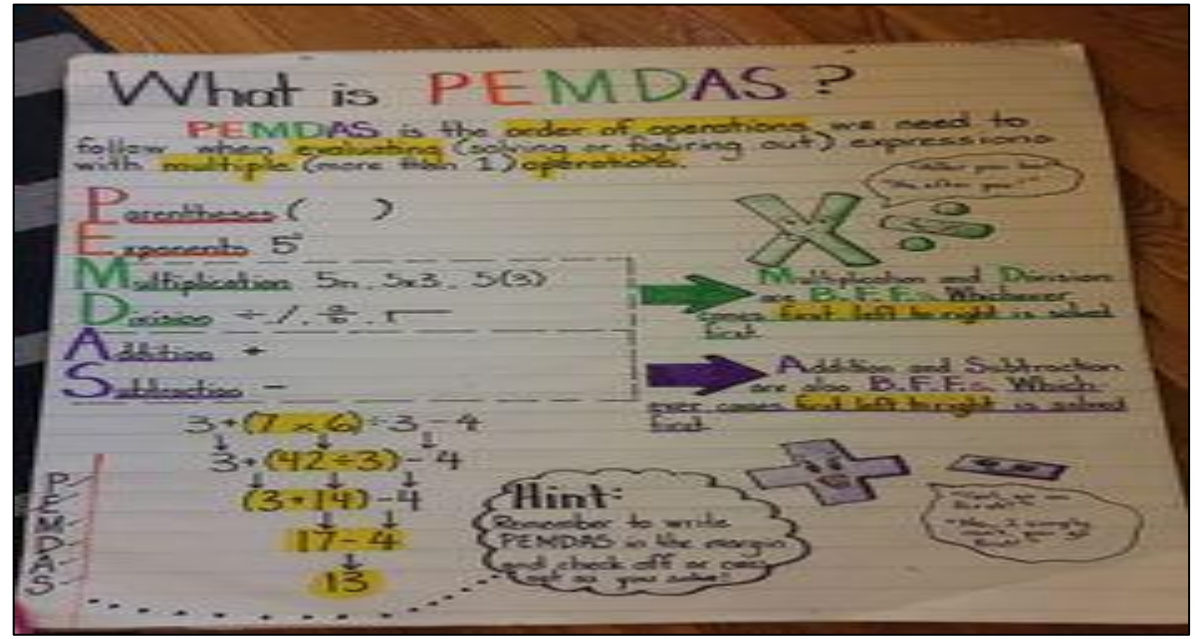





Symmetry
May 8th
Learning Goal
• sort polygons according to the number of lines of symmetry and the order of rotational symmetry.
Lines of Symmetry
• a line that divides a 2D shape into halves that match when the shape is folded along the line of symmetry.
Rotational Symmetry
• a shape that can fit on itself exactly more than once in complete rotation has rotational symmetry.
This trapezoid has 1 line of symmetry.
This shape does not have rotational symmetry.
This square is a regular polygon. It has 4 equal sides, and 4 lines of symmetry.
This square does have rotational symmetry (order of 4).
This parallelogram has 0 lines of symmetry.
This shape does have rotational symmetry (order of 2).


Symmetry
line of symmetry
Symmetric
Asymmetric


ADD
SUBTRACT
MULTIPLY
DIVIDE
total
decreased by
less than*
reduced by

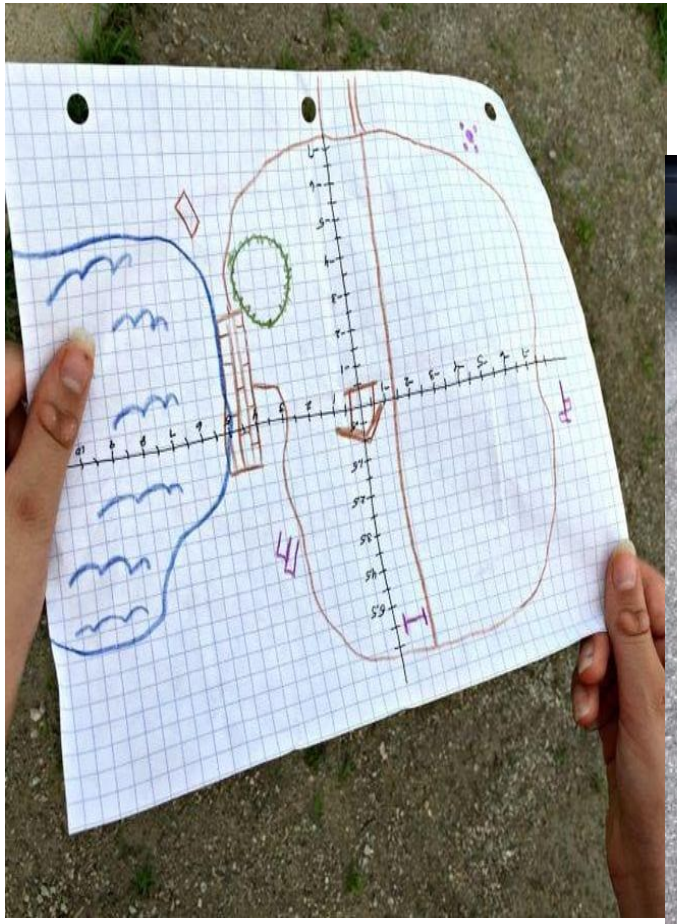

What is PEMDAS?
PEMDAS is the order of operations we need to follow when evaluating (solving or figuring out) expressions with multiple (more than 1) operations.
Parentheses ( )
Exponents 5²
Multiplication 5n, 5x3, 5(3)
Division ÷, /, a/b
Addition +
Subtraction −
Multiplication and Division are B.F.F.s. Whichever comes first left to right is solved first.
Addition and Subtraction are also B.F.F.s. Which ever comes first left to right is solved first.
3+(7×6)÷3−4
3+(42÷3)−4
(3+14)−4
17−4
13
Hint:
Remember to write PEMDAS in the margin and check off as you solve!

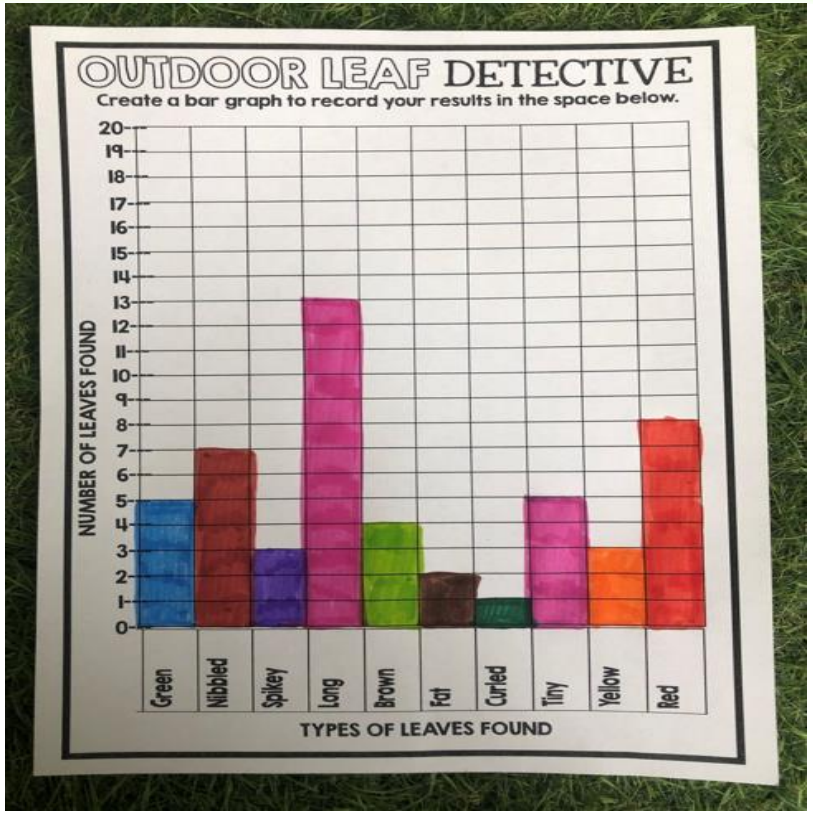
Using your body & Nature makes learning more embedded.

Students go outside and around the building to find these Geometric Shapes. With their IPADS they can take a picture of what they find.

https://thirdspacelearning.com/us/blog/outdoor-math-activities-elementary-school/#1-2-playground-problem-questions

Outdoor math



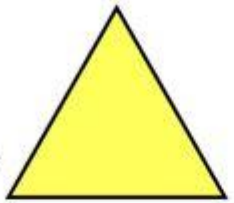


Types of Polygons

MATH MONKS

Triangle

- Has 3 sides and 3 vertices
- Has no diagonals
- Sum of the interior angles is 180°

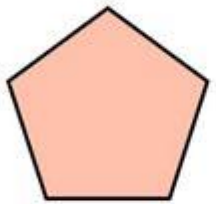


Quadrilateral

- Has 4 sides and 4 vertices
- Has two diagonals
- Sum of the interior angles is 360°

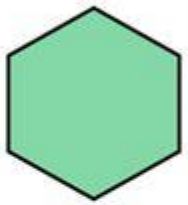
Pentagon

- Has 5 sides and 5 vertices
- Has 5 diagonals
- Sum of the interior angles is 540°



Hexagon

- Has 6 sides and 6 vertices
- Has 9 diagonals
- Sum of the interior angles is 720°



Heptagon

- Has 7 sides and 7 vertices
- Has 14 diagonals
- Sum of the interior angles is 900°

Octagon

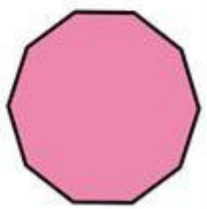
- Has 8 sides and 8 vertices
- Has 20 diagonals
- Sum of the interior angles is 1080°

Nonagon

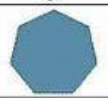
- Has 9 sides and 9 vertices
- Has 27 diagonals
- Sum of the interior angles is 1260°

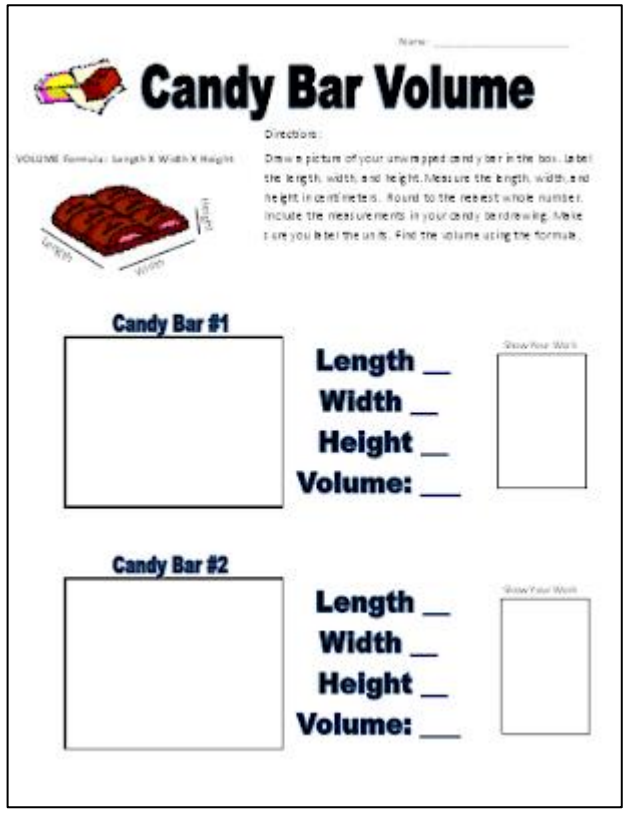
Decagon

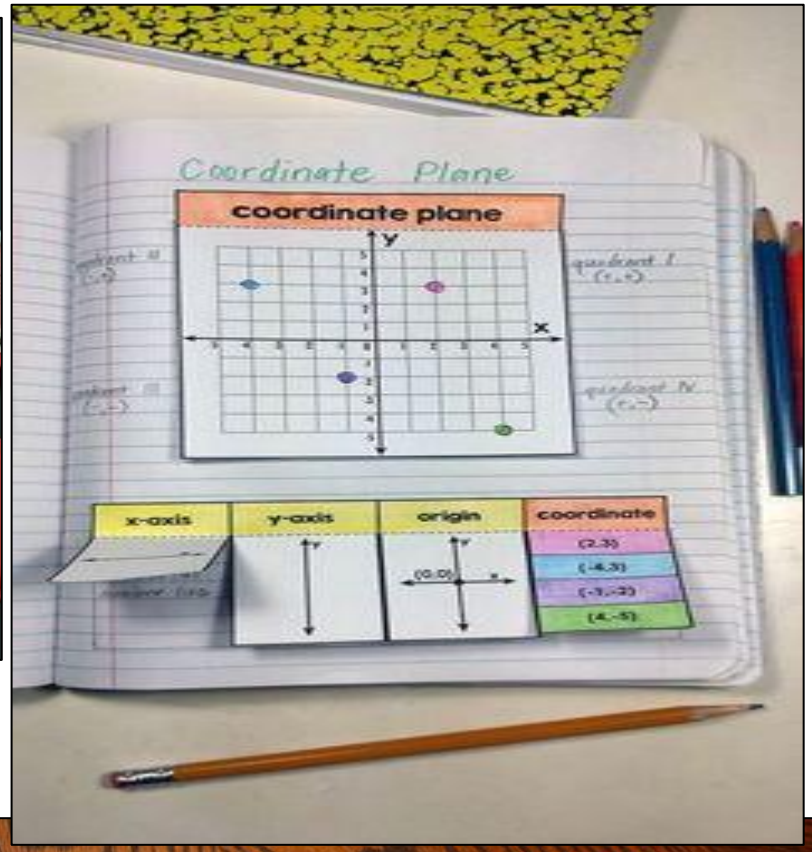
- Has 10 sides and 10 vertices
- Has 35 diagonals
- Sum of the interior angles is 1440°



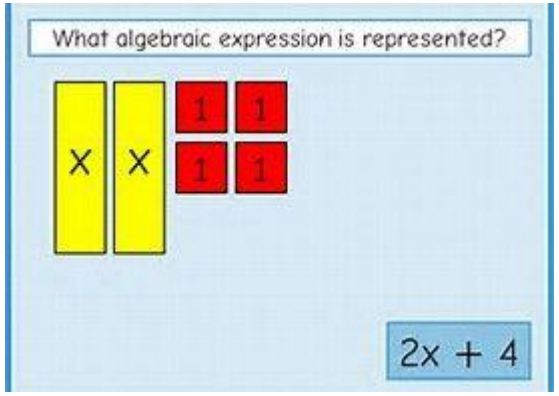
Students have to fill in
Sides, Angles, Vertices, Diagonals, Triangles.
Differentiate by having the class find only sides and add more for older students.

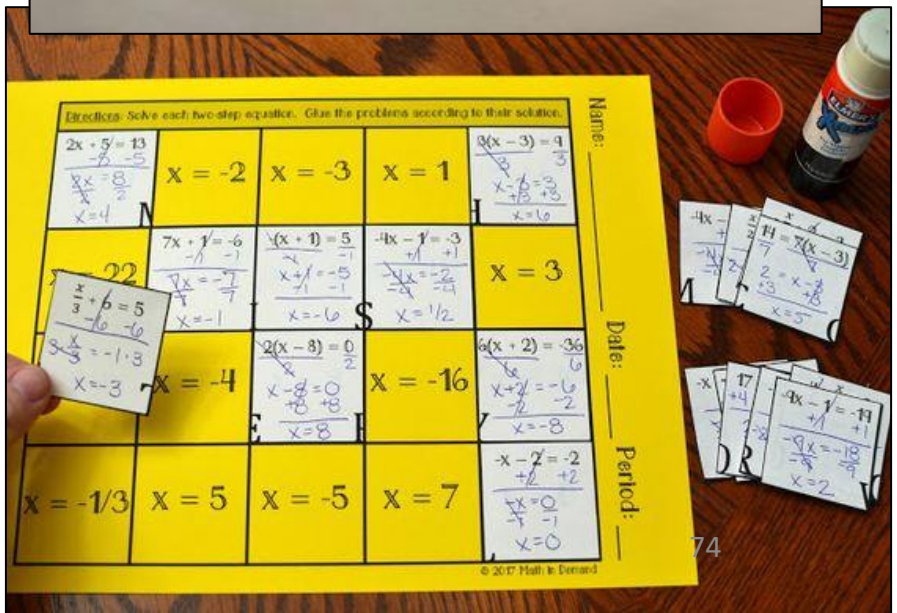
Polygon	Graphic	Sides	Angles	Vertices	Diagonals	Number Triangles
Triangle		3	3	3	0	1
Quadrilateral		4	4	4	2	2
Pentagon		5	5	5	5	3
Hexagon		6	6	6	9	4
Heptagon or Septagon		7	7	7	14	5
Octagon		8	8	8	20	6
Nonagon or Novagon		9	9	9	27	7
Decagon		10	10	10	35	8
Dodecagon		12	12	12	54	10
n-gon	---	n	n	n	$\frac{1}{2}n(n-3)$	$(n-2)$


Name:
Candy Bar Volume
Directions:
VOLUME Formula: Length X Width X Height
Draw a picture of your unwrapped candy bar in the box. Label the length, width, and height. Measure the length, width, and height in centimeters. Round to the nearest whole number. Include the measurements in your candy bar drawing. Make sure you label the units. Find the volume using the formula.
Candy Bar #1
Length __
Width __
Height __
Volume: ___
Show Your Work
Candy Bar #2
Length __
Width __
Height __
Volume: ___
Show Your Work


Coordinate Plane
coordinate plane
x-axis
y-axis
origin
coordinate


BATTLESHIP
partner activity
BATTLE MY MATH SHIP
SLOPE
PLAYER 1
Identify the space you would like to attack. Find the slope to see if you sunk a battleship.
HIT
HIT
HIT
ALGEBRA and Beyond
[ALG, ∞]


What algebraic expression is represented?
X
X
1
1
1
1
2x + 4


Directions: Solve each two-step equation. Glue the problems according to their solution.
Name:
Date:
Period:
x = -2
x = -3
x = 1
x = 3
x = -4
x = -16
x = -1/3
x = 5
x = -5
x = 7

Guided Math

Whole Class Instruction (10-15 minutes)

Mini-Lesson See weekly lesson plans for details.

For the Week of:

_____

Guided Math Groups (15 minutes)

Strategy or Extension Group Topic(s):

_____

_____

Day & Date: _____

Group Members: _____

_____

_____

Strategy or Extension Group Topic(s):

_____

_____

Day & Date: _____

Group Members: _____

_____

_____

Strategy or Extension Group Topic(s):

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Day & Date: _____

Group Members: _____

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Strategy or Extension Group Topic(s):

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Day & Date: _____

Group Members: _____

_____

_____

Strategy or Extension Group Topic(s):

_____

_____

Day & Date: _____

Group Members: _____

_____

_____

Individual Conferences (10-15 minutes)

Name:

Topic:

Name:

Topic:

Name:

Topic:

Task Nine –Lots of Center Ideas

1. Tell me a center you might try in your classroom.
2. How would you set it up?
3. What materials would you need?
4. Where would you make the room in your classroom?
5. How would you group students?
6. How would you differentiate the center?
7. How would you manage the centers and student rotation?
8. What assessment or product would you choose for them to produce after the center practice?
9. What grade/rubric would you use?

Task Ten -Look at the website and answer

- https://mathpractices.edc.org/view-all-illustrations.html grades 4-HS Please look at this link. It will give you all the math practices and a lesson to go with them. The lesson has student dialogue in it to show you how students are thinking as they work through the problem.

- Pick one and tell me how you would create a center /station for that practice.
- If you are teaching a K-3 classroom, look at 4th grade and see if it could be modified for your classroom. Tell me how?

RESOURCES TO USE

- https://mathpractices.edc.org/ videos
- https://www.commonsense.org/education/lists/math-tools-aligned-to-common-core-standards
- https://www.nj.gov/education/standards/math/Index.shtml Right side each grade level
- https://www.generationgenius.com/trial-DM/?utm_source=google&utm_medium=cpc&utm_term=math%20lessons&gclid=Cj0KCQjw4NujBhC5ARIsAF4Iv6djZVcpPwYgb9hFJxEHzzdLLe4TjBnb-iHBNIE55ujsmvGjtX2fwBMaAneYEALw_wcB videos You can create a free account and see lessons you could use
- https://www.k-5mathteachingresources.com/math-centers.html math centers
- https://www.sadlier.com/school/sadlier-math-blog/math-center-ideas-that-will-make-implementation-a-success math centers done already 3 grade on –Will have to download them but they are free
- https://www.weareteachers.com/best-math-websites/ lots of websites for math

Task Eleven -My formative assessment

You can answer the questions below or make a Word Cloud

1. What was the most important learning from this training, and why?
2. Did anything surprise you? If so, what?
3. What was the most confusing part of the training, and why?
4. What is something that will likely try to do because of this training?

Make a Word Cloud of the highlights of this training

Thank you for completing the training

First, grade level by grade level students must master standards. This will ensure that students will have the background knowledge to proceed to the next level. If not, Tier 2 interventions should take place as soon as possible.

Anytime you get students outside, out of the room, into a novel task, work with a partner or group, bring in fun, music, movement and most of all your passion, math is successful.

Please send all your task answers to me with the pre/post test.

Thank you and Have Fun With Your Students!!!!!!!!!!!!!

2 nice 2 be 4gotten… Math is just in everything = + - %