Unpacking the Math HiSET Test

Part 1: Topic Lessons & Activities

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For this part of the Mini-Grant, I have taken the top 10 Math topics from two HiSET Practice Tests and found contextual activities, lessons, and Foldable Lessons to support them.

Foldable Lesson Ideas: Foldables are 3-dimesional graphic organizers that students create to enhance the learning of a skill or concept. They help the student stay organized and retain information. Foldables break up information into smaller pieces making it easier for students too process and remember information.

a. Material needs for these hands-on activities include: different sized and colored papers, scissors, glue sticks, and colored writing utensils.
b. **See Foldables Basics in Appendix**

Table of Contents

Numbers & Operations

Operations

Warm-up #1:

Expressions

1. 16 – 21
2. 32(-4)
3. 16 ÷ -4
4. -5 + 7
5. (-72)(-15)
6. $\frac{-64}{-8}$

Warm-up #2a:

Floor Activity: (Kinesthetic) Write math vocabulary words, symbols, and phrases on index cards. Place the 8 Headings out on the floor. Randomly hand out the index cards to each student and have them sort according to the correct heading. Check for correctness as a class.

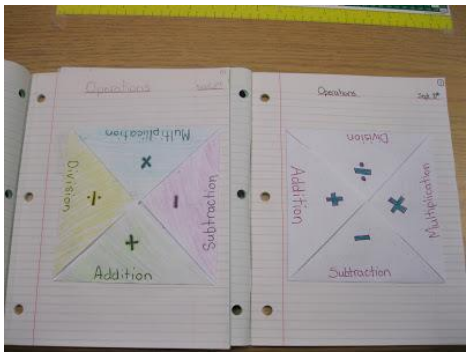
Warm-up #2b:

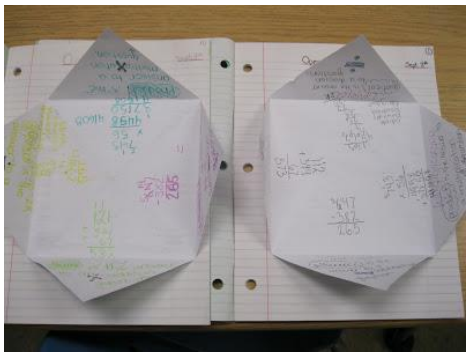
Have students fill in the chart once the Floor activity has been completed.

TRANSLATION CHART

OPERATION	SYMBOLS	WORDS	PHRASES	EXPRESSION
ADDITION				
SUBTRACTION				
MULTIPLICATION				
DIVISION				
More Than				
More Than or Equal To				
Less Than				
Less Than or Equal To				

Foldable:





Make a square, fold each corner into the middle, write the operation and symbol for each on the outside (use color for creativity).
Inside include the definition for each answer word - example: "Sum" is the answer to an addition question and a solved sample problem.

Lesson/Activity:

QR Code: Watch this video to explain the connections between words, operations, and functions.

See Assignment Discovery Online Curriculum in Appendix

Real Numbers

Warm-up:

Number System

Give 3 examples where you would find negative numbers in the real world.

Foldable:

http://a-sea-of-math.blogspot.com/2013/07/foldable-classifying-real-numbers.html

At the bottom of the above blogspot page there is a slide show showing a different Real Number foldable

Lesson/Activity#1: Organizing Numbers

Organizing Numbers

Reporting Category Number and Number Sense

Topic Investigating the real number system

Primary SOL 8.2 The student will describe orally and in writing the relationships between the subsets of the real number system.

Materials

- Real Numbers Cards (attached)
- Scissors
- Real Number System Subset Labels (attached)
- Real Number System Venn Diagram (attached)
- Student whiteboards and markers

Vocabulary

natural numbers, whole numbers, integers (earlier grades)

rational numbers, irrational numbers, real numbers (8.2)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Distribute scissors and copies of the Real Numbers Cards. Discuss various characteristics of the numbers. Then, direct students to cut the cards apart and sort them any way they like. When they are finished sorting, have them discuss with partners how they did their sorts. Lead a class discussion about the different ways they sorted the numbers, asking them to explain the processes they used.
2. Distribute copies of the Real Number System Subset Labels. Have students cut them apart and arrange them in any order. Have students assign each number card to a subset. Point out how some numbers belong in more than one subset, and discuss the characteristics of each subset.
3. Have students work with partners to sort the number cards into rational and irrational numbers. Then, have them sort the rational numbers into integers, whole numbers, and/or natural numbers. When they have finished sorting, discuss the fact that some numbers can appear in more than one subset, e.g., 4 is a rational number, an integer, a whole number, and a natural or counting number. Explain that the attributes of one subset can be contained in whole or in part in another subset. Explain the process of sorting numbers into the *most specific* subset.
4. Distribute copies of the Real Number System Venn Diagram. Have students write the names of the subsets in the appropriate areas on the diagram and then write the numbers from the number cards in the *most specific* subsets. Finally, have students add two more numbers to each subset, explaining why the only number that can be uniquely in the “Whole Numbers” subset area is zero.

Assessment

- **Questions**
  - To which subset(s) of the real number system does the number −0.75 belong? Why?
  - Is the square root of 15 rational or irrational? How do you know?
- **Journal/Writing Prompts**
  - Identify whether a number can be both whole and irrational, and explain why or why not.
  - Identify which subset of the real number system contains the most rational numbers, and explain why.
  - Explain why rational numbers are "friendly."
  - Identify whether pi (π) is rational or irrational, and explain why.

Extensions and Connections (for all students)

- Display examples of Venn diagrams used in other areas of study to model the purpose of a Venn diagram.
- Have students utilize graphic organizer software to create their own organizers to represent the real number system.
- Prepare a large shopping bag labeled "Real Numbers." Inside the bag, place two smaller equal-size bags, one labeled "Irrational Numbers" and the other labeled "Rational Numbers." Inside the "Rational Numbers" bag, place a smaller bag labeled "Integers." In the "Integers" bag, place a yet smaller bag labeled "Whole Numbers," and in the "Whole Numbers" bag, place the smallest bag labeled "Natural Numbers." Display the "Real Numbers" bag, and pull the smaller bags out one at a time to show the differences in sizes and how they relate to each other. Discuss the types of numbers that would be in each bag. Hand student number cards to put into the *most specific* bags, and then demonstrate putting the set of bags together again.

Strategies for Differentiation

- Use different colors of paper to help students distinguish the different subsets of numbers.
- Use the Venn diagram with only the vocabulary terms, and as a class, create examples to include. Then, have students create their own Venn diagrams and use the real number cards provided to glue into place.
- Place location signs around the room labeled "Natural Numbers, Whole Numbers, Integers, Rational Numbers, Irrational Numbers, and Real Numbers." Give each student a number card, and have him/her match the number to as many locations as possible by going to the location(s) and writing the number on the sign(s). Confirm in class discussion the place or places each number is placed. Repeat this activity throughout the year.

Real Numbers Cards

Copy cards on cardstock, and cut out.

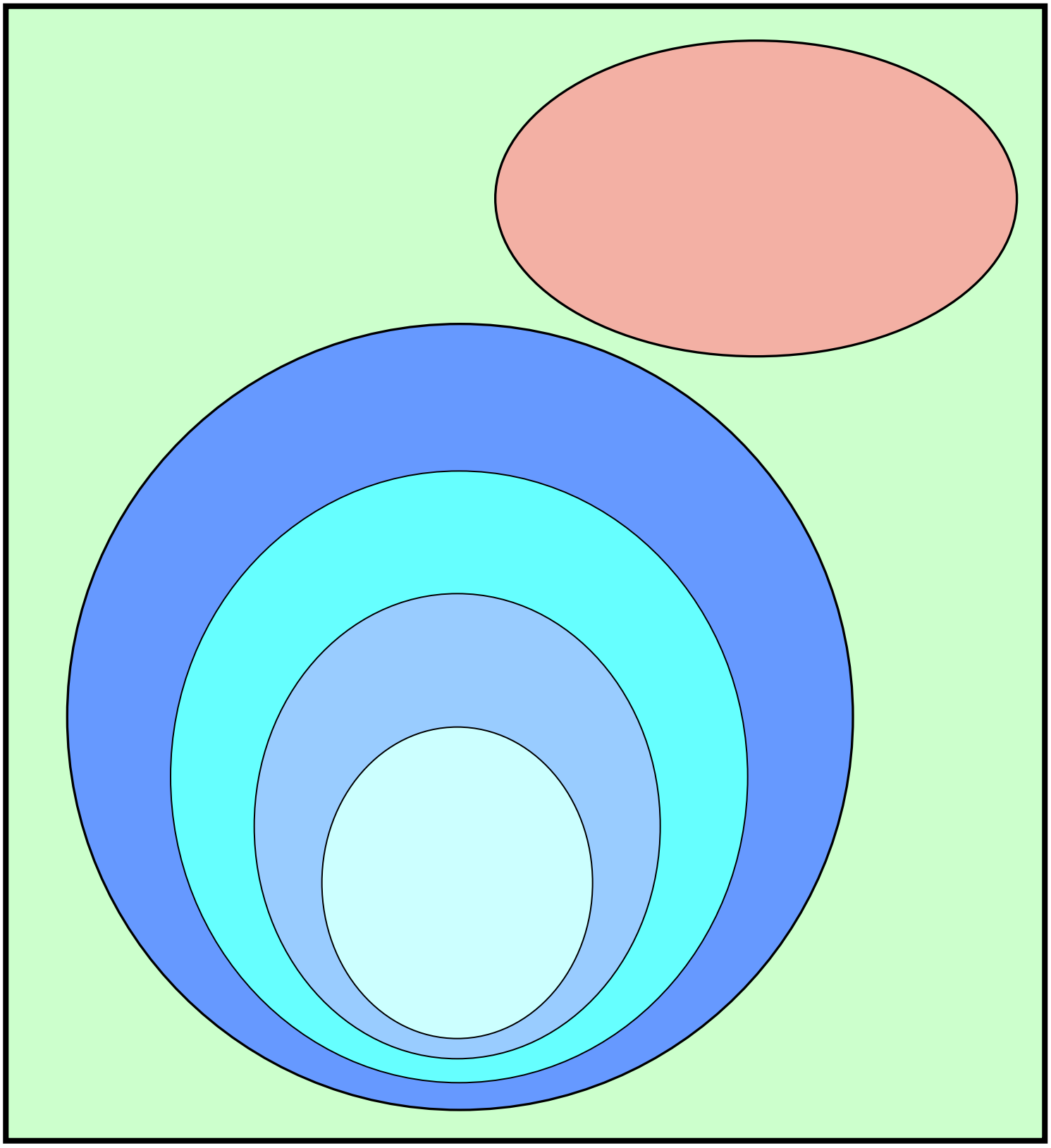
-6	0.5	$0.\overline{4}$	$0.349\ldots$
$\sqrt{25}$	2	0	$\frac{3}{5}$
π	$\sqrt{13}$	$\frac{2}{3}$	$-\frac{10}{2}$
5	2.25	$-\sqrt{25}$	$\frac{9}{3}$

Real Number System Subset Labels

Copy labels on cardstock, and cut out.

Real Numbers
Irrational Numbers
Rational Numbers
Integers
Whole Numbers
Natural Numbers

Real Number System Venn Diagram



Activity #2: Real Number System - Check off all categories that apply to each number

Number	Real	Rational	Irrational	Integer	Natural
4					
$\sqrt{4}$					
-3					
$\frac{1}{2}$					
$\sqrt{\frac{1}{9}}$					
$0.3\overline{3}$					
0.25					
0.171771777...					
$\sqrt{7}$					
π					

Answers

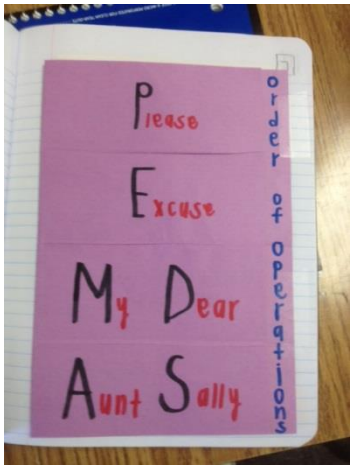
Number	Real	Rational	Irrational	Integer	Natural
4	x	x		x	x
$\sqrt{4}$	x	x		x	x
-3	x	x		x	
$\frac{1}{2}$	x	x			
$\sqrt{\frac{1}{9}}$	x	x			
$0.3\overline{3}$	x	x			
0.25	x	x			
0.171771777...	x		x		
$\sqrt{7}$	x		x		
π	x		x		

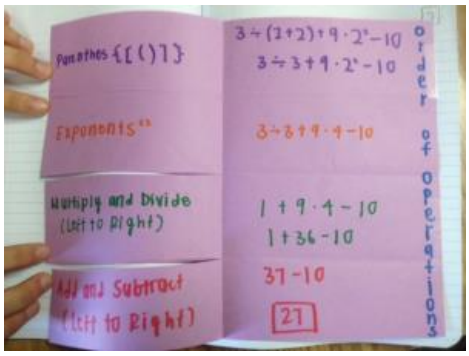
Order of Operations

Warm-up:

http://www.scribd.com/doc/109117656/Order-of-Operation-Puzzles

Foldable:





Lesson/Activity #1:

Order of Operations Bingo Game by Illuminations

http://illuminations.nctm.org/Lesson.aspx?id=2583

See Order of Operations Bingo in Appendix

Lesson/Activity #2:

See Order of Operations Task Cards in Appendix

Proportions

Warm-up:

Foldable: See Solving Proportions in Appendix

Lesson/Activity:

This Lesson includes a Cyberchase video and explains proportions in relation to bike gears. The lesson also has 2 assessments with answers.

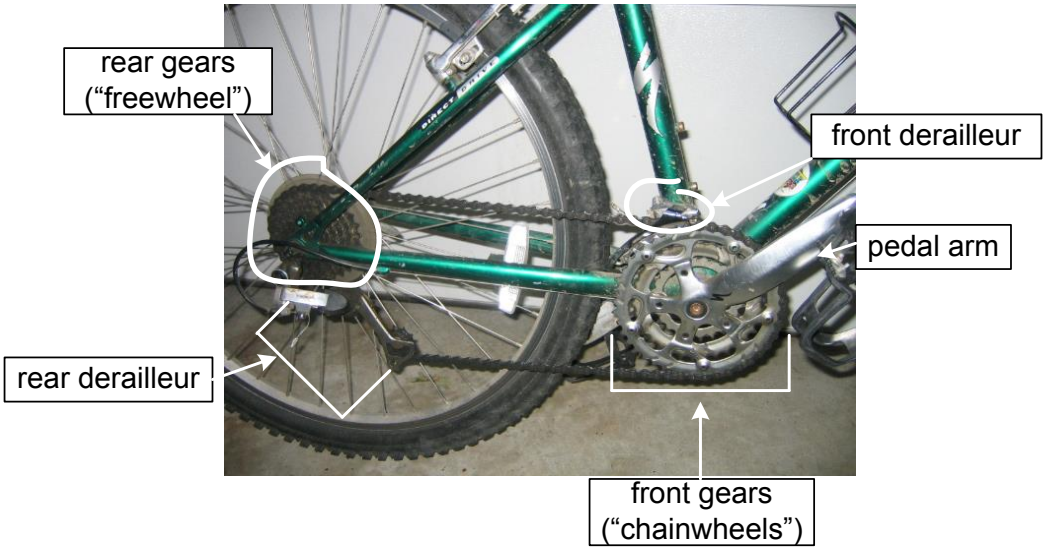
http://www.pbslearningmedia.org/resource/vtl07.math.number.rat.lpgears/gears-and-proportions/

"Gearing Up" Handout

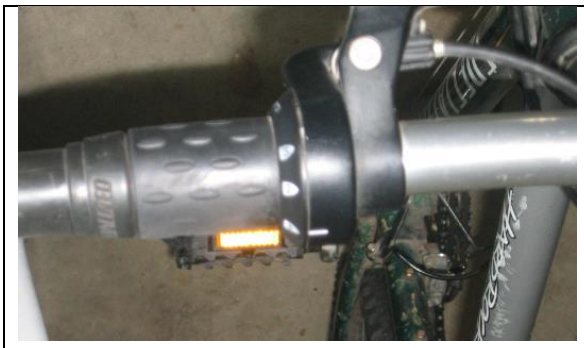
Bicycles have a bewildering assortment of gears on them. But what are all those gears for? Let's explore how the gears on a bike work.

Part 1

The pictures below show you some of the basic parts of a bicycle. There are two places on a bike where gears can be found. The front gears (also called the "chainwheels") are attached to the pedal arms (which hold the pedals out at their ends). Then there are gears attached to the rear wheel's hub. All the rear gears are contained in a cluster of gears on a "freewheel," which only turns the rear wheel when you pedal forward. It is "free" of the wheel if you pedal backwards. The two sets of gears are connected by the bicycle's chain. All the gear teeth are the same size. Why must this be the case?



The gear shifts on bikes can be on the handlebars, or mounted on the bicycle frame:

	
Left gear shift, for front gears. Note that on this bike, there are three marked positions (3 front gears)	Right gear shift, for rear gears Note that on this bike there are 7 marked positions (7 rear gears)

"Gearing Up" Handout

The left shifter controls the front derailleur, for the front gears, or chainwheels. The right shifter controls the rear derailleur, for the rear gears, or freewheel.

The derailleurs, as their name suggest, "de-rail" the chain from one gear to the next, by pushing the chain to the left or the right.

From your own experience, and the pictures, answer the following questions.

1. Each time a pedal goes all the way around, which gearset--the front or the rear--goes around once?

2. When the rear wheel goes around once, which gear set--the front or the rear--goes around once?

3. If a bicycle has 2 gears in the front, and 5 in the rear, how many different combinations of gears are possible? Justify your answer.

For each of the remaining problems, assume that the bicycle has 2 gears in the front, one of which has 30 teeth and the other 24. The bicycle also has 5 gears in the back, with 8, 12, 16, 20, and 24 teeth.

4. Now list all the pairs of possible combinations of gears in the following format: (# teeth on the front gear, # teeth on the rear gear). For instance, one combination would be (30,12), indicating the 30-tooth front gear connected by the chain to the 12-tooth rear gear. Enter the values in the table below. The first example is entered already.

Number of teeth in front gear	**Number of teeth in rear gear**	**Gear combination**
30	12	(30,12)

Now that we have all the combinations of gears on our bicycle, we will learn how to interpret how the ratio of the gears affects the action of the bicycle.

5. If a front gear had 24 teeth, and a rear gear has 12 teeth:

    a. Each time the pedal goes around once, how many times does the rear gear (and wheel) go around?

    b. If the pedal goes around twice, how many times will the rear wheel go around?

    c. If the pedal goes around 4 times, how many times will the rear wheel go around?

We say that the ratio of the number of teeth in the front gear, to the number of teeth in the rear gear, is equal to 24:12. When we put this ratio in simplest terms, we call it the "gear ratio." Therefore, this 24:12 ratio represents a gear ratio of 2:1.

When the bike shop owner told Bianca about a speed gear, he was referring to gear ratios that cause the wheel to go around more times per pedal revolution. High performance bikes can have chainwheel-freewheel combinations that include gear ratios of up to 5 or more.

6. If the chain is on the 24 tooth front gear, and on the 8-tooth rear gear:

    a. What is the gear ratio?

    b. How many times does the rear wheel go around when the pedal goes around once?

    c. Will this combination result in a higher speed than the 2:1 gear ratio? Justify your answer.

7. Complete the table below with the gear combinations for the bicycle that has two gears in the front, one of which has 30 teeth and the other 24. And five gears in the back have 8, 12, 16, 20, and 24 teeth.

# teeth in front gear	# teeth in rear gear	ratio of # front teeth: # rear teeth	(gear ratio)	# turns of wheel for each turn of pedal
24	8	24:8	3:1	3
24	12	24:12	2:1	2
24				
24				
24				
30				
30				
30				
30				
30				

Percent

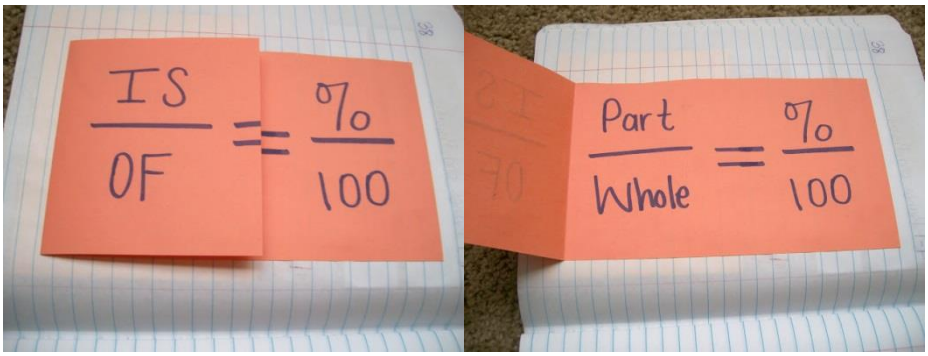
Warm-up:

See Percent Flash in Appendix

Foldable:

See Percent Fold It Up! in Appendix

Percent Proportion



Percent Review & Application Booklets

See Percent Review Book in Appendix

Measurement & Geometry

Standard (Customary) System

Foldable #1:

See Customary Measurement Foldable in Appendix

Foldable #2:

See Measurements in the Customary System Review Book in Appendix

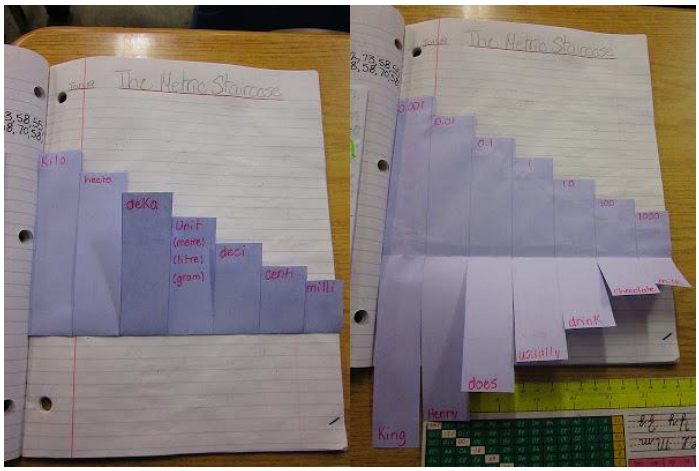
Metric System

Warm-up Game:

http://www.quia.com/rr/96635.html

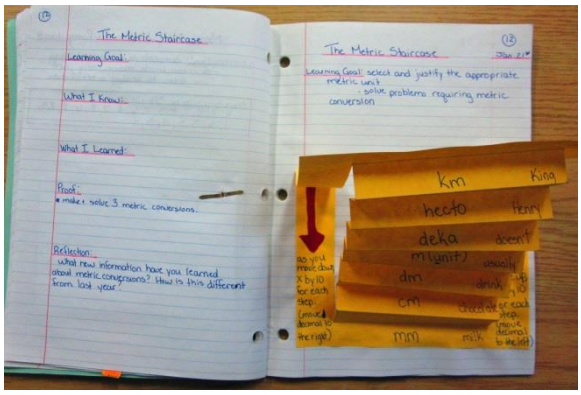
Foldable:

Metric Staircase #1:



The "Metric Staircase" shows students the order and the value of the prefixes of the metric system. On the inside record the mnemonic device "**K**ing **H**enry **D**oesn't **U**sually **D**rink **C**hocolate **M**ilk."

Metric Staircase #2:



For this interactive tool, you have to fold a piece of paper in half (we also trimmed a little bit off the side so it fit better in our notebooks). With the paper folded in half, draw two 12cm parallel lines down the page. Divide this into 6 sections (2 cm each). Do the same on the other side. Cut down the 12cm lines (NOT all the way to the bottom of the page) and when you open the paper, you have 2 slits down the page (24cm long). Fold the paper back and forth (accordion style) along each of the sections you made … and watch the magic staircase appear! We labelled each step with the metric prefix - and we wrote the mnemonic device on the side of each step to help the students remember – "**K**ing **H**enry **D**oesn't **U**sually (units) **D**rink **C**hocolate **M**ilk."

Conversion:

On the left side of the staircase make a BIG red arrow pointing down and write under it--
Move down-multiply by 10 for each step (shortcut: move decimal to the right).
On the right side of the staircase make a BIG red arrow pointing up and write under it—
Move up divide by 10 for each step (shortcut: move decimal to the left)

Lesson/Activity:

http://www.teacherspayteachers.com/Product/The-Metric-System-and-Handout-Math-PowerPoint-355181

This Power Point Presentation is located at Teachers Pay Teachers. Must become a member and then able to download this for free.

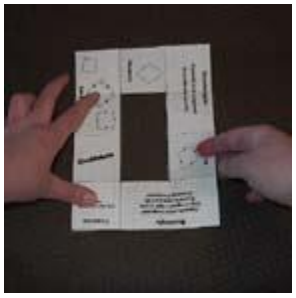
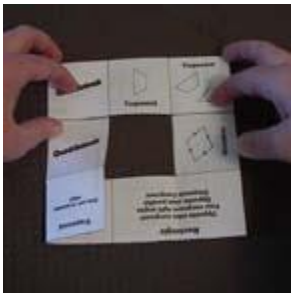
Shapes & Formulas

Quadrilaterals:

Quadrilateral Tetraflexagon

See Quadrilateral in Appendix

Directions:



1. Cut out the large square. Fold it into sixteen smaller squares. Then cut the four center squares out, leaving a ring of twelve small squares.
2. Fold the four left squares toward the center.
3. Fold the top three squares toward the center.
4. Fold the bottom two squares to the center. As you fold, the left side must carefully be tucked under.
5. Tucking the last square under produces the folded tetraflexagon

Quadrilateral Tetraflexagon Worksheet

1. What does “quadrilateral” mean? _____

2. Name four properties of a square

   _____ _____

   _____ _____

3. Name four properties of a rectangle

   _____ _____

   _____ _____

4. Name two properties of a rhombus

   _____ _____

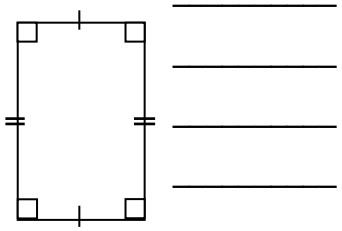
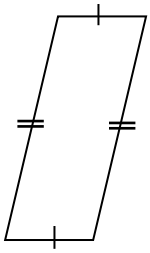
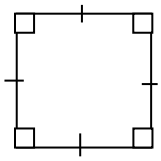
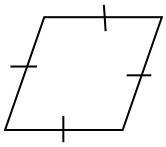
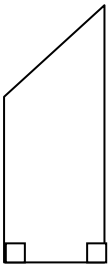
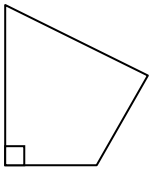
5. Name two properties of a parallelogram

   _____ _____

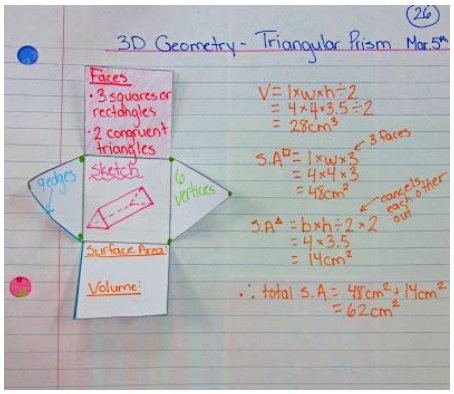
6. Name one property of a trapezoid

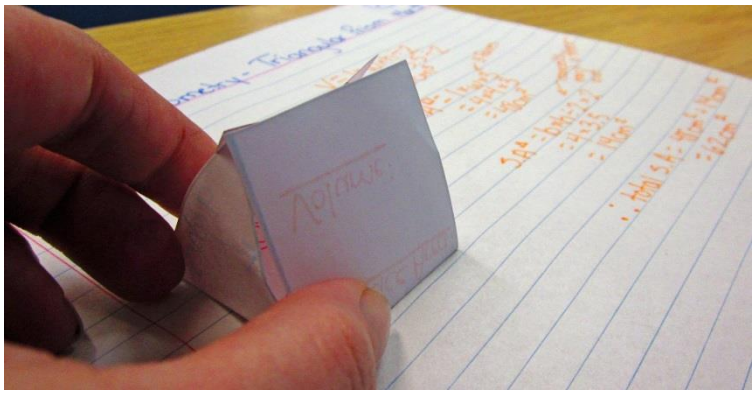
   _____

7. List all of the quadrilateral names that can correctly be used to describe these figures.

a)  _____ _____ _____ _____ _____	b)  _____ _____ _____ _____ _____	c)  _____ _____ _____ _____ _____
d)  _____ _____ _____ _____ _____	e)  _____ _____ _____ _____ _____	f)  _____ _____ _____ _____ _____

3-D Geometry





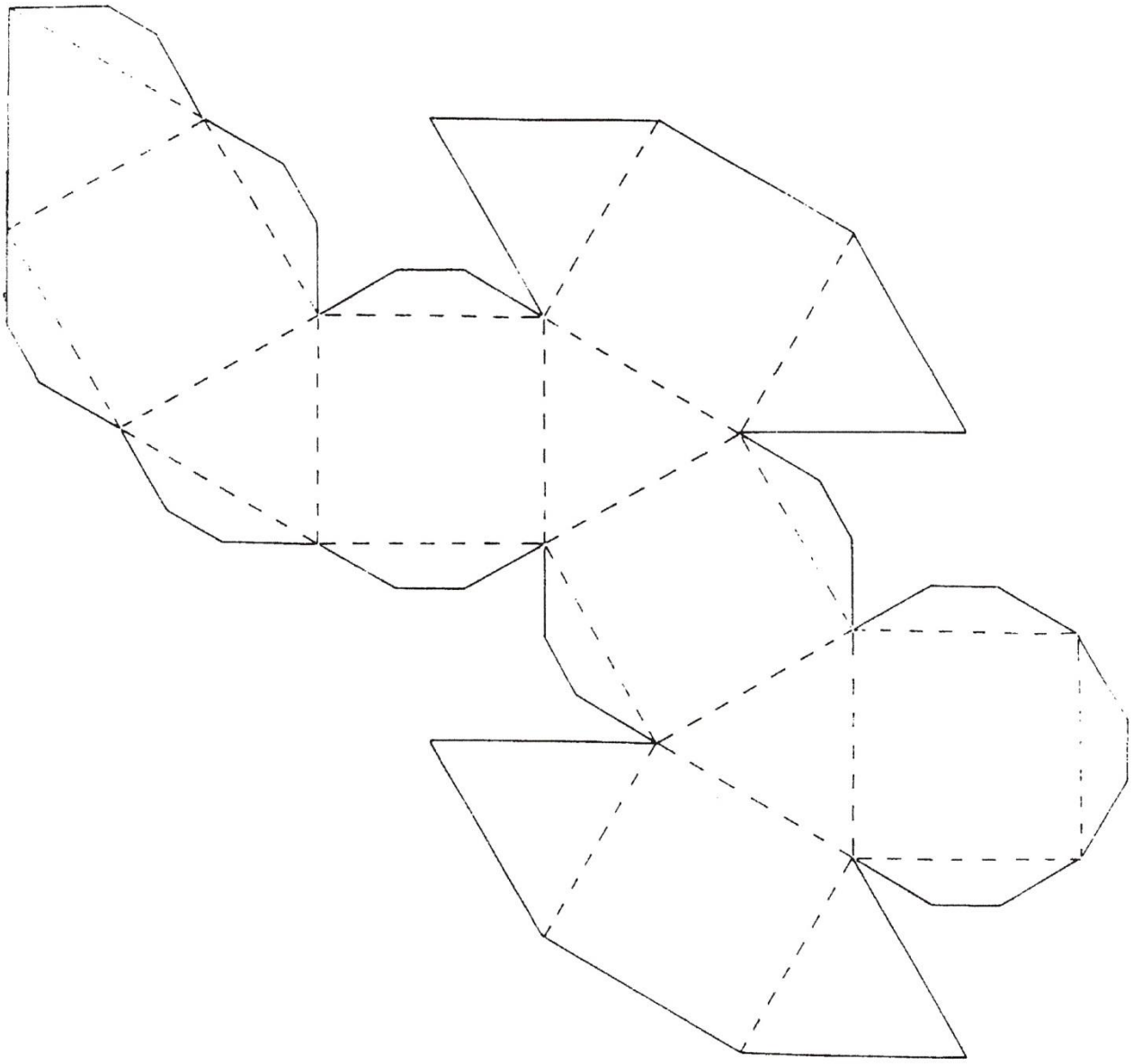
Data Analysis/ Probability/ Statistics

Probability

Warm-up:

ACTIVITY 5.3 *Experimental Probability*

The net of a cuboctahedron is given below. It consists of 6 squares and 8 triangles.
Make this 3-dimensional object using card.



If this object is thrown, what do you think will be the probability of it landing on

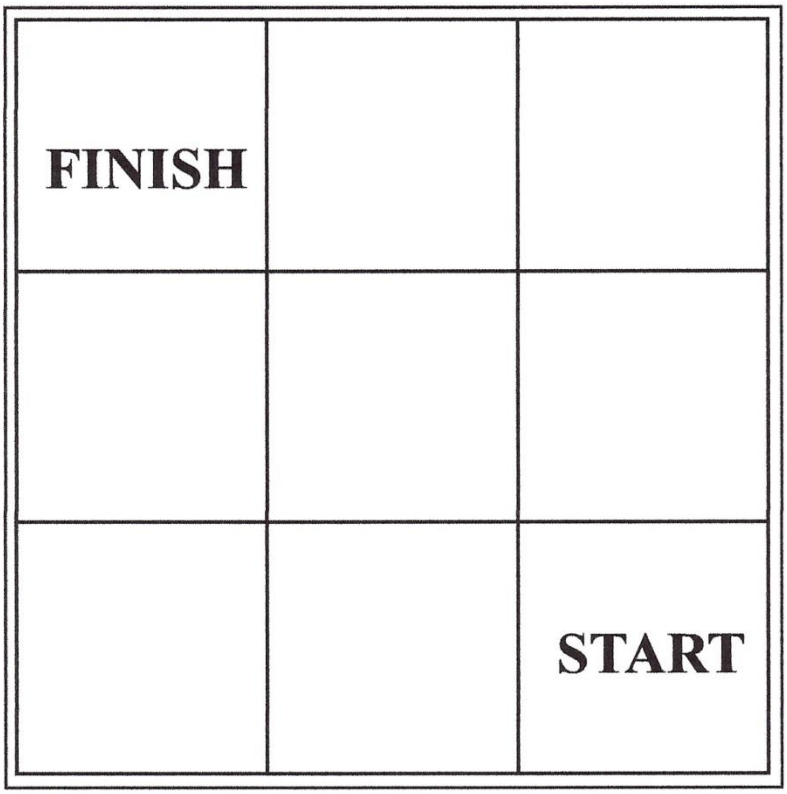
(i) one of its square faces

(ii) one of its triangular faces?

Throw the object (at least 100 times) and estimate these probabilities.
How close are they to your original estimates?

ACTIVITY 5.2 *Evens and Odds*

This is a simple game, where you throw a dice which controls the position of your counter on a 3×3 board.



Place your counter at the START square. Throw a dice.

If you get an EVEN number, you move your counter one square *upwards*.

If you get an ODD number, you move your counter one square *left*.

If your counter moves off any side of the board, you lose!

If your counter reaches the FINISH square, you have won.

Play the game a few times and see if you win.

How many 'odds' and how many 'evens' do you need to get to win?

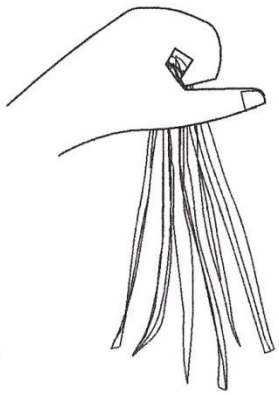
What is the probability of winning?

Extension

Analyse the same game on a 4×4, 5×5, . . ., board.

ACTIVITY 5.4 *A Russian Fable*

This is the method traditionally used in some Russian villages to see which of the girls in the village are to be married next year! You take three blades of grass, folded in two, and hold them in your hand so that the six ends are hanging down. A young girl ties the ends together in pairs. If, on release, a large loop is formed, the girl will be married next year.



1. What are the possible outcomes for this experiment in terms of small, medium and large loops?

2. By labelling the six ends (say *a* and A for the two ends of one blade of grass), consider all the possible outcomes and hence find the probability of getting the large loop.

3. Test your predicted probabilities by using short lengths of string and getting the class to work in pairs, recording their answers. Collect all the data together and use it to work out the experimental probabilities. Compare these to the theoretical values found in question 2.

4. If a Russian village has 30 young girls and they all go through this ritual, how many do you estimate will be predicted to marry next year?

Extension

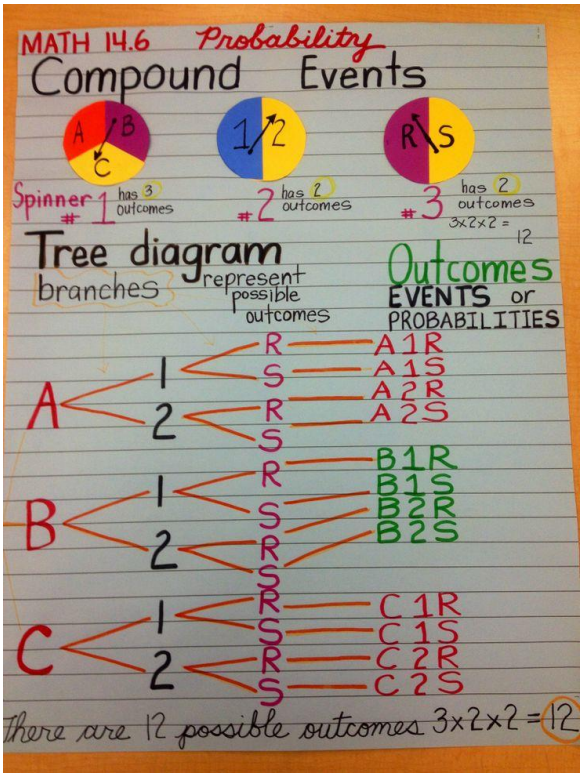
What happens if either 4 or 5 blades of grass (string) are used? What is the probability of now obtaining one large loop?

Foldable:

See Probability Foldable in Appendix

Lesson/Activity:

See m-n-m Probability Game in Appendix



See Probability in the bag in Appendix

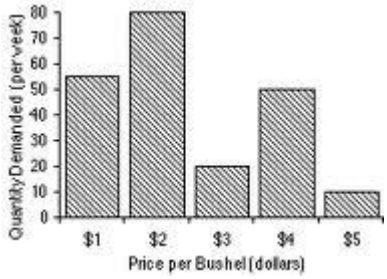
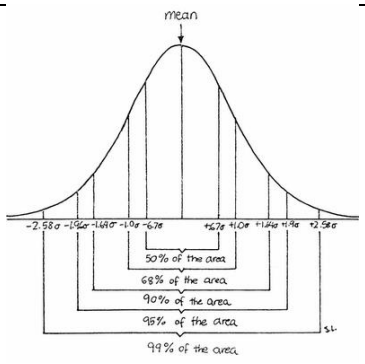
Measures of Central Tendency (Mean*Median*Mode*Range)

Warm-up:

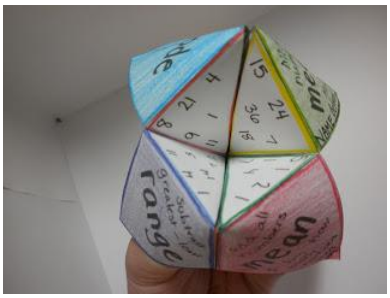
Copy tickets onto card stock. Shuffle and have students match each ticket to its Vocabulary Topic

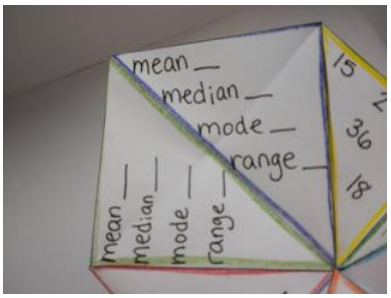
Mean (Average)	Median
The sum of the values in the set divided by the number of values in the set.	The middle value when the values are in numerical order, or the mean of the two middle values if there are an even number of values
$\bar{x} = \frac{x_1 + x_2 + x_3 + ... + x_n}{n}$	1. Order the data from least to greatest. 2. If there is an odd number of values, median is in the middle. 3. If there is an even number of values, then find average of the two middle values.
Find the mean with the given data: Number of hours Kaley did homework over the past six days: 3,8,4,6,5,4 Find the mean: $\bar{x} = \frac{3+8+4+6+5+4}{6} = \frac{30}{6} = 5$	Find the median with the given data: Number of hours Kaley did homework over the past six days: 3,8,4,6,5,4 Find the Median: 3,4,4,5,6,8 4 & 5 are the two values in the middle: mean = 4.5
Find the mean with the given data: The weight in pounds of Maizy's five cats: 12,14,12,16,16 $\bar{x} = \frac{12+14+12+16+16}{5} = \frac{70}{5} = 14$	Find the median with the given data: The weight in pounds of Maizy's five cats: 12,14,12,16,16 Find the Median: 12,12,14,16,16 =14

Mode	Range
The most frequently occurring value in the data set.	The difference between the greatest value of the set and the least value of the set.
The data set can have more than a single mode in which case it is multimodal or it can have no mode.	The range is a measure of how the data of a set is spread out.
Find the mode with given: data: Number of hours Kaley did homework over the past six days: 3,8,4,6,5,4 Mode: 4	Find the range using the given data: Number of hours Kaley did homework over the past six days: 3,8,4,6,5,4 Range = $8-3=5$
Find the mode with given data: The weight in pounds of Maizy's five cats: 12,14,12,16,16 Mode: 12,16	Find the range using the given data: The weight in pounds of Maizy's five cats: 12,14,12,16,16 Range: $16-12=4$

Bar Graph	Normal Curve (Bell Curve)
Shows the frequency of an element in a set of data and compares quantities.	A curve that represents a common distribution of data.
The bars in a bar graph must be of equal width and should not overlap	In a normal curve, the mean, median, and mode are all equal.
To make a Bar Graph: 1. Use the scale & interval from frequency table. 2. Draw a bar for the number of scores in each interval	In a normal curve, the mean corresponds to the maximum of the curve, half of the data values are above this value and half are below
	

Foldable:





Use template with directions and fold the cootie catcher. Label the four corners with Mean Median Mode Range and define each term.(pic #1) On the inside write a variety of integers with varying amounts of them.(pic #2) On the very inside flap write mean median mode & range.(pic #3). Before starting activity have each student create an answer key for their own cootie catcher. Have students work in pairs and write their answers in notebooks

Lesson/Activity:

"Candy Statistics" Lab Instructions

Objective: To find out if the number of candy in individually wrapped packages is normally distributed.

1. Count the number of candies in each package separately and log data in the frequency table.
2. Use the Tally column to make tick marks.
3. Count the tally marks and write the corresponding number in the *f* = frequency column.
4. Multiply the value from the 1st column with the value from the 3rd column and record the product in the last column labeled *nf*.
5. Total both the *f* =frequency and the *nf* column.
6. Find the Mean $\bar{x}$ of the data by dividing $\frac{total\ of\ the\ nf\ column}{total\ \ of\ the\ f=frequency\ column}$
7. Find the Median by listing all the data in the *n* = Number of Candy Pieces column in order from least to greatest and find the number in the middle.
8. Find the Mode by locating the most frequent value in the *f* = frequency column.
9. Create a bar graph on the transparency sheet. Use the graph paper as a guide if needed. Make sure you are using intervals that are appropriate for the data set.
10. Share your information with the class.

Count and log the number of pieces of candy found in each bag given to your group.

$n =$ Number of candy Pieces	Tally	$f =$ Frequency	nf (product of number of candy and frequency)

Use the data from the table above; find the following Measures of Central Tendency:

Mean $\bar{x}$ = Median = Mode = Range =

Roll two dice and log the sum of each roll

$n =$ sum of two dice	Tally	$f =$ Frequency	nf (product of sum of dice value and frequency)
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Use the data from the table above; find the following Measures of Central Tendency:

Mean = Median = Mode = Range =

Algebra

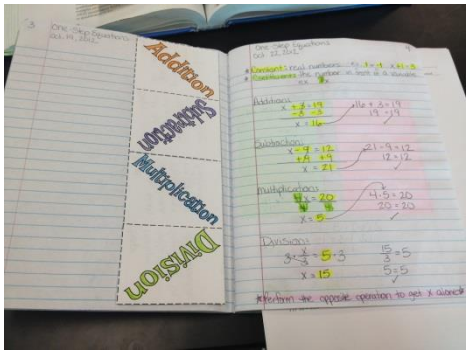
Foldable:

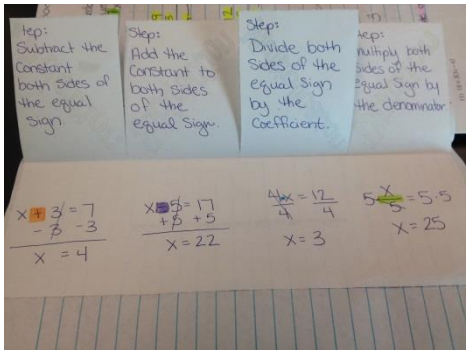
See Algebra Properties in Appendix

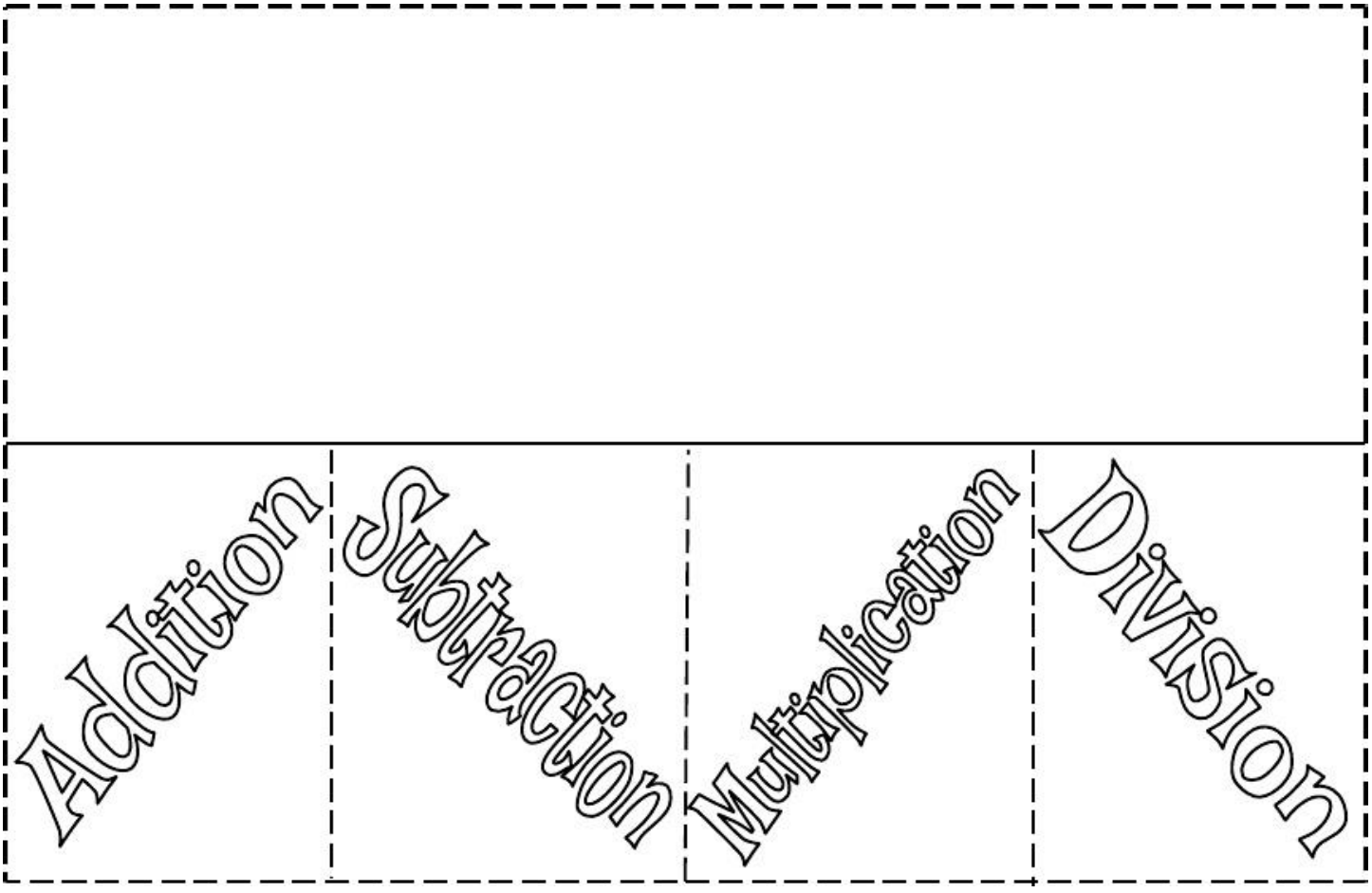
Single Variable Equations

One-Step Equation

Foldable:







Cut on the dotted line and fold on the solid line.

Fill out the foldable with each type of one-step equation. Make sure it is by type of problem not solution that is performed.

On the top of the flap write the step needed to solve for that specific problem and on the base work out a sample problem of each kind.

Multi-Step Equation

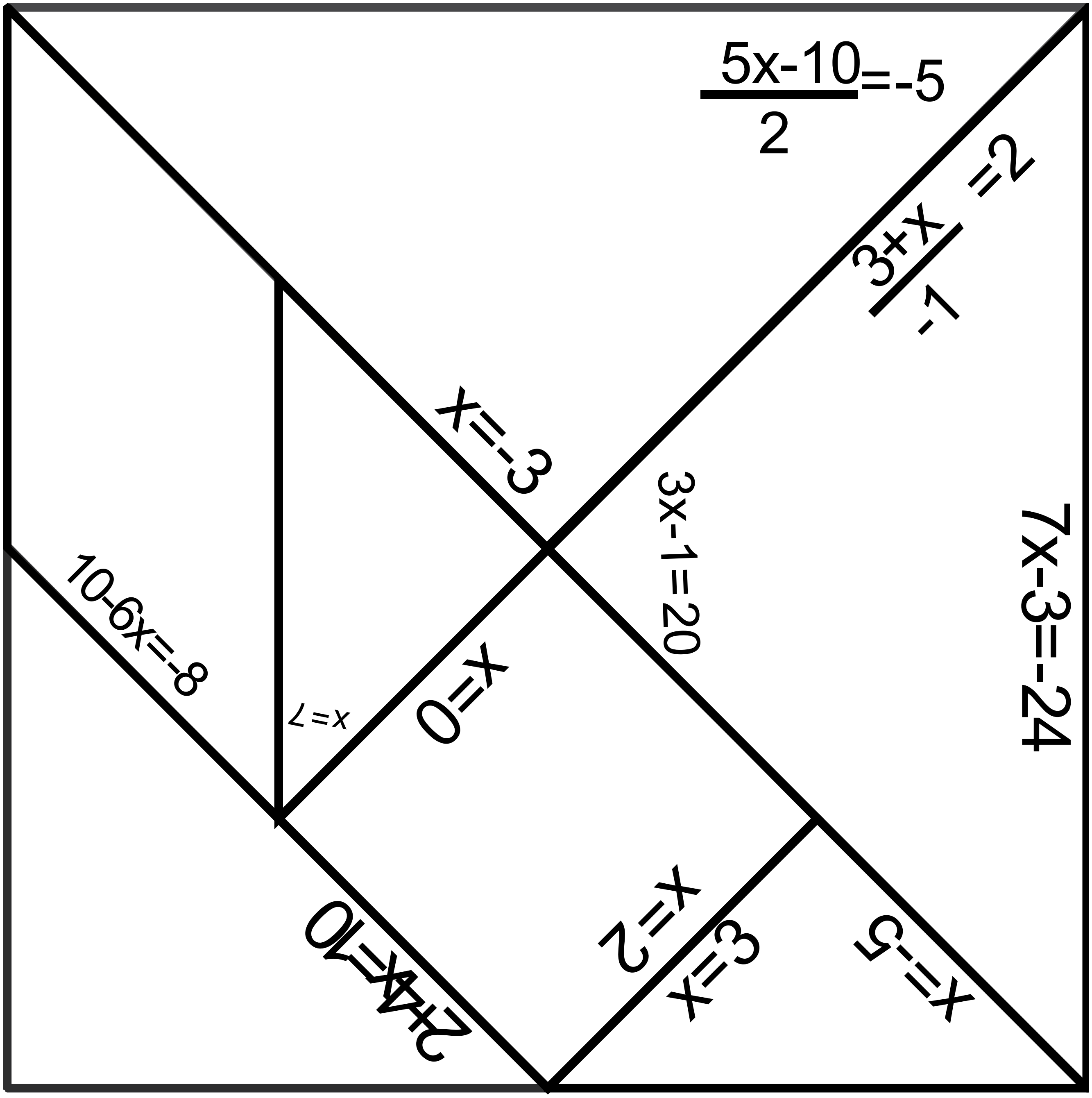
Warm-up:

Tangram Directions:

Copy each Tangram onto cardstock and have students cut them out so that they have 7 puzzle pieces: 2 large right triangles, 1 medium right triangle, 2 small right triangles, 1 square, and 1 parallelogram. Once they are finished invite them to start matching vocabulary words with definitions, math problems with answers or questions with answers. As students continue matching a formation will appear. Allow students to switch and try different puzzles.

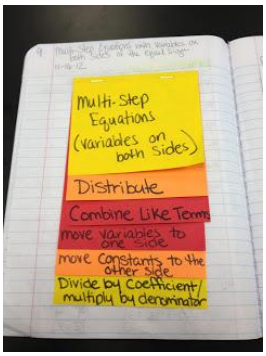
Tangram Game Rules:

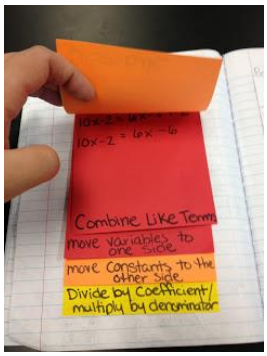
1. All 7 pieces must be used
2. All pieces must lie flat
3. All pieces must touch
4. No pieces may overlap
5. Pieces may be rotated and/or flipped to form desired shape



5x-10
2
=-5
3+x
-1
=2
x=-3
3x-1=20
7x-3=-24
10-6x=-8
x=7
x=0
x=2
x=3
x=-5
2+4x=-10

Foldable:

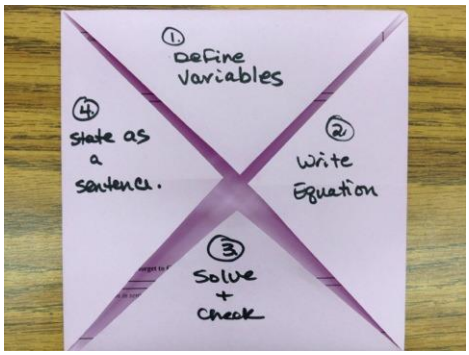


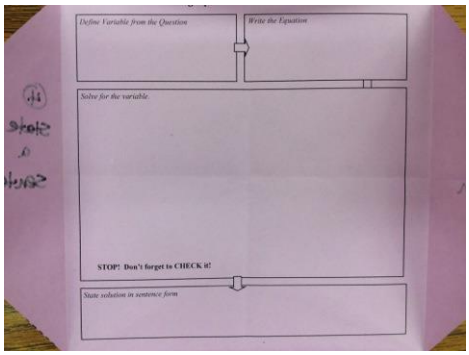


See Layered Look Book in Appendix

Word Problems

Foldable:





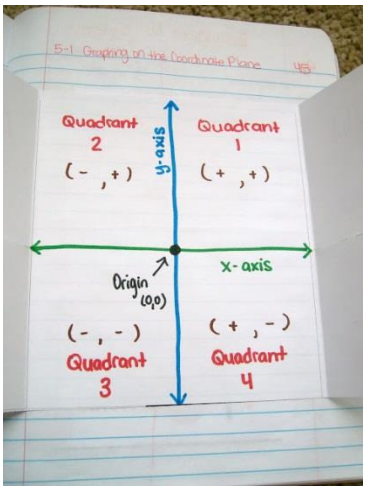
Coordinate Plane

Warm-up:

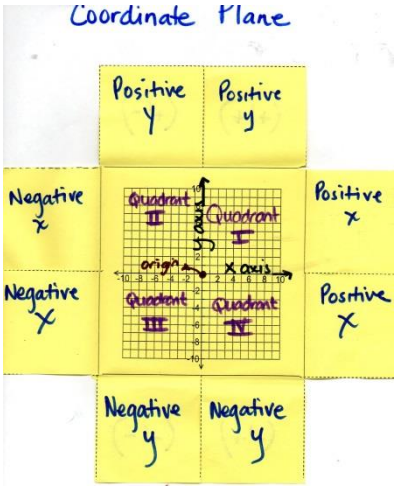
http://www.mathplayground.com/locate_aliens.html

QR Code: Locate the Aliens-an interactive game that assists with identifying coordinate pairs on a graph

Foldable:



Writing the word QUADRANT and the Big letter "C" allows the students to remember which order the quadrants go.



By adding in the extra tabs on top, bottom, and both sides allows for students to remember where the *x* and *y* coordinates are positive or negative.

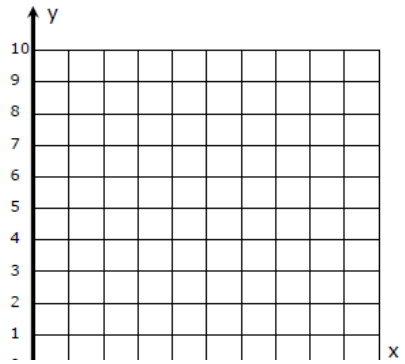
Linear Functions

Warm-up:

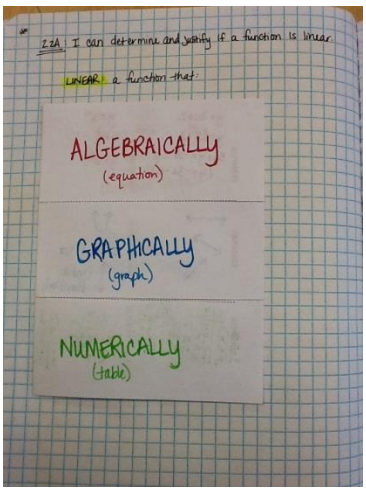
Functions

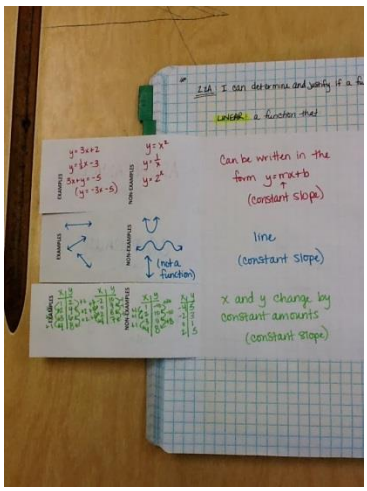
Make graph using this function:

Y = 2x + 4



Foldable #1:





Linear Functions can be represented 3 ways: Algebraically, Graphically, and Numerically. Use the template below to assist with spacing and the linear function graphs to create the table for the numerical tab.

Foldable #2:

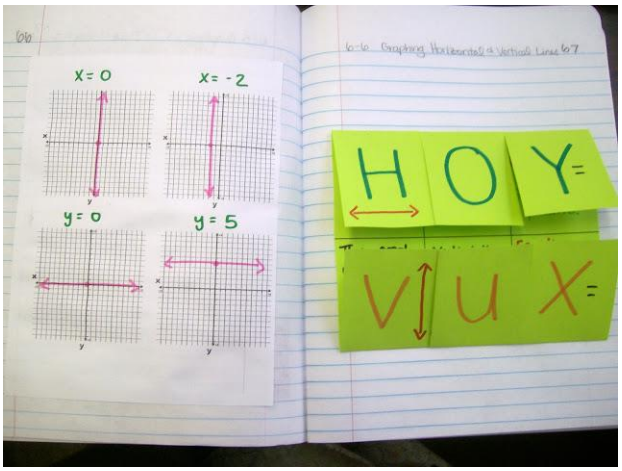
http://home.centurytel.net/cdefreese/foldables/trihexaflexagon.htm

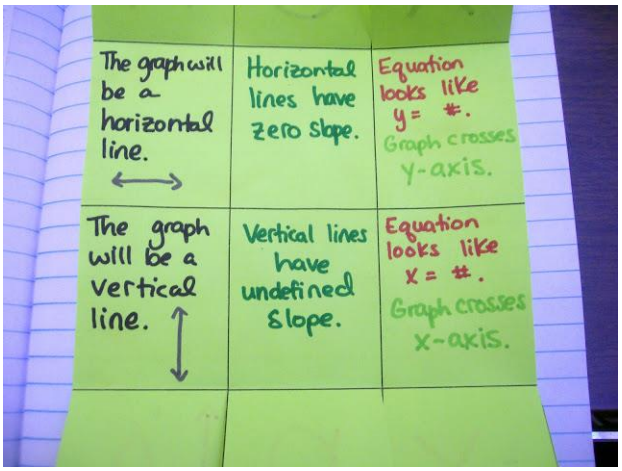
QR Code: Gives step by step directions for the Line Trihexaflexagon

Horizontal and Vertical Lines

Foldable:

http://mathequalslove.blogspot.com/2012/11/hoy-vux-foldable-with-template.html



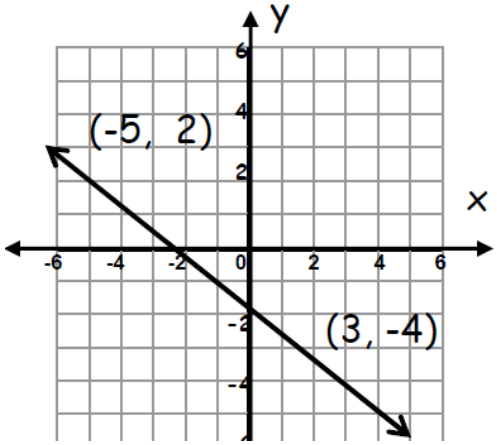


Slope

Warm-up:

Slope

Determine the slope.



Foldable:

Finding Slope 4 Different Ways:

See Finding Slope in Appendix

To fold: Place paper blank side up, fold along solid lines so each side (left &right) meets in the middle, cut along dotted lines(creating 4-flaps), solve each of the four ways to find slope on the inside under corresponding flap.

Lesson/Activity #1:

QR Code below: This Comparing Slopes Interactive can be used on its own or with a worksheet to verify different slopes.

Lesson/Activity #2:

SLOPING LETTERS

The letters of the alphabet can be written as a collection of straight line segments which is often necessary on digital displays when it is not possible to create curved segments. Some letters are naturally a group of straight lines, such as A or W.

If the letter is composed of straight line segments then each can be described by the slopes of the line segments of which it is composed.

For example:

E – one line with an undefined slope and three lines with zero slope

or V – one line with a positive slope and one with a negative slope.

To decode the following message, determine which letter best fits the description and put that letter in the corresponding box below the number.

1. Two lines with undefined slopes, one line with a positive slope and one with a negative slope
2. One line with a positive slope, one with a negative slope and one with zero slope
3. One line with an undefined slope and one with zero slope
4. Two lines with undefined slopes and one line with zero slope
5. One line with an undefined slope
6. Three lines with zero slope and two lines with undefined slopes
7. Two lines with zero slope and one line with an undefined slope
8. Two lines with undefined slopes and one line with zero slope
9. Two lines with undefined slopes and one line with a negative slope

1	2	3	4		5	6		7	8	9

Scientific Notation

Conversion

Warm-up #1:

QR Code: Power of 10 Game – Connecting the size of things in the universe to powers of ten

Warm-up #2:

Scientific Notation

Write in scientific notation.

1. 34,000,000

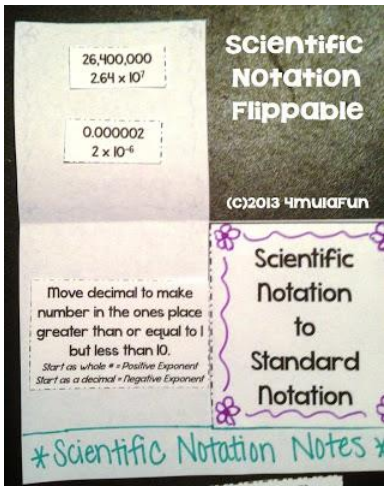
2. 0.0000543

Write in standard form.

3. 1.527×10^{7}

4. 8.3×10^{-9}

Foldable:



On the inside write the directions of how to convert from standard notation to scientific notation and vice versa. Include a few examples using both positive and negative exponents.

Lesson/Activity:

See Scientific Notation Card Sort in Appendix

Operations

Foldable:

See Scientific Notation Foldable in Appendix

Lesson/Activity:

QR code below: Scientific Notation explanations, worksheets, & activities.

Appendix

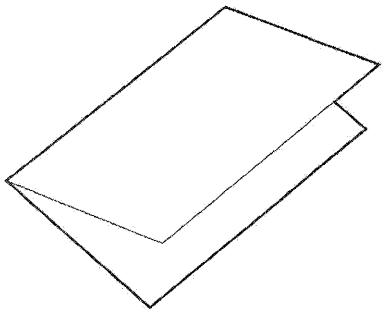
1. Foldables Basics
2. Assignment Discovery Online Curriculum
3. Order of Operations Bingo
4. Order of Operations Task Cards
5. Solving Proportions
6. Percent Flash
7. Percent Fold It Up!
8. Percent Review Book
9. Customary Measurement Foldable
10. Measurements in the Customary System Review Book
11. Quadrilateral
12. Probability Foldable
13. m-n-m Probability Game
14. Probability in the Bag
15. Algebra Properties
16. Layered Look Book
17. Finding Slope
18. Scientific Notation Card Sort
19. Scientific Notation Foldable

Macmillan McGraw-Hill

Foldables™ Basics

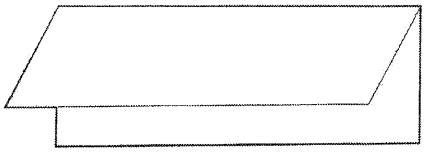
by Dinah Zike

Foldables study organizers are 3-dimensional, interactive graphic organizers that can help your students to organize, remember, review, and learn many kinds of information. They encourage students to use their creativity in a kinesthetic learning environment while reinforcing important thinking and communication skills. Listed below are a few basic Foldables instructions. On the other side you'll find some of the most versatile Foldables designs.



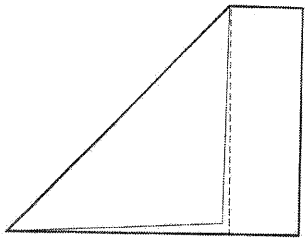
Hamburger Fold

Fold a rectangular sheet of paper in half along the long side.



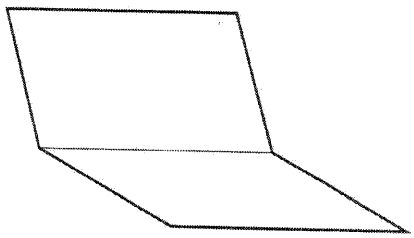
Hot Dog Fold

Fold a rectangular sheet of paper in half along the short side.



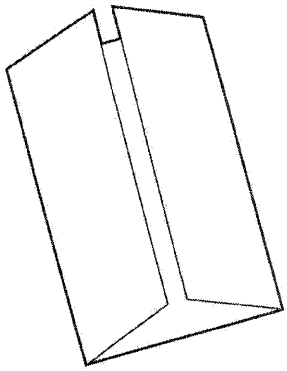
Taco Fold

Fold the corner of a sheet of paper over to create a triangle. Trim any excess.



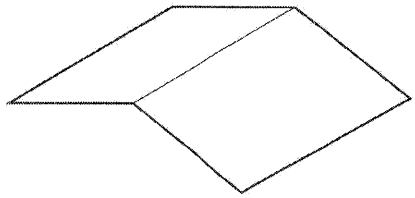
Valley Fold

A valley fold has sides that rise up from the center fold.



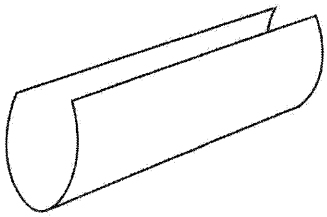
Shutter Fold

Find the midpoint on a piece of paper, then fold each side in to meet that point.



Mountain Fold

A mountain fold has sides that slope down from the center fold.



Burrito Fold

A burrito fold rolls the page up without creating a crease in the paper.

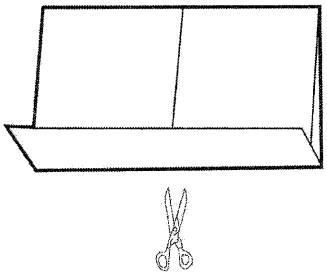
Macmillan McGraw-Hill

Foldables™ Basics

by Dinah Zike

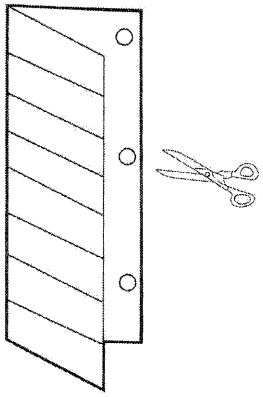
Matchbook

Fold a sheet of paper in half like a hamburger but leave one side one inch longer than the other. Fold that one-inch tab up over the short side to create an envelope-like fold. Cut in half or in thirds (depending on the paper size) to create multiple Matchbooks.



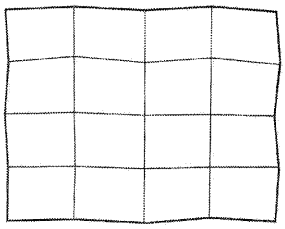
Vocabulary Book

Fold a sheet of notebook paper in half like a hot dog. On one side, cut every third line to create tabs. You can adjust the number of lines depending on the paper and the desired size of the tabs. Label the tabs with vocabulary words and write the definitions underneath.



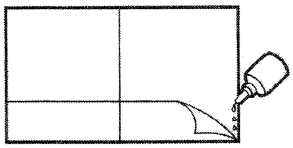
Folded Table or Chart

Fold a sheet of paper in half (for two columns), then in half again (for four columns). Do the same in the other direction for the desired number of rows, or simply make one fold along the top for column headings.



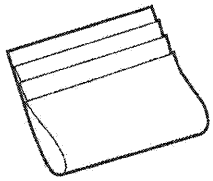
Pocket Book

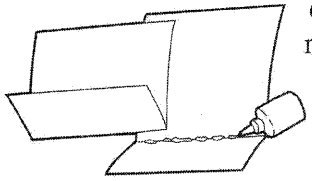
Fold a large sheet of paper in half like a hamburger. Open it up, then fold one of the long sides up to form a tab of about two inches. Refold so that the newly formed pockets are on the inside. Use glue or staples to secure the outer edges. Students can place index cards or quarter-sheets of paper inside the labeled pockets.



Layered-Look Book

Stack two or more sheets of paper so that the top edges are an equal distance apart. Bring the bottom edges up and align the sheets so that all of the layers (or tabs) are the same distance apart. Fold and crease well to form the Layered-Look Book. Use glue or staples to hold the sheets together. Students can label the tabs and record information inside the Layered-Look Book.





Assignment Discovery Online Curriculum

Lesson title:
Math in Everyday Life

Grade level:
2-3

Subject area:
Math

Duration:
Two class periods

Objectives:
Students will do the following:

- Discuss how to solve word problems involving time and money
- Work as a class to solve word problems focusing on addition, subtraction, multiplication, and simple fractions
- Work with a partner to make up their own word problems

Materials:
- Overhead projector with transparencies and pens

Procedures:
1. Begin the lesson by asking students to think about how time and money are used in their daily lives. Students may suggest the following:

- Amount of time it takes to get to soccer practice
- Amount of time they are supposed to practice their musical instrument
- The times school starts and ends
- How much money they earn for allowance or receive as gifts
- How much money they need to save to buy a new toy

2. Explain to students that they use math every time they figure out how much time or money they have, spend, or need. During this lesson, students will be working together to apply the math skills they already know (addition, subtraction, multiplication, and fractions) to solve real-life problems about money and time. They will begin by working as a class to solve word problems about money and time. After practicing, students will work with partners to apply the same writing and math skills as they prepare their own word problems involving either time or money.

3. Write the following problem on the board or on an overhead transparency:

> Your teacher told you to buy a notebook, a ruler, a pencil, and an eraser for math class. The notebook costs $3.00, the ruler $1.50, the pencil $.20, and the eraser $.40. What is the total amount of money you need to buy these items?

Ask students how they would solve this problem. First, discuss which operation they should use. Point out that the words "the total amount" usually indicate that addition is called for.

Go through the following steps with your students to solve this problem:

- To find out how much money you need, add up the following:
  $3.00
  $1.50
  $0.20
  $0.40
  +____
  $5.10

- You would need to take $5.10 to the store to have enough money to buy the supplies.
- Ask students how they would solve the problem if the teacher asked them to get three pencils and three erasers. Explain that when they hear the word *each*, they know that they will likely have to multiply.
  - To find out how much money you would need now, begin by multiplying:
    $.20 X 3 = $.60
    $.40 X 3 = $1.20
- Then add those totals to the other expenses for single items:
  $3.00
  $1.50
  $0.60
  $1.20
  +____
  $6.30

4. Now work on this problem with the class:

> Sophie has soccer practice at 3:45 p.m. If it takes one hour to drive there, plus an additional 15 minutes during rush hour, what time do she and her mother leave to get there on time?

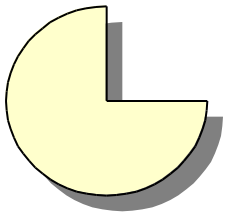
Discuss the way to solve the problem with the class. What operation must they use? Have them identify the need to use subtraction to determine that one hour earlier than 3:45 would be 2:45. Subtracting another 15 minutes would bring the time to 2:30. To get to practice on time, Sophie and her mom must leave at 2:30.

Ask students how they would figure out how much total time Sophie would be gone from home, including travel time to and from practice and actual practice time (which is 1 hour and 30 minutes). Tell them to try to use fractions in solving this problem.

In this case, they would need to determine that 1 hour and 15 minutes is the same as 1 1/4 hours and that 1 hour and 30 minutes is the same as 1 1/2 hours. Then they would add the travel time to the practice time and the travel time home:

1 1/4 hours
1 1/4 hours
+1 1/2 hours
4 hours

You may want to use a circle graph like this one to illustrate this information. The quarter of the pie missing represents 15 minutes, or one-quarter of an hour.



5. Give students one final problem to work on as a class:

> Jimmy's neighbors asked him to rake their leaves. They offered to pay him $5 an hour. How many hours must he work to earn $20?

To solve the problem, suggest that students set up the following equation: $5 X number of hours = $20.

You may choose to set up a table such as this one to illustrate how Jimmy earns money for each hour worked.

No. of hours	Money earned
1	$5
2	$10
3	$15
4	$20

If they know their multiplication tables, they will see that $5 x 4 hours = $20. If students have learned how to divide, they can divide $20 by 5 to get 4 hours.

6. Ask students if they understand how they use math all the time. Have them pick partners. Then have each pair make up one word problem focusing on time or money. The problems should give students practice working on addition, subtraction, multiplication, or fractions. Have students write their problems on a piece of paper or on a transparency so they can present to the class. After they have written the problems, have them prepare their own solution in the form of an equation or equations, as well as a written explanation of the steps they used to solve the problem.

Have each pair present its problem to the class. Have the presenting pair lead a discussion about the steps needed to solve the problem. Then they can reveal their own solutions.

Discussion Questions:

1. Which words in a word problem usually mean that addition is the correct operation to use? Which words usually indicate that subtraction should be used?

2. Give two examples of problems about money or time that came up in your everyday life. Were you able to solve them?

3. Take one of the problems presented by your classmates and add a sentence to it that requires using another mathematical operation to find the solution. (They might ask them to figure out how much time is needed each week, if the activity was only for one day. Or, they might ask how much change they would get back for their purchase, if they gave the cashier a $20 bill for a smaller amount.)

Evaluation:
Use the following three-point rubric to evaluate how well students listened in class, participated in class discussions, and were able to apply what they learned to write their own word problems.

Three points: very attentive during class; actively participated in class discussions; and applied what they learned to write accurate, interesting word problems.

Two points: somewhat attentive during class; showed some involvement during class discussions; and applied what they learned to write satisfactory word problems.

One point: not attentive during class; showed little involvement during class discussions; and had difficulty applying what they learned to write their own word problems.

Extension:

Tips for Solving Problems

Divide students into groups of three or four. Based on what they learned during class, have each group write a chart of at least three tips for other students on how to solve word problems. The chart should encourage students to do the following when solving word problems:

- Read the problem very carefully.
- Point out key words that signify which operation to use.
- Discuss the importance of showing the steps involved in solving a problem.

Students can be as creative as they want in developing their posters and can use symbols, drawings, or problems to express their ideas. If time permits, have students share their posters. Then display them in the classroom

Suggested Reading:

Numbers (Math Matters series, vol. 1)
Grolier Educational, 1999.
This is a clear introduction to the world of math and numbers. Lots of cartoon drawings explain the history of numbers, number places, minus numbers, fractional numbers, and numbers on graphs, and a lot more. Good examples accompany all the information. This is the first title in an excellent series to introduce young people to math concepts.

Telling Time: How to Tell Time on Digital and Analog Clocks!
Jules Older. Charlesbridge Publishing, 2000.
This is a colorful and cheerful introduction to telling time for young children. In addition to describing in detail how to tell time on both analog and digital clocks, the concept of time is covered. Lots of examples are found on every page and a poem at the end will help children remember how long things take!

Vocabulary:

decimal
Definition: A fraction (as .25 = 25/100 or .025 = 25/1000) or mixed number (as 3.025 = 3-25/1000) in which the denominator is a power of 10 usually expressed by use of the decimal point .
Context: We use **decimals** when we count money.

elapsed time
Definition: The actual time taken to complete a task.
Context: The amount of time it takes to complete a project is known as **elapsed time**.

equation
Definition: A mathematical statement of equality.
Context: Addition, subtraction, multiplication and division can be used in solving **equations.**

fraction

Definition: A numerical representation of a portion of a whole.
Context: One-fourth (1/4) and one-half (1/2) are **fractions.**

operation
Definition: The practical application of principles or processes; in mathematics, this refers to addition, subtraction, multiplication, or division.
Context: When solving word problems, the first step in finding the answer is determining which **operation** to use.

Academic Standards:
This lesson adheres to standards from the National Council on the Teaching of Mathematics:

- Numbers and Operations
- Problem Solving

Credit:
Marilyn Fenichel, freelance writer and curriculum developer.

This lesson was developed in consultation with Dianne Hoffman, consulting teacher in Montgomery County, Maryland.

Order of Operations Bingo

Cut into strips, and share just the expressions with the class.

Expression	Answer
$(5 \times 5) \div (5 \times 5)$	1
$7 \div 7 + 7 \div 7$	2
$1 + 1 + 1 \times 1$	3
$5 - 4 + 6 - 3$	4
$3 \cdot 2 - 1$	5
$2 \times 4 + 6 - 8$	6
$1 + 2 + 1 \times 2 + 1 \times 2$	7
$2 \times 2 + 2 \times 2$	8
$3 \div 3 \times 3 \times 3$	9
$1 + 2 + 3 + 4$	10
$2 \times 3 \times 4 - 6 - 7$	11
$5 \div 5 \times 5 - 2 + 9$	12
$((1 + 2) \times 3) + 4$	13

Expression	Answer
$2 \times 3 + 4 \times 5$	26
$4 + 5 \times 6 - 7$	27
$2 \times 2 \times (3 + 4)$	28
$(3 + 4 \cdot 5) + 6$	29
$9 \cdot 8 - 7 \cdot 6$	30
$4 + 3 \times 3 \times 3$	31
$4 \times 4 + 4 \times 4$	32
$7 + 6 \times 5 - 4$	33
$10 \times 9 - 8 \times 7$	34
$5 + 5 + 5 \times 5$	35
$(3 + 3) \times 2 \times 3$	36
$5 \times 6 + 7$	37
$(5 \cdot 4 \cdot 4 - 4) \div 2$	38

$1 \times 2 + 3 \times 4$	14
$5 + 4 + 3 \times 2$	15
$(1 + 2) \times (3 + 4) - 5$	16
$8 + 8 + 8 \div 8$	17
$6 \cdot 5 - 4 \cdot 3$	18
$5+4\times5-6$	19
$2 + ((3 + 4) + 5) + 6$	20
$1 + (2 + 3) \times 4$	21
$6 \times 7 - 5 \times 4$	22
$6 + (5 \times 4) - 3$	23
$2 \times 3 \times 4$	24
$(1 + 4) \times (4 + 1)$	25

$3 \times (4 + (4 + 5))$	39
$(4 + 3 + 2 + 1) \times 4$	40
$6 \times 7 + 8 - 9$	41
$2 \times 3 \times (3 + 4)$	42
$5 + 6 + 8 \times 4$	43
$4 \times (3 \times 2 \times 2 - 1)$	44
$8 + 7 \times 6 - 5$	45
$2 \cdot (3 + 4 \cdot 5)$	46
$2 \cdot 3 + 4 + 5 \cdot 6 + 7$	47
$54 - 3 \times 2$	48
$7 \times 7 \times 6 \div 6$	49
$8 + 7 \times 6$	50

B (1 – 10)	I (11 – 20)	N (21 – 30)	G (31 – 40)	O (41 – 50)

B (1 – 10)	I (11 – 20)	N (21 – 30)	G (31 – 40)	O (41 – 50)

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http://illuminations.nctm.org

Order of Operations Matching Task Cards

$16 \div 4 + 7 + 2 \times 5 =$	21
$(3 \times 8) - 6 + (24 \div 6) =$	22
$4^2 \div 2 + (28 \div 4) - 6 =$	9
$132 \div 4 - 5^2 + (17 \times 3) =$	59
$175 - 18 \times 3^2 \div 6 =$	148

$43 + 6^3 - (42 \div 2) =$	238
$4^3 \div 2 + (117 - 19) =$	130
$(81 \div 9) \div (15 \div 5) \times 16 =$	48
$53 + 3^3 \div (30 - 3) =$	54
$100 - 2^4 \times 3 - 16 =$	36

SOLVING PROPORTIONS USING CROSS PRODUCTS

STEP 1

STEP 2

STEP 3

Multiply diagonally. ("Play Pool")

$$\frac{16}{24} = \frac{x}{15}$$

$16 \bullet \_\_\_ = \_\_\_ \bullet x$

Divide both sides to get x alone.

$$\frac{\square}{\square} = \frac{\square}{\square}$$

$\_\_\_\_\_ = x$

Check so see if your proportion is correct. Try this strategy: Plug in x and reduce each fraction.

$$\frac{16}{24} = \frac{\_\_\_\_}{15}$$

Reduced:

$\_\_\_ = \_\_\_$

Percent Flash

Challenge your kid to use his knowledge about percentages in this fun game. Just roll the dice and race to calculate the percentage. Whoever gives the correct answer first earns a point and the first person to reach 15 points wins! In this game your kid will practice working out the percentages with the help of a calculator, a great tool for determining percentages.

Before getting started, it might help to briefly review how percentages work:

A percentage is a fraction or a part of a whole. Therefore, when working to find a percentage of a number, you will need to convert the percentage value to a decimal. For example, 25 % is equal to 0.25. You will multiply by the decimal amount to determine the percent. For example 25% of 60 is 0.25 x 60.

What You Need:

- Deck of cards with the face cards amd aces removed
- 2 dice
- One calculator per player
- Paper
- Pencil

What You Do:

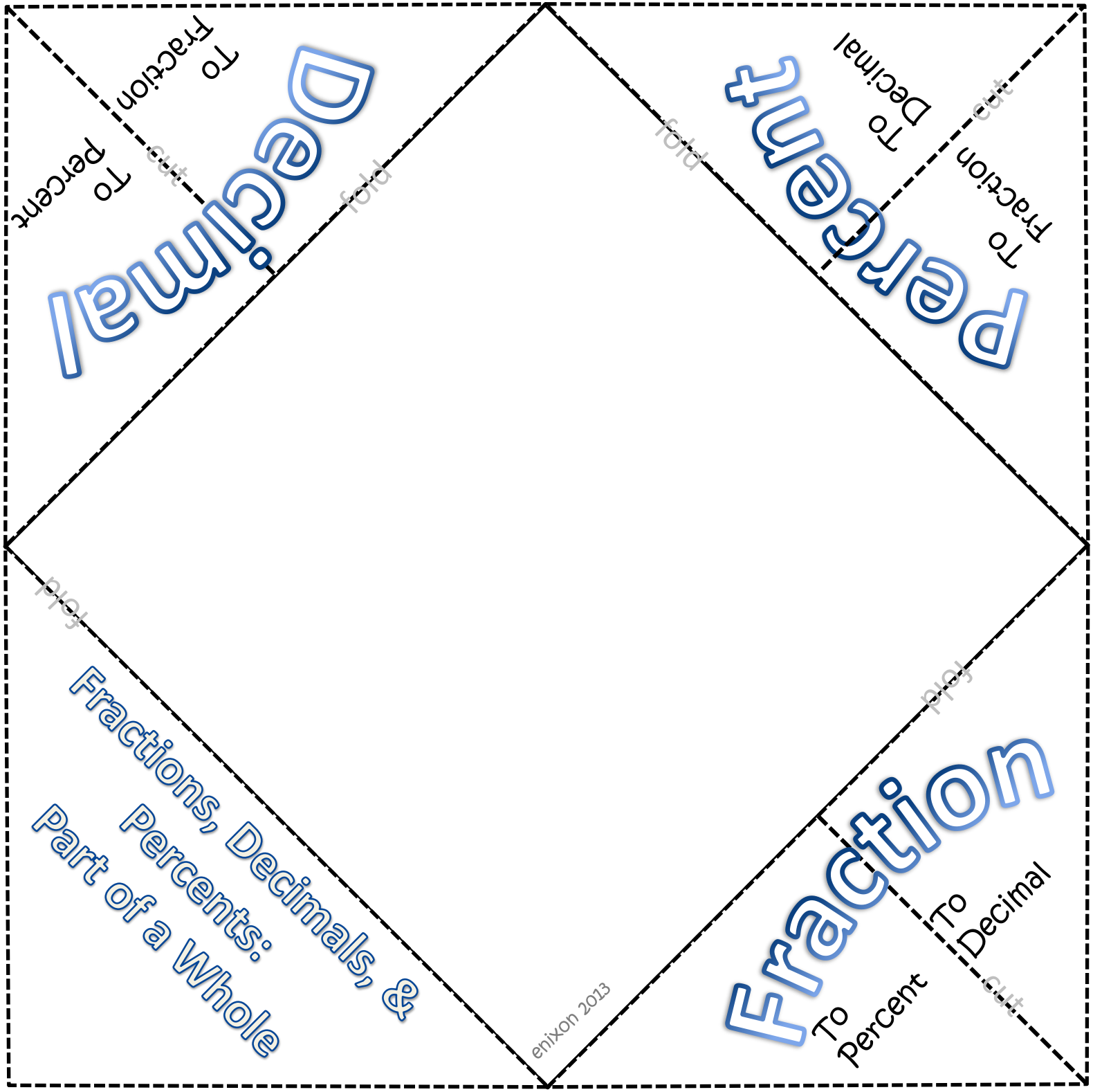
1. Explain to your child that in order to determine the percentage she will be working with in each round, she'll need to add a zero to the card she draws. For example, if she draws an 8 the percentage she'll need to calculate will be 80
2. Shuffle the deck of cards and place the cards face down in the center of the play area.
3. The first player should turn over a card and roll the dice. Players race to see who can get the correct percentage of the number rolled on the dice. For example, if the total of the 2 dice was 11 and the percent was 20%, players try to determine what is 20% of 11.
4. The first player to get the correct answer wins that round and gets a point.
5. Play continues until one player reaches 15 points.

Variations:

Instead of adding the dots on the dice, have one die stand for the tens place of a number and the other stand for the ones place. For example, if a player rolls a 2 and a 6, the number could be 26 or 62.

Fraction Decimal Percent Fold It Up!

Cut out the large square and then cut on the dotted lines to divide each triangle.




Fraction
To Decimal
To Percent
37.5%
To fraction
2 places to the left
43% = 0.43
Fractions, Decimals, & Percents:
Part of a Whole

fraction

÷ numerator by denominator

$\frac{3}{8} = 8\overline{)3.}$ 0.375

1) ÷ numerator by denominator

2) × 100 (move 2 places to right

$\frac{3}{8} = 0.375$

0.375 = 37.5%

1) Write as a fraction % as numerator & 100 as denom.

2) Reduce

20% = $\frac{20}{100} = \frac{1}{5}$

Decimal

Move decimal point 2 places to the left.

43% = 0.43

Write as a fraction using place value (tenths, hundredths)

$0.3 = \frac{3}{10}$

Move decimal Point 2 places to the right

0.56 = 56%

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Percent Review Book

Name _____

To Change a **Fraction** to a **Percent**:

- _____ the numerator by the denominator.
- Move the decimal point _____ places to the _____.

Examples:

$\frac{2}{3}$ =

$\frac{7}{8}$ =

$\frac{1}{2}$ =

$\frac{3}{4}$ =

Estimating with Percents:
Quick hints:

To find 10% of a number, drop the last 0 (or move the decimal over 1 place to the left).
Ex. Find 10% of 72
Answer is *about* _____.

To find 5% of a number, find 10%, then take half of it.
Ex. Find 5% of 81
Answer is *about* _____.

You can find 65% of a number by combining answers.
Find 50% + 10% + 5%

To Change a **Percent** to a **Fraction**:

- Write the percent over 100 and reduce the _____ fraction.

OR

- Change the percent to a _____ and use the place value name to write the fraction.

Examples:

9% =

36% =

87.5% =

60% =

15% =

Percent Proportions:

Use the formula:

$$\frac{\%}{100} = \frac{\text{is}}{\text{of}}$$

"**Is**" is the _____, while "**Of**" is the _____.

(Don't be fooled: Sometimes the Part is bigger than the whole! Think of Extra Credit.)

Examples:

What percent of 25 is 13?

What is 35% of 40?

16 is 25% of what number?

What percent of 40 is 50?

Applications of Percents

Name _____

Calculating Sales Tax

1. Change percent to a _____ by moving the decimal _____ places to the _____.
2. _____dollar amount by the sales tax decimal.
3. **ADD** sales tax to calculate total.

Example:
Calculate 8.75% sales tax and total cost for a $48 purchase.

Sales tax _____

Total _____

Calculating Percent Change

Use the formula:

$$\frac{\text{change}}{\text{original}}$$

⇒ Then change to a percent.

Example: Last year, your math average was 80. This year, it is 100. Find the percent change.

Answer _____

Calculating Interest

Use the formula ***I = prt*** , where

p = _____

r = _____

t = _____

Example: Calculate interest earned on a $400 investment at 2.5% interest for 3 years.

Answer _____

Calculating Discount and Sale Price

1. Change percent to a _____.
2. _____dollar amount by the discount decimal.
3. SUBTRACT discount price from original to calculate total.

Example:
Calculate discount and sale price for a $64 item marked 35% off.

Discount _____

Sale Price _____

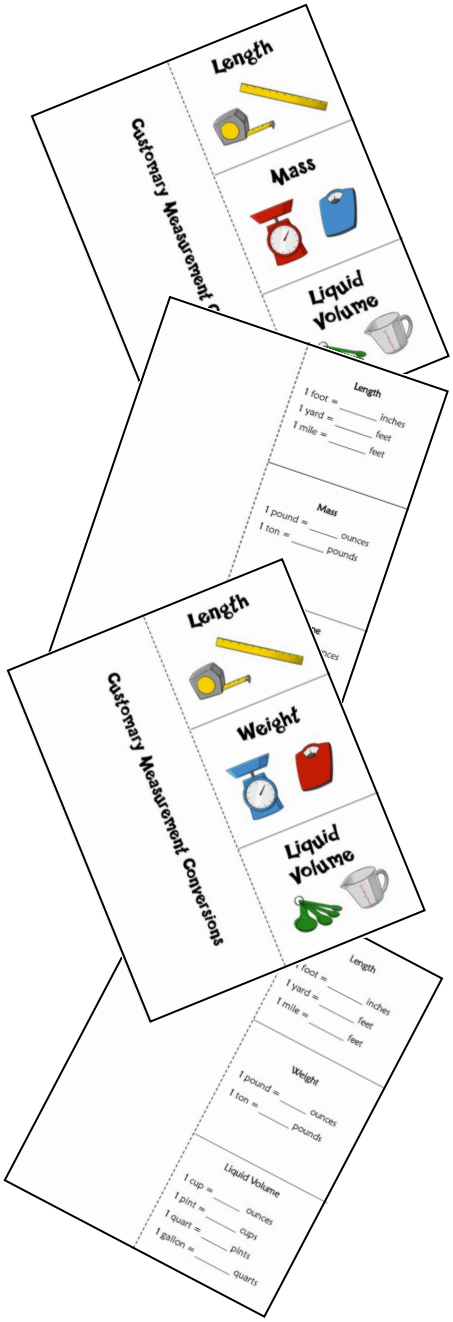
Calculating Commission

1. Change percent to a _____.
2. _____dollar amount by the discount decimal.

Example: Calculate 3% commission on a $1900 sale.

Answer _____

Customary Measurement Foldable



By Laura Candler

The Customary Measurement Foldable is a three-flap foldable that students can use to take notes when learning about customary measurement. Please note that it's aligned with Common Core Standards for 4th and 5th grade, and the CCSS standards use the term "mass" and "weight" interchangeably in elementary school. I've included two variations of the pattern so you can choose the term you prefer to use with your students.

To create the foldable, print the two pages back to back. Fold in half on the vertical dotted line and cut the solid lines to form flaps. Students can lift up each flap and fill in the basic conversion units during your lesson. Great for math test prep and review!

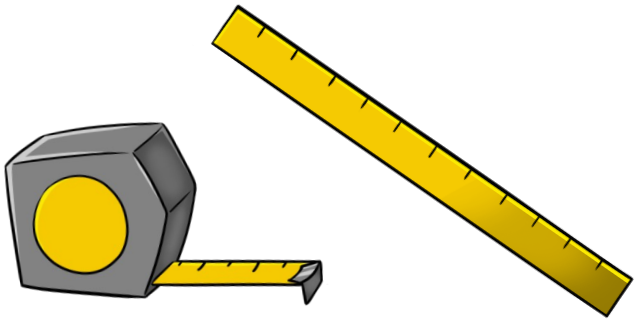
This foldable is a free sample from my Customary Measurement Conversions Power Pack. If you like it, please take a look at the entire CCSS aligned teaching resource. You might also be interested in Gallon Robot to the Rescue. Both can be found in my TpT store.

www.teacherspayteachers.com/Store/Laura-Candler

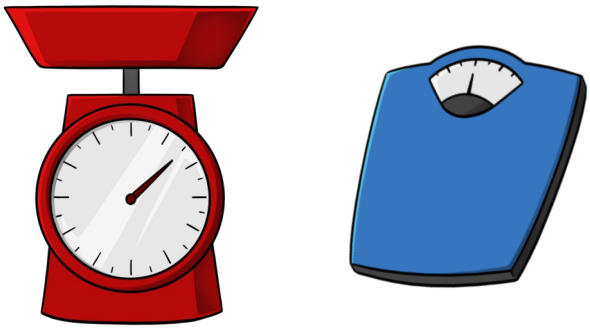
Laura Candler

Customary Measurement Conversions

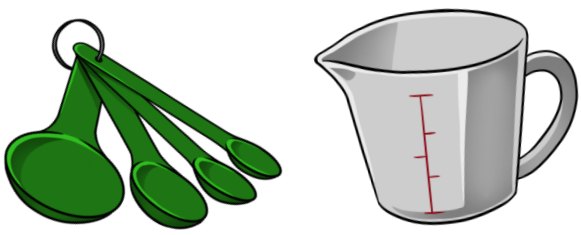
Length



Mass



Liquid Volume



Length

1 foot = _____ inches

1 yard = _____ feet

1 mile = _____ feet

Mass

1 pound = _____ ounces

1 ton = _____ pounds

Liquid Volume

1 cup = _____ ounces

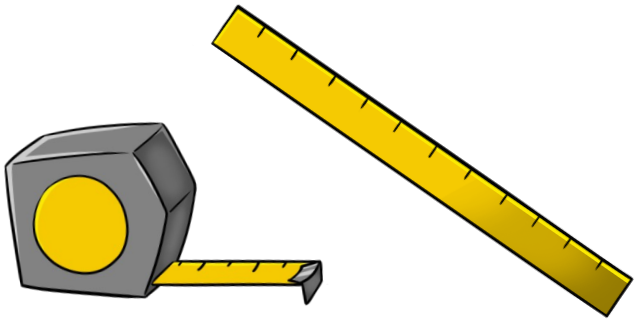
1 pint = _____ cups

1 quart = _____ pints

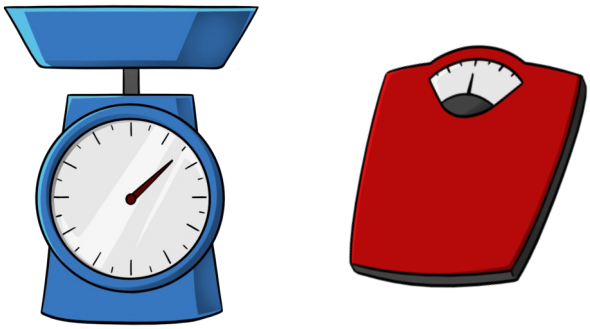
1 gallon = _____ quarts

Customary Measurement Conversions

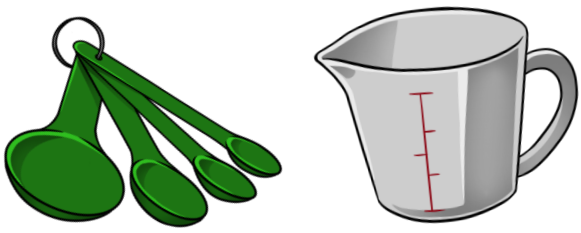
Length



Weight



Liquid Volume



Length

1 foot = _____ inches

1 yard = _____ feet

1 mile = _____ feet

Weight

1 pound = _____ ounces

1 ton = _____ pounds

Liquid Volume

1 cup = _____ ounces

1 pint = _____ cups

1 quart = _____ pints

1 gallon = _____ quarts

Common Core Alignment

The Customary Measurement Foldable is aligned with the parts of the 4th and 5th Grade Common Core Operations Measurement and Data Standards below:

4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.

5.MD.1 Convert among different-sized standard measurement units within a given measurement system .

Even though the foldable is not specifically aligned with standards for middle school students, it will come in handy if they are having trouble remembering their basic units of measurement.

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If you enjoyed the materials in this teaching resources pack, you might also enjoy these ebooks and lessons. You can purchase them from my store on TeachersPayTeachers.com by clicking the links below or by visiting my Teaching Resources website: www.lauracandler.com.

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Bingo Showdown:

Confusing Words Review

Character Bio Reports

Analyzing Character Traits

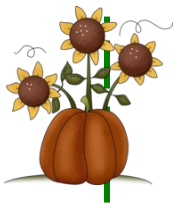
Powerful Poetry Combo

Plural Noun Showdown

Sentence Go Round

Writing Powerful Poetry

Seasonal Teaching Packs



October

November

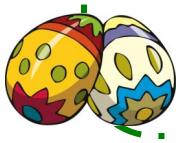
December

January

February (Free!)

March

April



Geometry: Exploring the Basics

Math Stations for Middle Grades (3-8)

Mastering Math Facts

Polygon Explorations

Talking Sticks Discussions (CCSS Aligned)

Place Value Spinner Games

Fraction Spinner Games

Simplify and Snap Fraction Game

Order of Operations Bingo

Measurement in the Customary System Review Book

This book belongs to:

____

Facts from Reference Sheet

1 pound (lb.) = 16 ounces

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

TRY THIS!

20 fluid ounces = ________ cups

TRY THIS!

6.5 tons = ________ lbs.

How to find equivalent measurements:

1. Locate the appropriate conversion fact from your reference sheet.
2. Write that fact (with labels) and underline each side of the equal sign.
3. Write the information you know from the question under the conversion fact (NOTE: Be sure to match units/labels).
4. Fill in the empty area with a variable (x).
5. Solve the proportion using

EXAMPLE 1:

18 quarts = _________ pints

Use this fact: 1 quart = 2 pints

$$\frac{1\text{ qt}}{18\text{ qt}} = \frac{2\text{ pt}}{x}$$

Solve: $\frac{1}{18} = \frac{2}{x}$

EXAMPLE 2:

18 quarts = _________ gallons

Use this fact: 1 gallon = 4 quarts

$$\frac{1\text{ gal}}{X} = \frac{4\text{ qt}}{18\text{ qt}}$$

Solve:

EXAMPLE 3:

11 pounds = __________ oz.

Use this fact: 1 pound = 16 ounces

Measurement in the Metric System

Review Book

This book belongs to:

____

How to find equivalent measurements:

1. Locate the appropriate conversion fact from your reference sheet.
2. Write that fact (with labels) and underline each side of the equal sign.
3. Write the information you know from the question under the conversion fact (NOTE: Be sure to match units/labels).
4. Fill in the empty area with a variable (x).
5. Solve the proportion using

EXAMPLE 1:

60 mm = _________ cm

Use this fact: 1 cm = 10 mm

$$\frac{1\text{ cm}}{X} = \frac{10\text{ mm}}{60\text{ mm}}$$

Solve: $\frac{1}{x} = \frac{10}{60}$

EXAMPLE 2:

5.8 km = _________ meters

Use this fact: 1 km = 1,000 meters

$$\frac{1\text{ km}}{5.8\text{ km}} = \frac{1{,}000\text{ m}}{x}$$

Solve:

EXAMPLE 3:

2,450 mL = __________ liters

Use this fact: 1 liter = 1,000 mL

TRY THIS!

50 grams = __________ kg

TRY THIS!

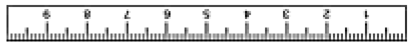
2.4 kg = _________ grams

Facts from Reference Sheet

1 centimeter = 10 millimeter

1 m = 100 cm = 1,000 mm

1 kilometer = 1,000 meters



1 gram = 1,000 milligrams

1 kilogram = 1,000 grams

1 liter = 1,000 milliliters

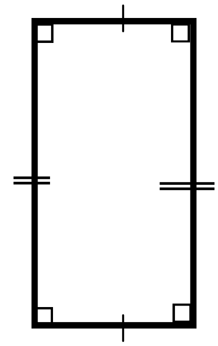
1 kiloliter = 1,000 liters

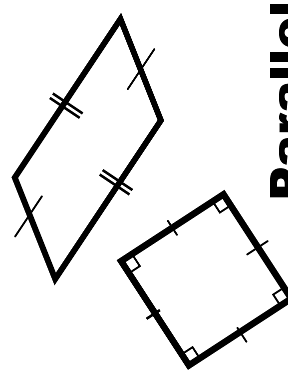
Rectangle

Opposite sides congruent
Four congruent right angles
Opposite sides parallel
Diagonals congruent

Rhombus

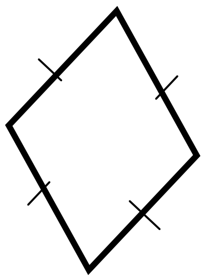
Four congruent sides
Opposite sides parallel





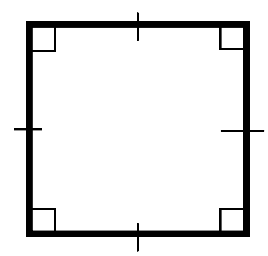
Parallelogram

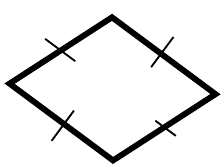
Rhombus



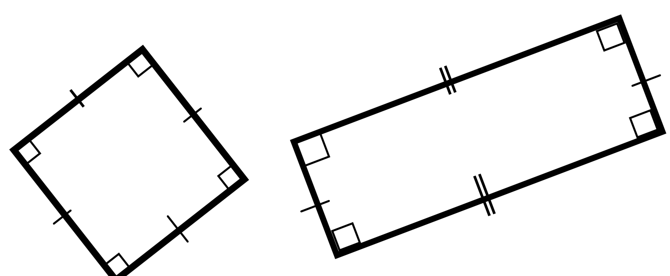
Parallelogram

Opposite sides congruent
Opposite sides parallel



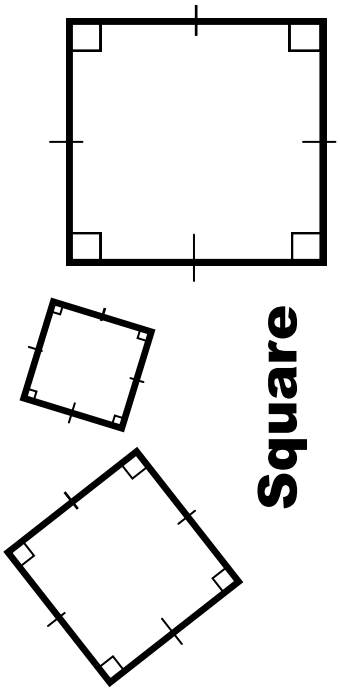
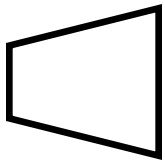
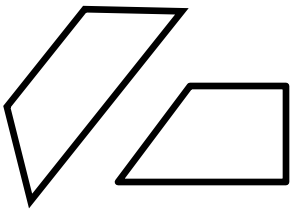


Rhombus



Rectangle

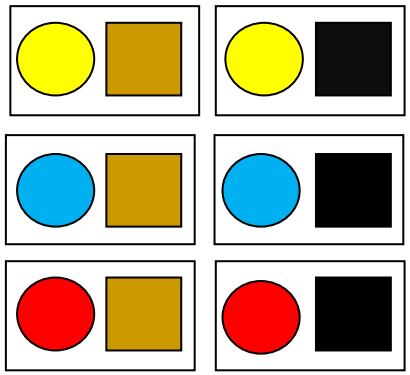
Bottom of Page

Trapezoid One pair of parallel sides	 **Trapezoid**	**Quadrilaterals** **Quad - "four"** **Lateral - "side"** **Quadrilateral** **"four sides"**	**Square** **Four congruent sides** **Four congruent right angles** **Opposite sides parallel**
Quadrilaterals			
 **Square**			**Quadrilaterals**
	Quadrilaterals	 **Trapezoid**	**Trapezoid** 

Count the objects and use pictures to find the possible combinations.

Make a chart with all the **possible combinations**.

3 shirts
*yellow, blue, red
2 pants
*black, brown



Each possible result of a situation is called an **outcome**.

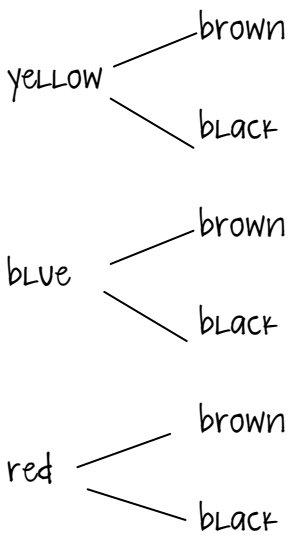
You can find the total number of possible outcomes by multiplying the possible outcomes for each situation.

For example:
Multiply the number of shirts by the number of pants.

$3 \times 2 = 6$

A **tree diagram** is a display that shows all the possible outcomes.

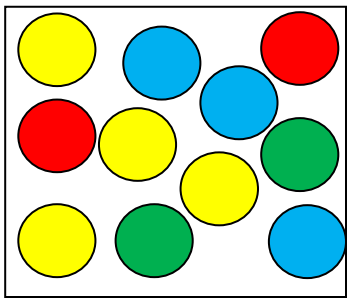
What are the possible combinations of three shirts and 2 pairs of pants?



Probability is the likelihood that an event will happen.

To make a fraction, you put the number of favorable outcomes as the numerator and the total number of outcomes as the denominator.

What is the fraction for the chance of picking a blue circle from the pile?



$$\frac{\text{There are 3 blue circles}}{\text{There are 11 total circles}}$$

$$\frac{3}{11}$$

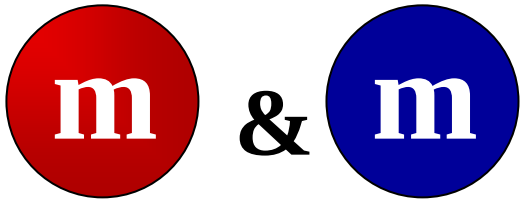
Outcomes

Finding Combinations

Probability as a Fraction

Tree Diagrams

M & M Probability Game



Probability

2	3	4	5	6	7	8	9	10	11	12

m & m Probability

GETTING STARTED:

- **Place M&M pieces on number line.**
- **Record on M & M recording sheet by drawing circles to represent where you placed the pieces.**

2	3	4	5	6	7	8	9	10	11	12
	○	○	○	○	○	○	○	○	○	
				○	○	○				

m & m Probability

PLAY GAME:

- **Toss two dice and add to get sum.**
- **If you have a piece on that number, remove it and record X on recording sheet.**
- **If you do not have a piece on that number, write an X in box.**

2	3	4	5	6	7	8	9	10	11	12
X	○	○	○	⊗	○	⊗	○	○	○	
				⊗	○	○				
				X						

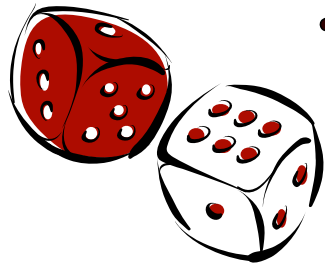
m & m Probability

PLAY GAME:

- **Continue playing until you have removed all of your pieces.**
- **Count up how many rolls it took to get all of your pieces. (Count the X's on your sheet.)**
- **Record results on class line plot.**

2	3	4	5	6	7	8	9	10	11	12
X	○	○	○	⊗	○	⊗	○	○	○	
				⊗	○	○				
				X						

M&M Probability



Directions:

1. With a partner, get an M&M number line, a set of dice, and 24 M&M counters.
2. Each player gets 12 M&M counters.
3. Each player will place all 12 M&M counters vertically along their number line. You may place them anywhere you want from 2 to 12.
4. Once both players have distributed their M&M counters, one player will role the dice. Together, you will find the sum of numbers that appear on the face of the dice. If you have a counter on that number, take it off the number line. If there is no M&M counter above that number, you don't do anything.
5. Continue to role the dice and remove the M&M counters .The first player to remove of all their M&M counters from the number line first wins.
6. Both players will record one set of data using the tally chart on this page. Every time your team rolls the dice and a sum is found, record a tally mark.
7. Both players will answer the questions on a separate piece of paper and then play again!
8. After round 2, answer the next set of questions.
9. Hand in your answers.
10. Find which sum was rolled most frequently. Plot your most frequent sum on the class line plot.

Sum	Frequency Round 1	Frequency Round 2
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Questions After Round 1:

1. Is the game fair? Explain why you think so.
2. How did you decide where you would place the counters?
3. In round 2, will you place your counters differently?

Class Data (After rounds 1 and 2)

Which sum was rolled the most?

_____

Questions After Round 2:

1. Did the changes in the distribution of the counters change your outcome?
2. Examine the frequency table from rounds 1 and 2. Do you see a pattern?
3. How is probability used in this game?
4. If you only rolled one die, would your outcome be the same?

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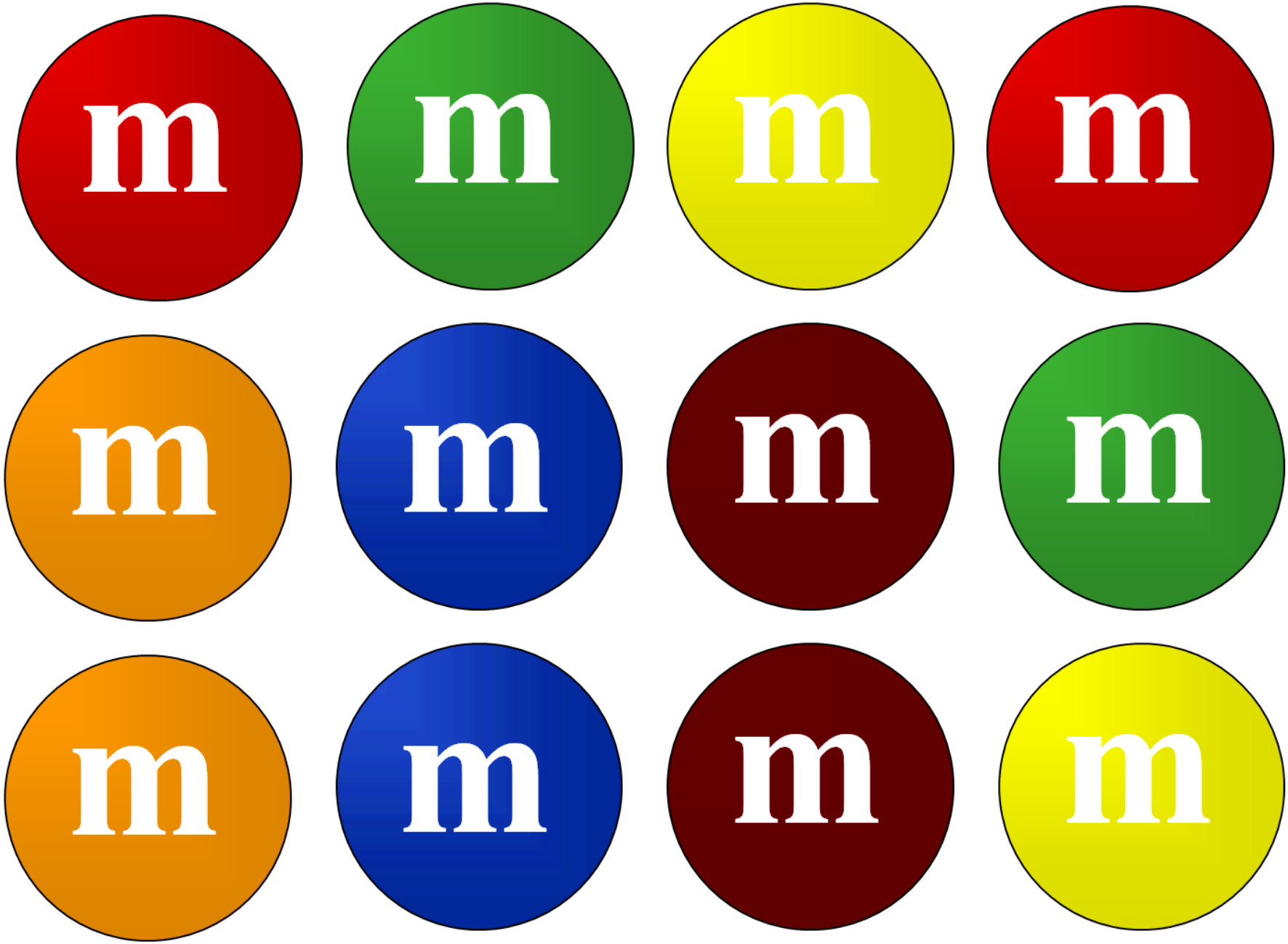


M&M PROBABILITY GAME PIECES

What's in the Bag?

D9. Conduct simple probability experiments and draw conclusions from the results; e.g., rolling number cubes or drawing marbles from a bag.
D10. Represent the likelihood of possible outcomes for chance situations

What's in the Bag?

(Part 1)

Materials:

- Brown Paper Bag
- Colored Tiles
- Math Journal
- Partner

Goal: I can conduct probability experiments and draw conclusions from the results. I can also represent the likelihood of possible outcomes.

1. Select a partner: _____ **Teacher Checkpoint: _____**
2. Partner 1 will secretly put 15 tiles in the bag without letting his partner see how many of each color (s)he is putting in.
3. Partner 1 will record how many of each color is in the bag in his or her math journal.
4. Partner 2 will draw a tile from the bag 10 times, *putting the tile back in the back after each time!*
5. Partner 2 will record the results in his or her math journal in a tally chart (see the example below).

Color:	**Tallies:**	**Total:**
Red		
Blue		
Yellow		
Green		

6. After drawing the 10 tiles and recording the results, Partner 2 will predict how many of each color is in the bag. Remember…there were a total of 15 tiles in the bag, so your predictions should equal 15. PARTNER 2 WILL RECORD HIS/HER PREDICTIONS IN HIS/HER MATH JOURNAL!
7. Partner 1 will then show Partner 2 the tiles that were in the bag.
8. Both partners will discuss Partner 2's predictions and determine if (s)he was close to the actual number. **Teacher Checkpoint: _____**
9. Now, the partners will switch roles, and repeat the activity.

D9. Conduct simple probability experiments and draw conclusions from the results; e.g., rolling number cubes or drawing marbles from a bag.
D10. Represent the likelihood of possible outcomes for chance situations

What's in the Bag?
(Part 2)

You may use the tiles to help you solve the problem below.

Kathy has a bag of tiles with 6 red tiles, 3 blue tiles, and 1 green tile. She wants her bag to have yellow tiles, *and* she wants there to be an equal chance of drawing any color tile.

What will Kathy need to do to change the tiles in her bag to be the way she wants it?

Kathy wants to change her bag again. She wants there to be a 0 chance of pulling a red tile. What will Kathy need to do to change the tiles in her bag?

Now Kathy wants there to be a 100% chance of pulling a green tile. What will Kathy need to do to change the tiles in her bag?

D9. Conduct simple probability experiments and draw conclusions from the results; e.g., rolling number cubes or drawing marbles from a bag.
D10. Represent the likelihood of possible outcomes for chance situations

Commutative Property

Associative Property

Identity Property for Addition or Multiplication

Inverse Property for Addition or Multiplication

Distributive Property

Zero Product Property

"**CO**mmutative"
= **C**hange **O**rder

$3 + 2 = \_\_\_\_ + \_\_\_\_$
$5 \cdot 7 = \_\_\_\_ \cdot \_\_\_\_\_$
$17 + 8 + 3 = 17 + \_\_\_\_ + \_\_\_\_\_$
$5 \cdot 18 \cdot 2 = 5 \cdot \_\_\_\_ \cdot \_\_\_\_$

Associate with
Different **Groups**
= move parentheses

$6 + (4 + 8) = (\_\_\_\_ + \_\_\_\_) + 8$
$4 \cdot (5 \cdot 9) = (\_\_\_\_ \cdot 5) \cdot \_\_\_\_\_$
$(4 + 2) + -2 = 4 + (2 + -2)$

Add Zero to keep the
number's identity
OR
Multiply by One to keep the
number's identity

$975 + 0 = \_\_\_\_\_$
$0 + \_\_\_\_\_ = -7$
$5 + (-3 + 3) = \_\_\_\_\_$
$-28 \cdot \_\_\_\_\_ = -28$
$\_\_\_\_\_ \cdot 1 = 3.75$

Add a number to its
opposite, the answer is 0.
OR
Multiply a number by its
reciprocal, the answer is 1.

$3 + \_\_\_\_\_ = 0$
$-7.5 + \_\_\_\_\_ = 0$
$2 \bullet ½ = \_\_\_\_\_$
$¾ \bullet \_\_\_\_\_ = 1$

Distribute = **Give out**
Distribute number to
each part

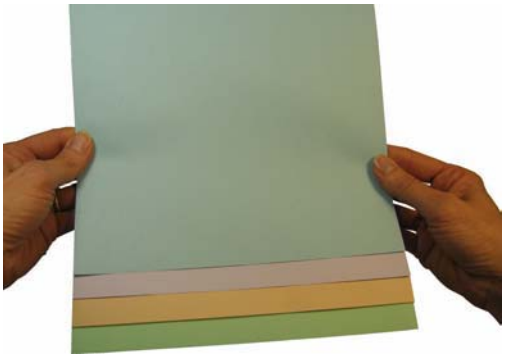
$4 \cdot (20 + 3) = 4 \cdot \_\_\_ + 4 \cdot \_\_\_$
$6 \cdot (30 - 1) = \_\_\_ \cdot 30 - \_\_\_ \cdot 1$
$8(\$0.99) = 8(\$1) - 8(\$.\_\_\_\_)$

Zero Product =
Zero Times a number

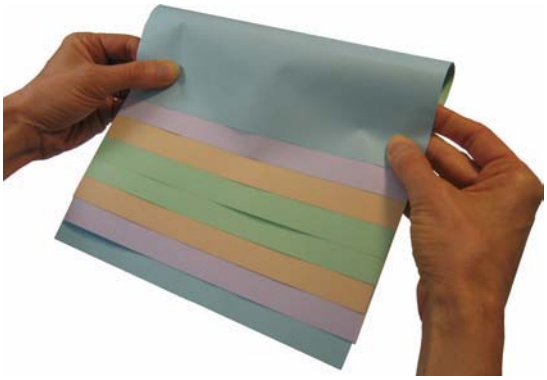
$21 \cdot 0 = \_\_\_\_\_$
$-8 \cdot \_\_\_\_ = 0$
$6 \cdot (-4 + 4) = \_\_\_\_$
$0 \cdot (793 \cdot 516) = \_\_\_\_\_$

How to make a Layered Look Book Foldable®*

1. Stack four sheets of paper (8 ½" x 11") together, placing each consecutive sheet around ¾ of an inch higher than the sheet in front of it.

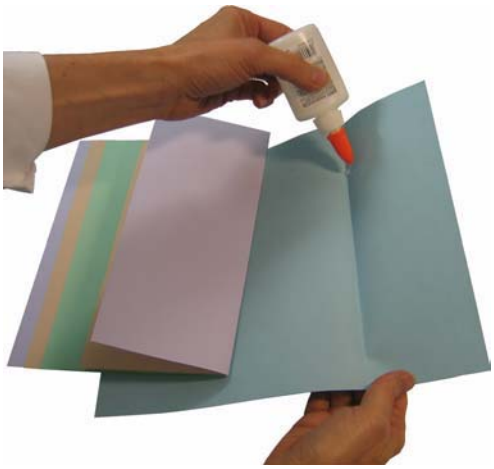


2. Bring the bottom of both sheets upwards and align the edges so that all of the layers or tabs are the same distance apart.



3. When all of the tabs are equal distance apart, fold the papers and crease well.

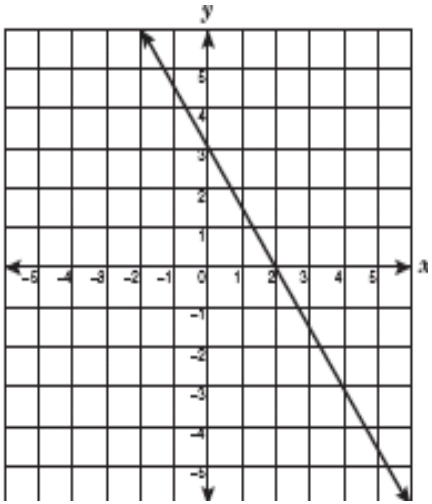
4. Open the papers and glue them together along the valley/center fold.



Finding Slope From an Equation

$3x + 2y = 6$

Finding Slope from a Graph



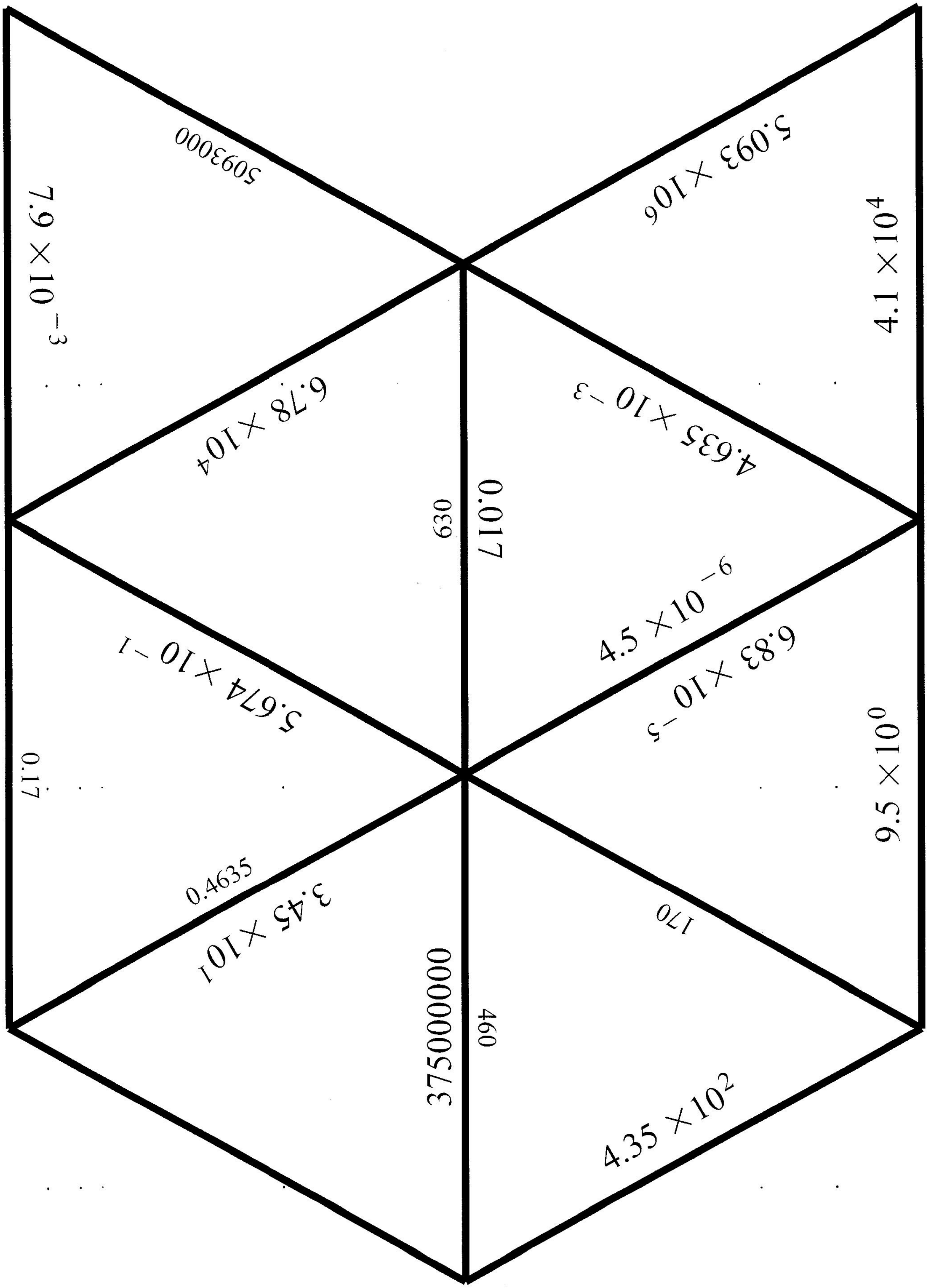
Finding Slope From a Table

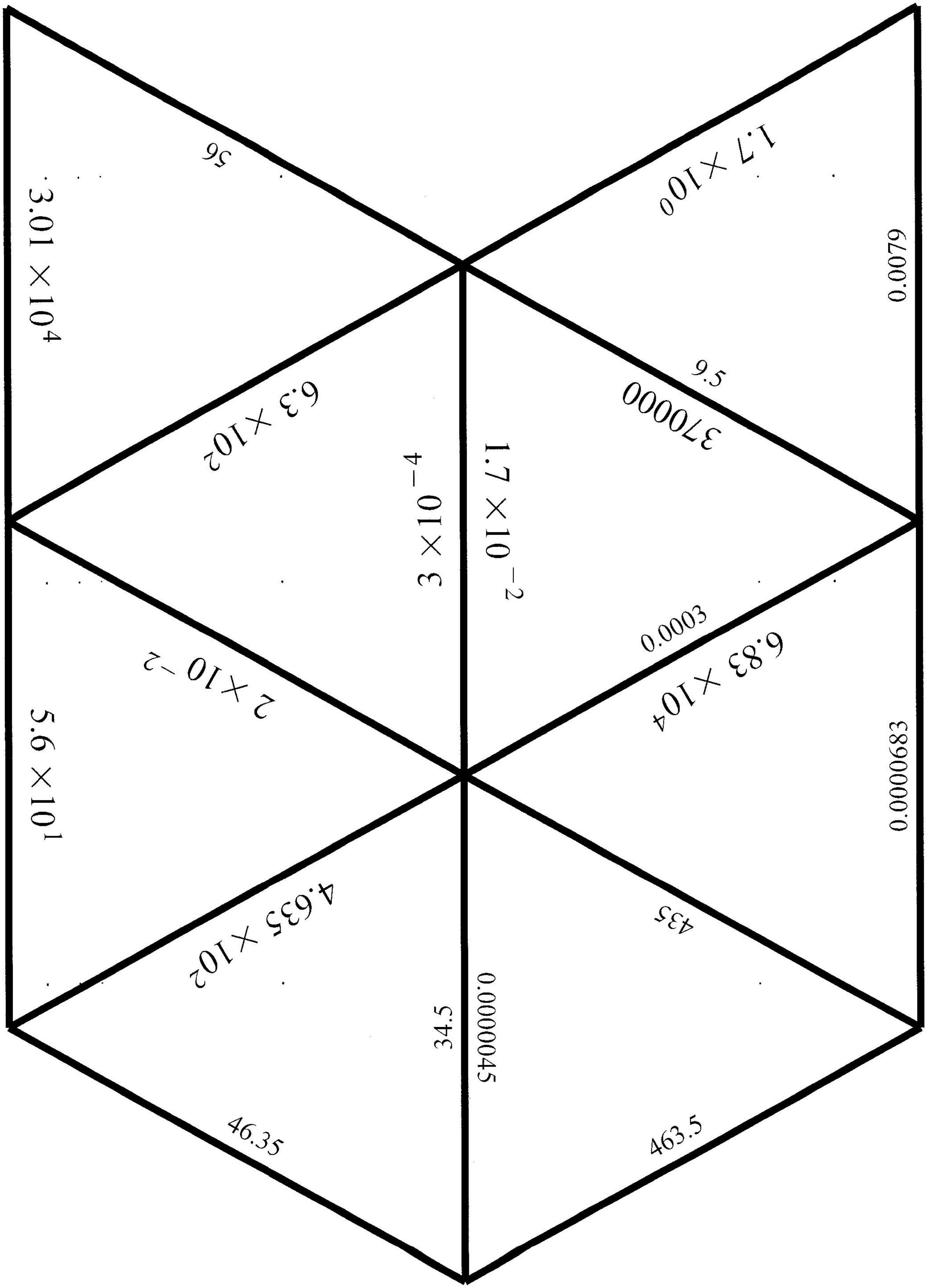
x	Y
-1	6
1	2
5	-6
7	-10

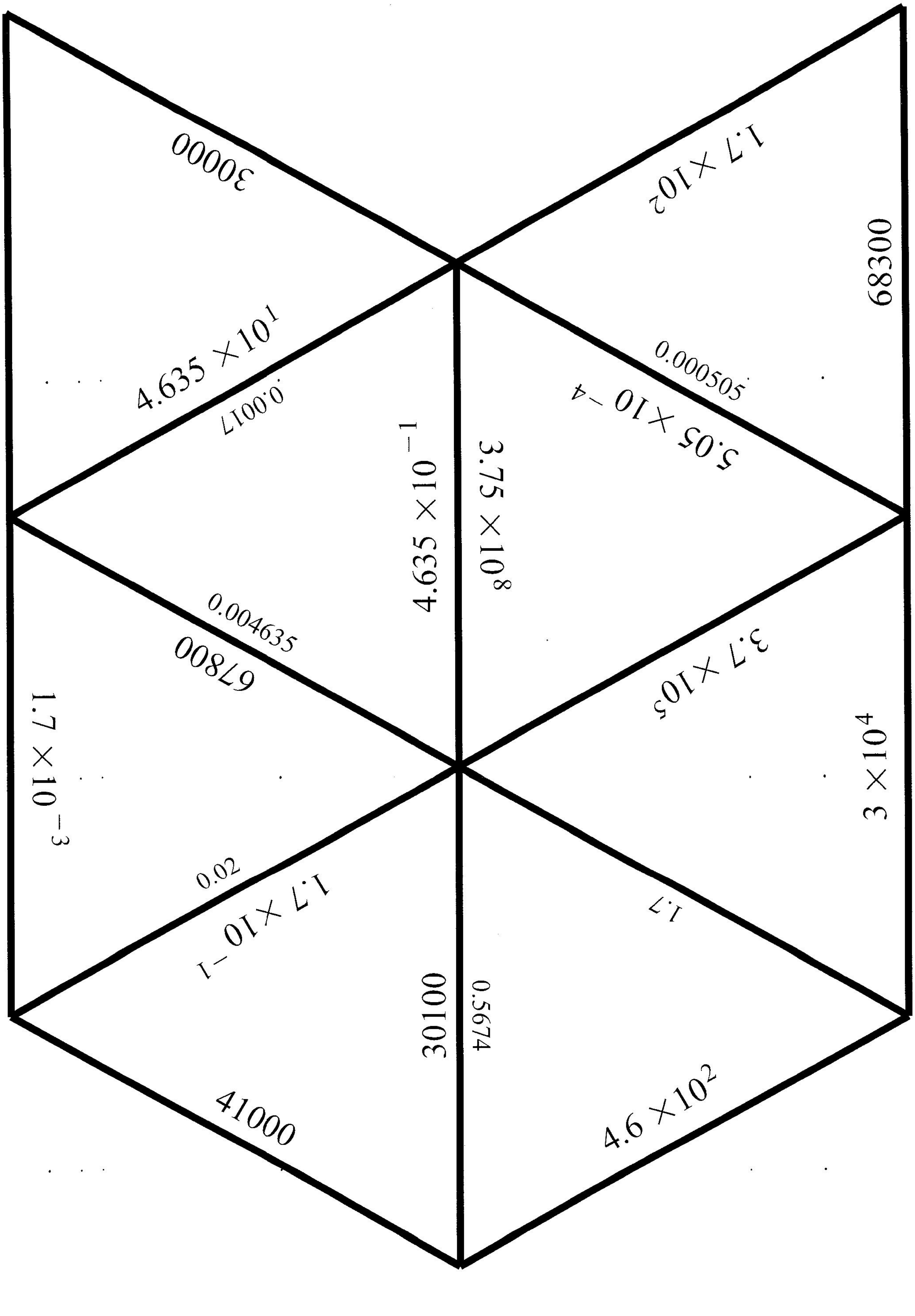
Finding Slope From Two Points:

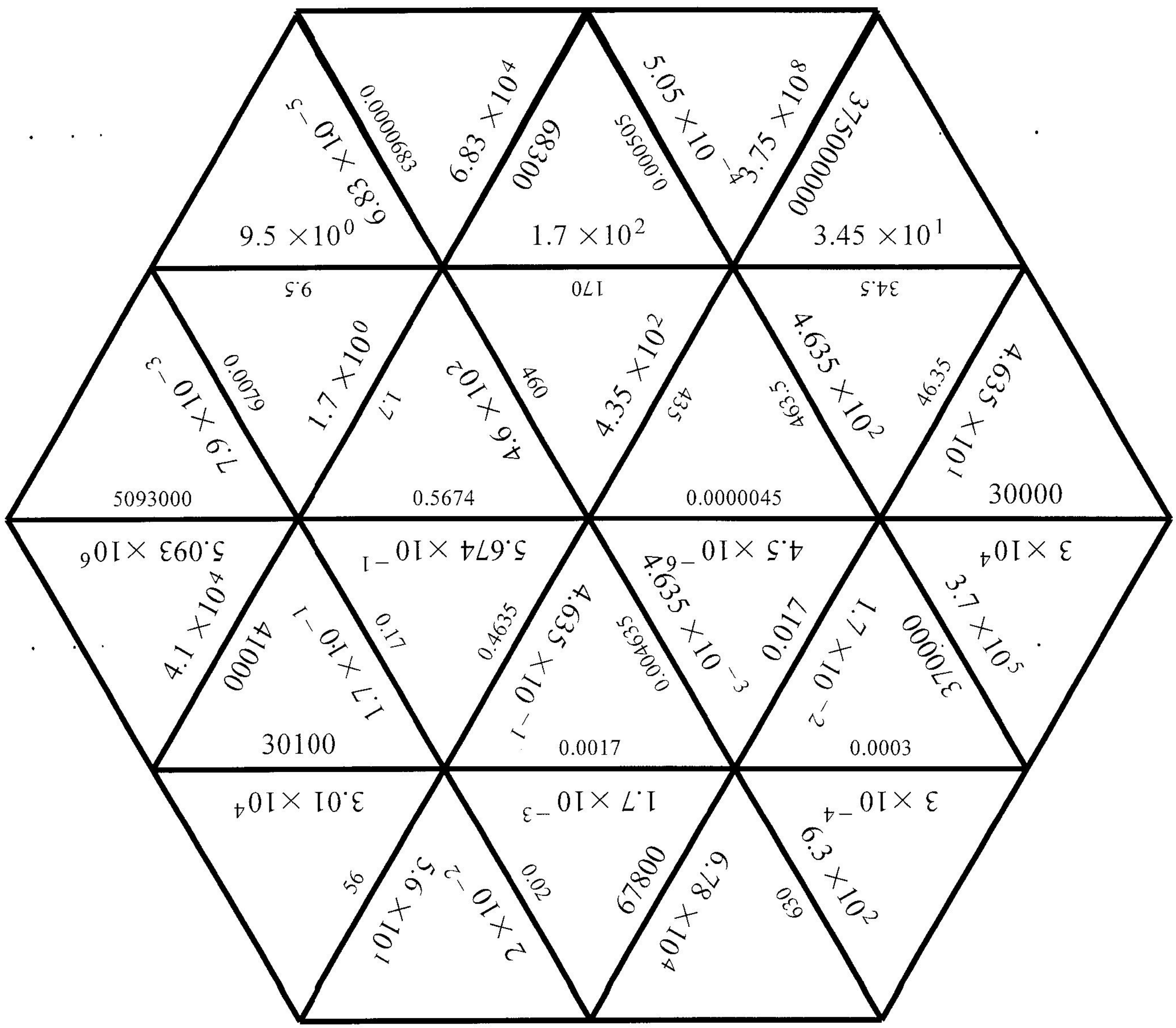
Point 1:
(-2, -4)

Point 2:
(2, -2)


5093000
7.9 × 10⁻³
5.093 × 10⁶
4.1 × 10⁴
6.78 × 10⁴
4.635 × 10⁻³
630
0.017
4.5 × 10⁻⁶
5.674 × 10⁻¹
6.83 × 10⁻⁵
9.5 × 10⁰
0.17
0.4635
3.45 × 10¹
170
375000000
460
4.35 × 10²


3.01×10^4
56
1.7×10^0
0.0079
6.3×10^2
9.5
370000
3×10^{-4}
1.7×10^{-2}
0.0003
6.83×10^4
2×10^{-2}
5.6×10^1
0.0000683
4.635×10^2
435
34.5
0.0000045
46.35
463.5


30000
1.7×10^2
68300
4.635×10^1
0.0017
0.000505
5.05×10^{-4}
4.635×10^{-1}
3.75×10^8
0.004635
67800
3.7×10^5
1.7×10^{-3}
3×10^4
0.02
1.7×10^{-1}
1.7
30100
0.5674
41000
4.6×10^2



0.0000683
6.83 × 10⁴
68300
0.00000505
5.05 × 10⁻⁶
3.75 × 10⁸
375000000
6.83 × 10⁻⁵
9.5 × 10⁰
1.7 × 10²
3.45 × 10¹
9.5
170
34.5
7.9 × 10⁻³
0.0079
1.7 × 10⁰
1.7
4.6 × 10²
460
4.35 × 10²
435
463.5
4.635 × 10²
46.35
4.635 × 10¹
5093000
0.5674
0.0000045
30000
5.093 × 10⁶
5.674 × 10⁻¹
4.5 × 10⁻⁶
3 × 10⁴
4.1 × 10⁴
41000
1.7 × 10⁻¹
0.17
0.4635
4.635 × 10⁻¹
0.004635
4.635 × 10⁻³
0.017
1.7 × 10⁻²
370000
3.7 × 10⁵
30100
0.0017
0.0003
3.01 × 10⁴
1.7 × 10⁻³
3 × 10⁻⁴
56
5.6 × 10¹
2 × 10⁻²
0.02
67800
6.78 × 10⁴
630
6.3 × 10²

- The powers of 10 must be _____.
- Change the smaller power to be equal to the larger power; adjust the decimal
- Add the _____
- _____ the power of 10.
- Express the answer in scientific notation.

Examples

$9.1 \times 10^2 + 1.3 \times 10^2$

$2 \times 10^7 + 3.6 \times 10^5$

Examples

$8 \times 10^9 - 2.9 \times 10^9$

$7 \times 10^5 - 5.2 \times 10^4$

- The powers of 10 must be _____.
- Change the smaller power to be equal to the larger power; adjust the decimal
- Subtract the _____
- _____ the power of 10.
- Express the answer in scientific notation.

- The powers of 10 _____ have to be the same.
- Multiply the _____.
- Add the _____
- Express the answer in scientific notation.

Examples

$(3.2 \times 10^4) \cdot (5.1 \times 10^8)$

$(6.3 \times 10^2) \cdot (7.9 \times 10^6)$

Examples

$(4.4 \times 10^9) \div (8.8 \times 10^5)$

$(7.2 \times 10^8) \div (9 \times 10^4)$

- The powers of 10 _____ have to be the same.
- Divide the _____.
- Subtract the _____
- Express the answer in scientific notation.

Operations with Numbers in Scientific Notation

Add Numbers in Scientific Notation

+

Subtract Numbers in Scientific Notation

–

Multiply Numbers in Scientific Notation

•

Divide Numbers in Scientific Notation

÷

Works Cited

"I Is a Number." *I Is a Number*. Web. 29 Sept. 2014.

"IHD." *IHD*. Web. 29 Sept. 2014.

"Illuminations." *Illuminations*. Web. 29 Sept. 2014.

"Math = Love." *Math = Love*. Web. 29 Sept. 2014.

"Math Can Take You Places." *Math Can Take You Places RSS*. Web. 29 Sept. 2014.

"Math Is Fun - Homework Help." *Math Is Fun - Homework Help*. Web. 28 Sept. 2014.

"Mathwire.com | Games." *Mathwire.com | Games*. Web. 29 Sept. 2014.

"Middle School." *Middle School*. Web. 29 Sept. 2014.

"PBS KIDS:." *Games*. Web. 28 Sept. 2014.

"Restructuring Algebra." *Restructuring Algebra*. Web. 29 Sept. 2014.

"Runde's Room." *Runde's Room*. Web. 29 Sept. 2014.

"Table of Contents - Math Open Reference." *Table of Contents - Math Open Reference*. Web. 29 Sept. 2014.

"Teaching in Special Education." *Teaching in Special Education*. Web. 29 Sept. 2014.

"Tothesquareinch." *Tothesquareinch*. Web. 29 Sept. 2014.

"The University of North Carolina at Greensboro." *The University of North Carolina at Greensboro*. Web. 29 Sept. 2014.

"Youth Education Services." *Youth Education Services*. Web. 29 Sept. 2014.