The Learning Wall

E

The 3 – 5 MATH Concept Learning Bricks packet is organized alphabetically, with each concept explanation (concept, question, answer, gesture, and examples) listed first and the Concept Learning Brick visual listed behind the explanation. This section contains **22** Concept Learning Bricks from the E - F sections. Please refer to The Learning Wall Introduction and Explanation at www.PEPnonprofit.org for details on how to implement these items in your classroom.

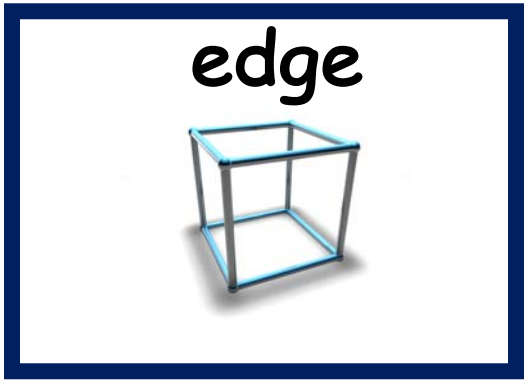
Ee

edge, equal to, equally likely event, equation, equilateral triangle, equivalent, equivalent fractions, endpoints, estimate, evaluate, even, expanded form, exponent, expression

Ff

face, fact family, factor, Fahrenheit, foot, fraction, frequency table, function table

Edge



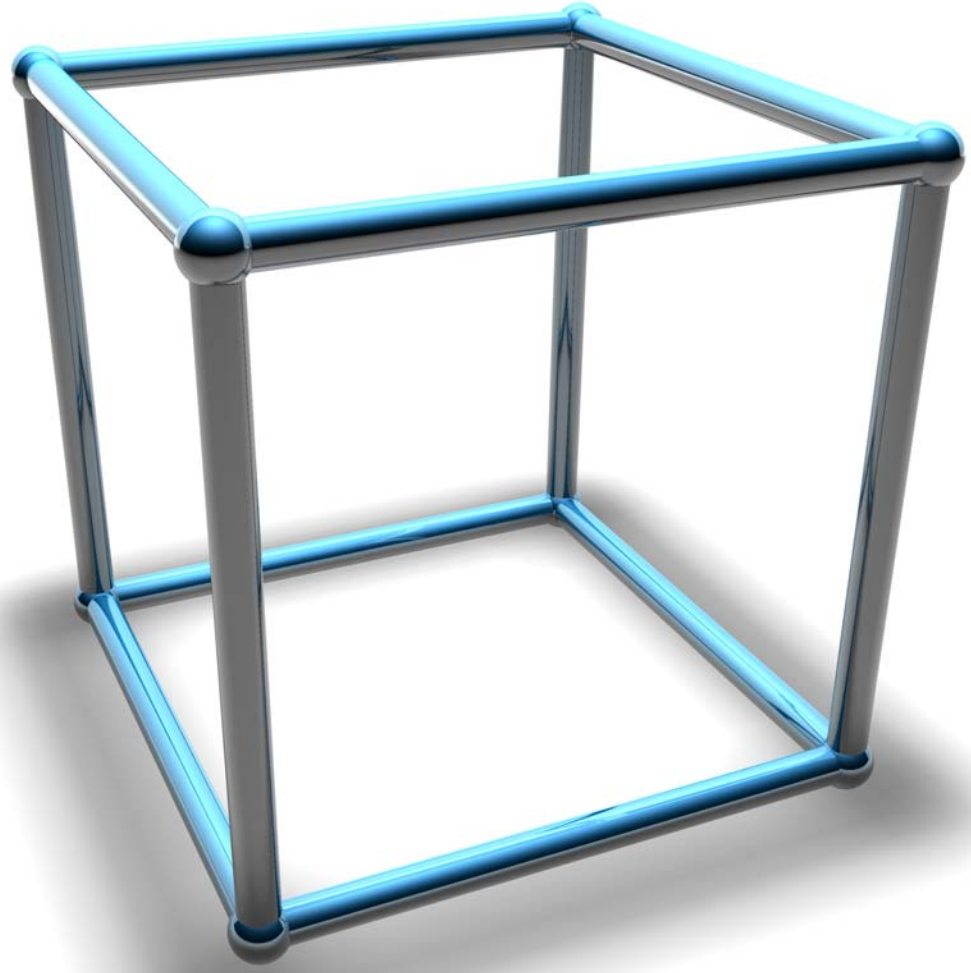
Question: What is an edge?

Answer: An edge is a line segment in a geometric shape.

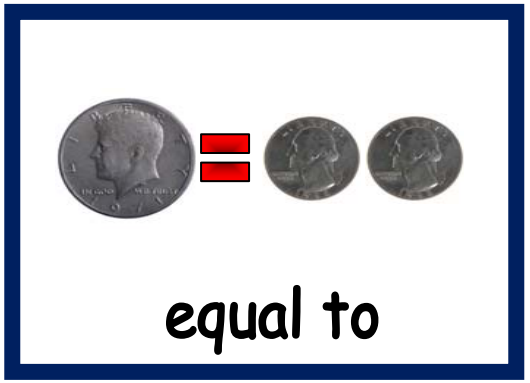
Gesture: Straighten hands into "line segments" and move/connect them like "edges" in front of your face as if doing the Madonna *Vogue* moves.

Examples: Find real world examples of geometric shapes (buildings, street signs, household/classroom items, etc.) and project them for students to see. Next, have students identify what shape is represented in each picture. Then, have a wood block example of the same shape to show in class after each real world example and count the edges to be certain.

edge



Equal To



Question: What does it mean to be equal to something else?

Answer: Equal to means all sides are the same.

Gesture: When saying the words "equal to," make an equal sign in front of you using your arms. On the words "all sides," spread fingers on left hand and hold at about shoulder position in front of you, looking at that hand as you do it. Leaving left hand in that position, do the same with your right hand on the words "the same," turning your head to look at the right hand.

Examples: Have sentence strips with amounts written on them in two columns on the whiteboard. The students have to identify pairs that are equal using one from each column. For example, one column might have a sentence strip which reads "half a dozen" and the other column could have a sentence strip which reads "twelve divided by two" and the students have to put them together and then say, "Half a dozen is equal to twelve divided by two."

=

equal to

Equally Likely Event

Question: What is an equally likely event?

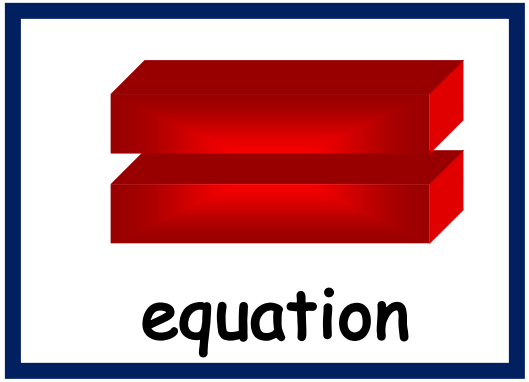
Answer: An equally likely event means the chances of selection is exactly the same for all variables.

Gesture: On the words "equally likely"' make an equal sign in front of you using your arms. Then, reach out with both arms in front of you and pretend you are picking various things right out of the air while saying "chances of selection." After that, return your arms to the shape of an equal sign while saying "exactly the same." Finally, gesture with both arms in front of you like a Broadway actress acknowledging the front rows of seating.

Examples: Have real life items such as marbles, M&M's, coins, etc, and display each item as an example of equally likely sets to show how it means there are equally amounts of each variable. For instance, having three red marbles, three green marbles, and three blue marbles is an equally likely set.

equally likely event

Equation

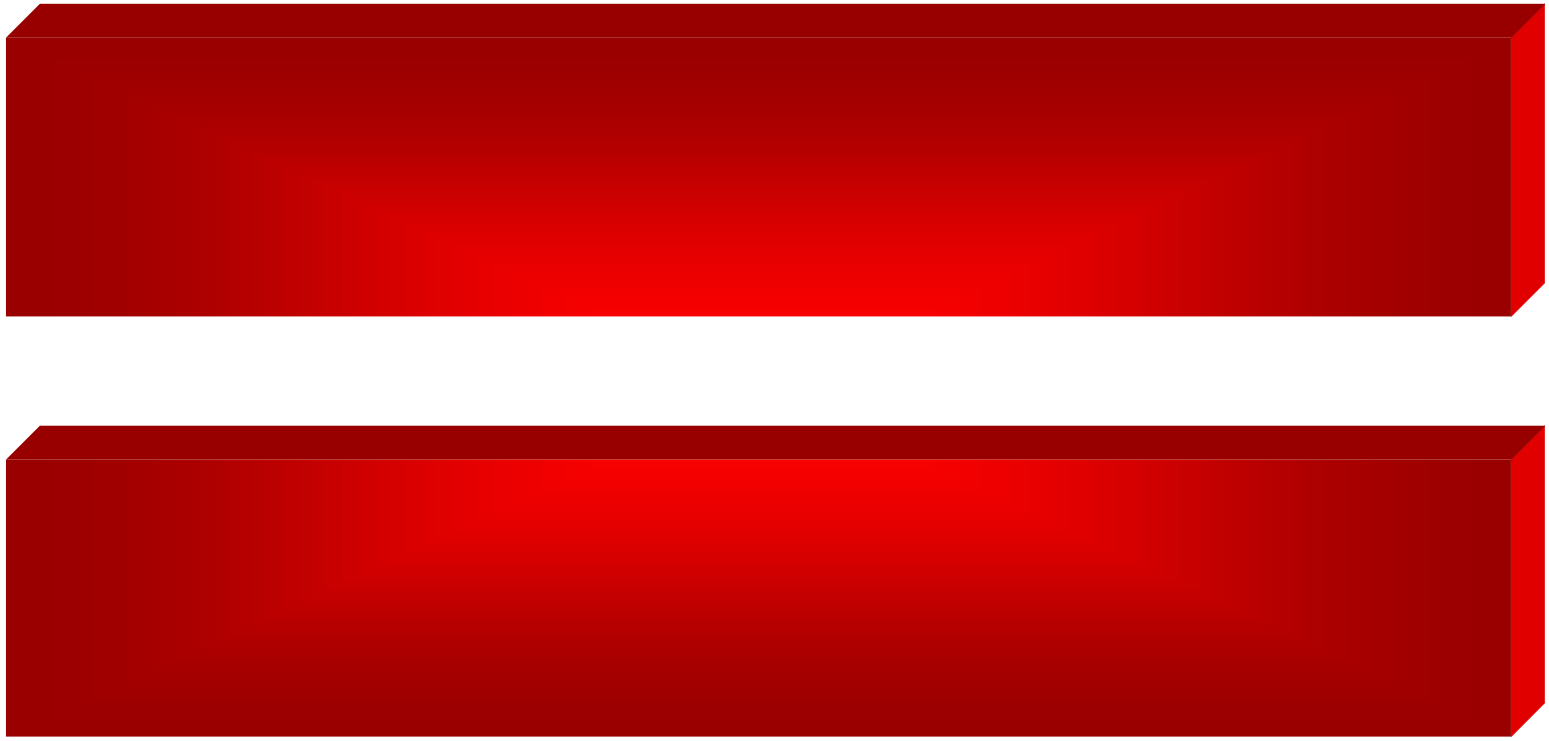


Question: What is an equation?

Answer: An equation is a number sentence which includes an equal sign.

Gesture: Hold hands out in front and flash numbers with your fingers while saying the statement. Then, move your arms into an equal sign and emphasize the words "equal sign" at the end of the statement.

Examples: Write several expressions and equations on the board. Point to each and ask the class to identify it as an expression or an equation. They must explain their answer for each one. Another idea is for the teacher to wear a white t-shirt with an equal sign on the front and call themselves "Equation Man/Woman" and show the class the "superpower" of being able to turn any expression into an equation by having several small equal sign cards and putting them at the end of the expressions prewritten on the board to create equations.



equation

Equilateral Triangle

Question: What is an equilateral triangle?

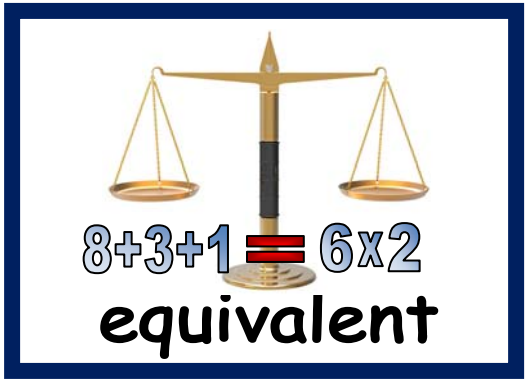
Answer: In an equilateral triangle, all three sides, and all three angles, are equal.

Gesture: Hold arms in the form of an equal sign and say, "In an equilateral triangle . . ." Then, hold three fingers up on one hand to one side at about shoulder height and say, ". . . all three sides . . ." Do the same with the other hand while saying, "and all three angles . . ." Finally, return your arms to the shape of an equal sign while saying, "are equal."

Examples: Have a two question "checklist" written on the board with the questions: "Are all three lines straight?", "Is the shape closed?", "Are all three sides equal?" and, "Are all three angles equal?" Then have examples of triangles on the board and the students will answer each question with a yes or a no and explain why they chose that answer. Students should see a pattern of three equal sides ALWAYS resulting in three equal angles.

equilateral triangle

Equivalent



Question: What does it mean to be equivalent?

Answer: Equivalent means all side are exactly the same.

Gesture: Hold both hands out to represent the trays of the scale and say, "Equivalent means all sides . . ." Then move hands together and lightly touch your pinkies together while keeping your hands in the "tray" position while saying. ". . . are exactly . . ." Finally, move them apart again while saying, ". . . the same." This is done simply to show that your hands are at the same exact level, thus making them equal.

Examples: Write the following sentence frame out for students to use when replying: "That example is (equivalent/not equivalent) because _____ is (equal/not equal) to _____." They have to chose one of the choices given inside each set of parenthesis. Then give several examples of things which may or may not be equivalent and working as partners students must determine which choices to choose when completing the sentence frame.

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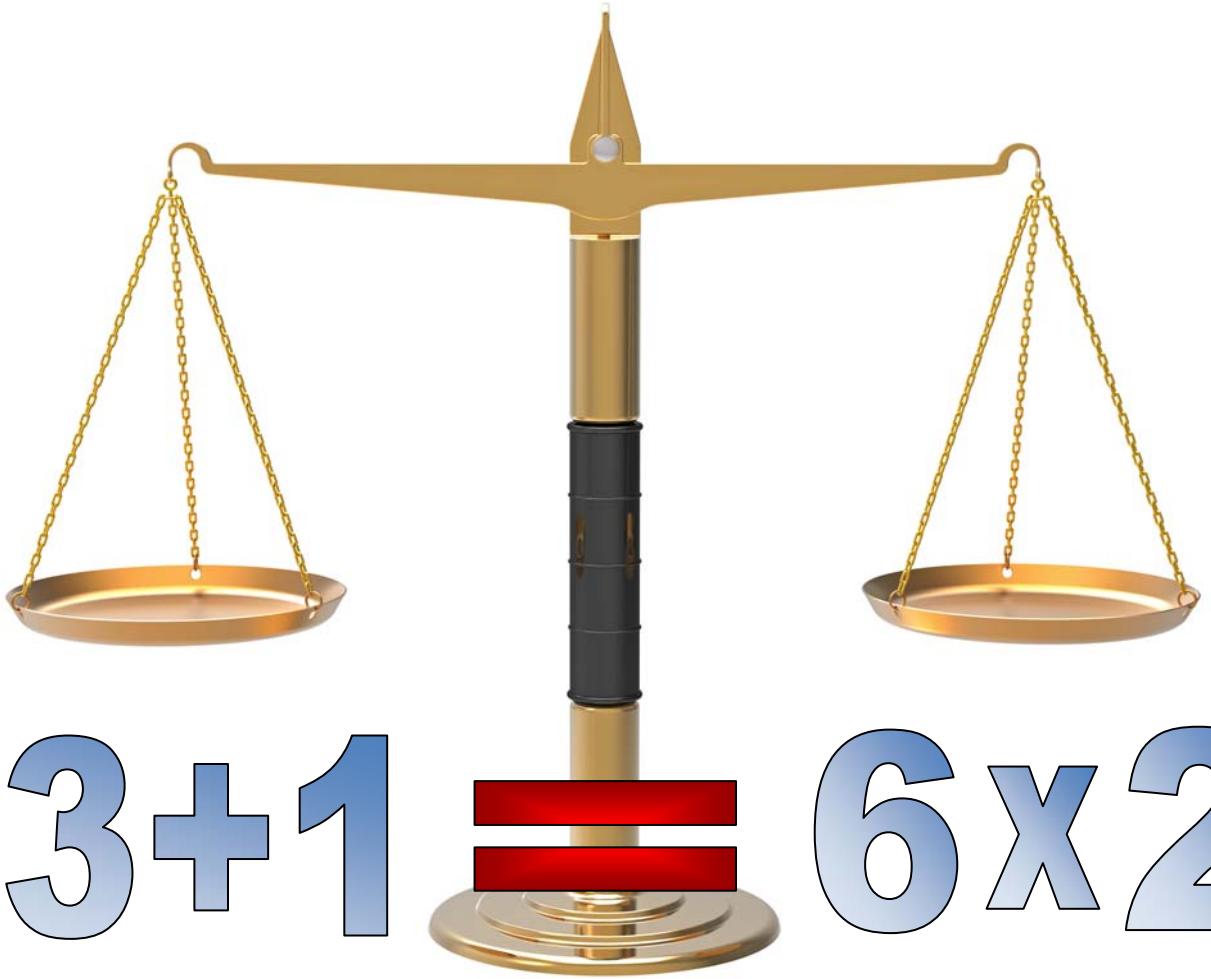
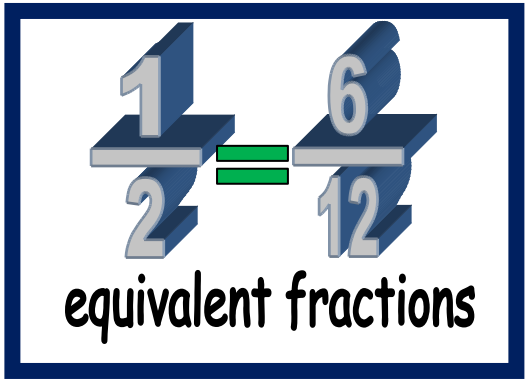


8+3+1 = 6x2

equivalent

Equivalent Fractions



Question: What are equivalent fractions?

Answer: Equivalent fractions have different numbers but the same exact value.

Gesture: Hold your arms in front of you in an equal sign position. When saying "different numbers," hold one finger up on one hand like a numerator and two fingers up in the denominator position on one side and then repeat with two fingers up in the numerator position and fingers up in the denominator position on the other side. Return arms to original position when saying "same exact value."

Examples: Draw pairs of identical sized shapes on the board. For instance, draw two bars on the board of equal size. Show one bar divided into two parts and shade in one of the parts to show 1/2 and divide the other bar into four parts and shade in two parts to show 2/4. Show the students how both represent the same exact value even though the numbers used are different. Do this same activity with the shapes not matching and have students focus on identifying equal "values" regardless of shape and size. Do this with several shapes and then move on to a mix and match activity in which students have to match equivalent values regardless of shape.

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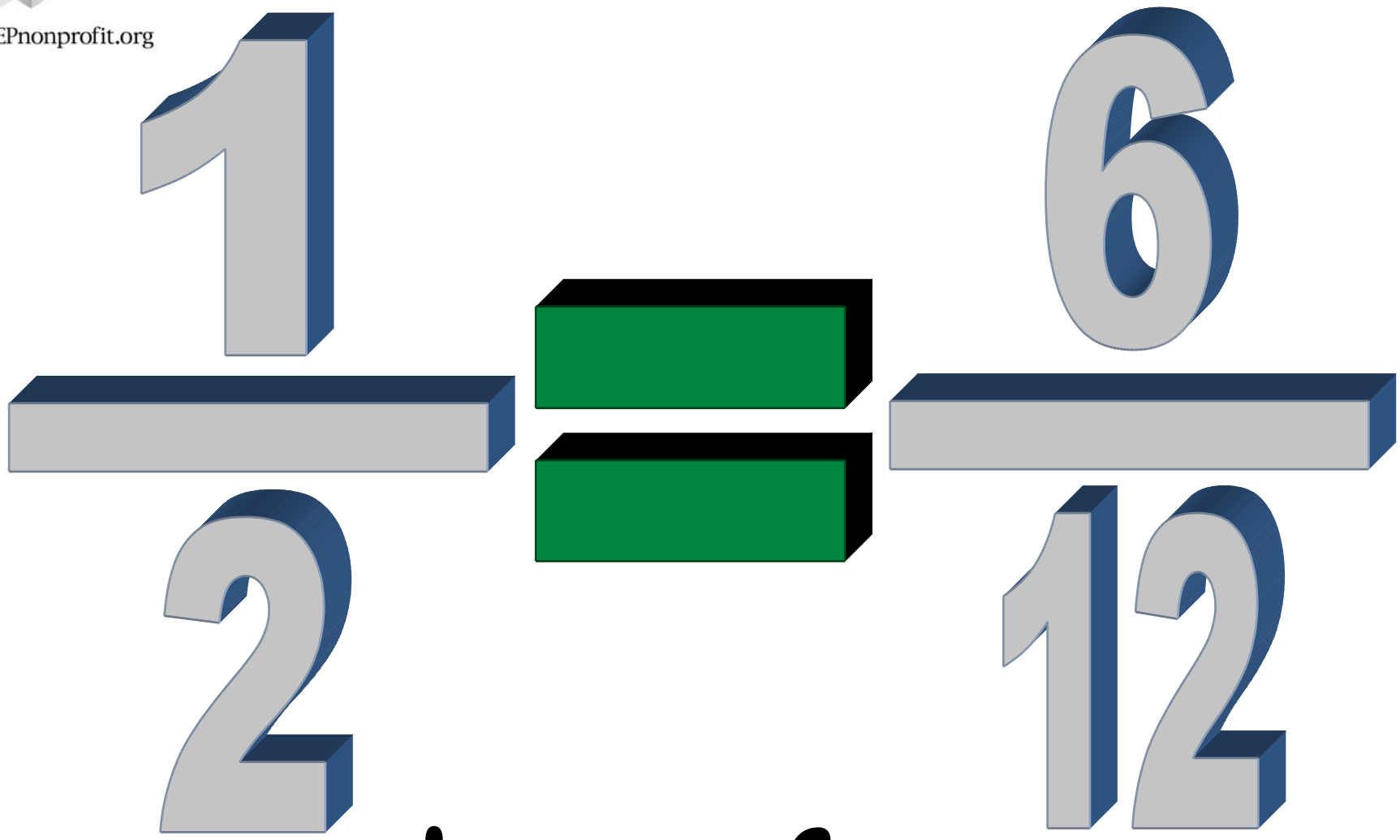
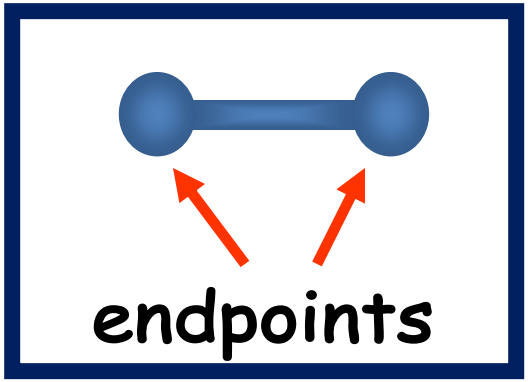


equivalent fractions

Endpoints



Question: What is an endpoint?

Answer: An endpoint shows where a line segment stops.

Gesture: Pretend to stretch a string side to side in front of you. Then, using a scissor motion with each hand, pretend to cut the string on each end and pull that segment toward you and then make two fists and hold them as if each fist is the endpoint of the line segment you just "cut" out of the line (string) in front of you.

Examples: Show a picture of a baseball field and show how the bases and home plate act as endpoints for each line segment connecting the bases. Then, find other real life examples that seem to have line segments with endpoints (football field, soccer field, bookshelf, etc.) and have students determine where endpoints could be used.

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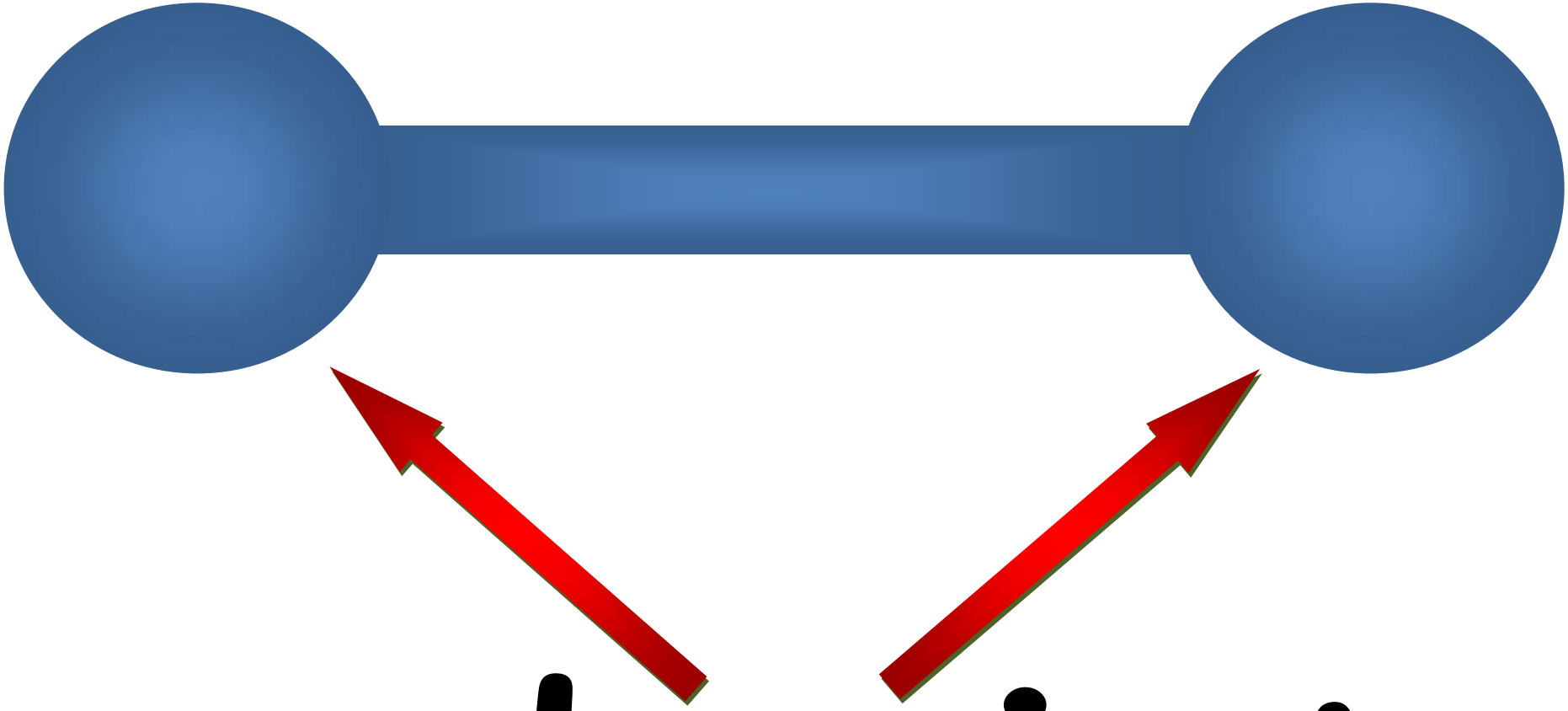

endpoints

Estimate

Question: What is an estimate?

Answer: An estimate is a simplified logical guess to determine the amount of something.

Gesture: Have students tap their heads as if thinking and after stating the answer frame above, they say, "I think there are about this many."

Examples: Have students estimate how many students are in their own class, at their grade level, in the school. Show a picture of houses on a street and have them estimate how many people live on that street. Students can step off the class room and estimate how many square feet the area of the classroom has.

estimate

Evaluate

Question: What is evaluate?

Answer: Evaluate means to use the correct process to come to an answer.

Gesture: Mimicking the image for this concept, use your fingers to show a logical sequence and at the end of the statement have students hold up one finger on one hand just above shoulder height to one side and say, "I got it!" as though they just solved a problem.

Examples: This is an academic vocabulary word so write several math problems on the board for the students to "evaluate." Be sure to use this word often during this lesson as well as during class throughout the year so students are familiar with it when they hear it or see it written.

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evaluate

Even

Question: What is an even number?

Answer: An even number is divisible by two and always ends in a zero, two, four, six, or eight.

Gesture: Hold your hands together. Separate your hands on the word "divisible" and hold up two fingers when saying "by two." Then, hold up the appropriate number of fingers as you say "zero, two, four, six, or eight."

Examples: Have students solve, "What is the question?" by having a question written on a sentence strip (Which of these numbers are even?) but turned around so they can't see the question. Also on the board you will have several numbers written with the ones place underlined and the word "yes" or "no" written after it.

(Backward Sentence Strip)

21<u>5</u> - NO	31<u>0</u> - YES	4<u>6</u> - YES	2,61<u>9</u> - NO
31<u>8</u> - YES	15,39<u>4</u> - YES	2,46<u>5</u> - NO	2<u>2</u> - YES

Students have to figure out what the question is by the information provided and connecting it to the lesson. Turn over the sentence strip when they solve it. Save the sentence strip and do this randomly as they come into class throughout the year to reinforce/review.


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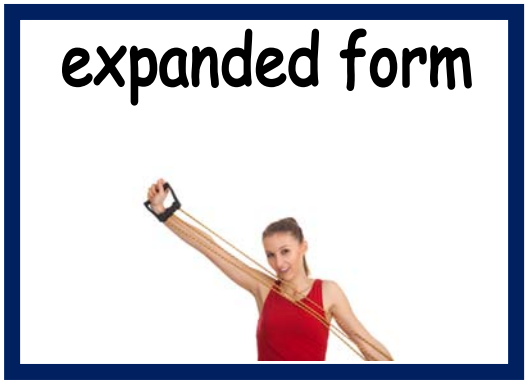
0 2 4 6 8
even

Expanded Form



Question: What is expanded form?

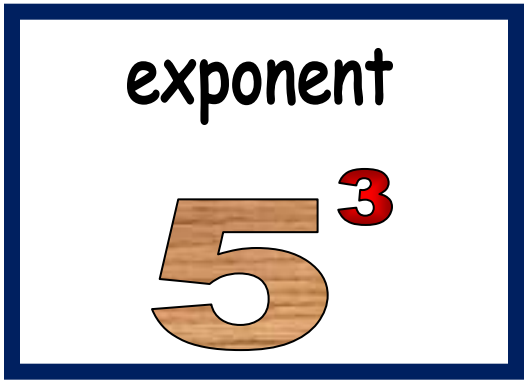
Answer: Expanded form is a number all stretched out to separate the value of each place.

Gesture: Hold fists together as though holding handles of the bungee cord exercise tool in the image and slowly pull hands apart while stating the answer frame.

Examples: Using a deck of cards, separate out the Ace through Nine cards and write a large "0" on the back of each card in black marker. Then, deal out 3 cards face up. Starting with the largest place value, turn over the cards to the right to show the zero on the backs to demonstrate the value of the card still face up. Write this value down and turn all the cards face up again and repeat this with the next lower place value, only turning over the cards to the right of the focus place to show the value of each digit in relation to the place it is in.

expanded form

Exponent



Question: What is an exponent?

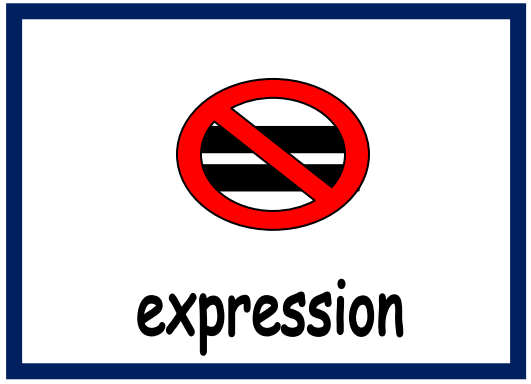
Answer: An exponent is a number which tells how many times to multiply the base by itself. Five times five times five.

Gesture: Hold up 5 fingers on one hand and three fingers on the other hand in the exponent position relative to the five. When saying "five times five times five" hold out the hand with five fingers up and with the other hand use your index finger to put imaginary dot each time you say times between the fives you hold up each time you say "five," moving from your left to right as you do this.

Examples: Put several numbers with exponents on the board with two answers next to them, one incorrect answer as though the base and exponents were multiplied or added together and the correct answer. have the first few answers already circled and have students explain to their partners why each given answer is correct according to the definition and gesture. Then solve more problems together as a class and extend this to challenge them to figure out what mistake was made to get to the incorrect answer

exponent

Expression



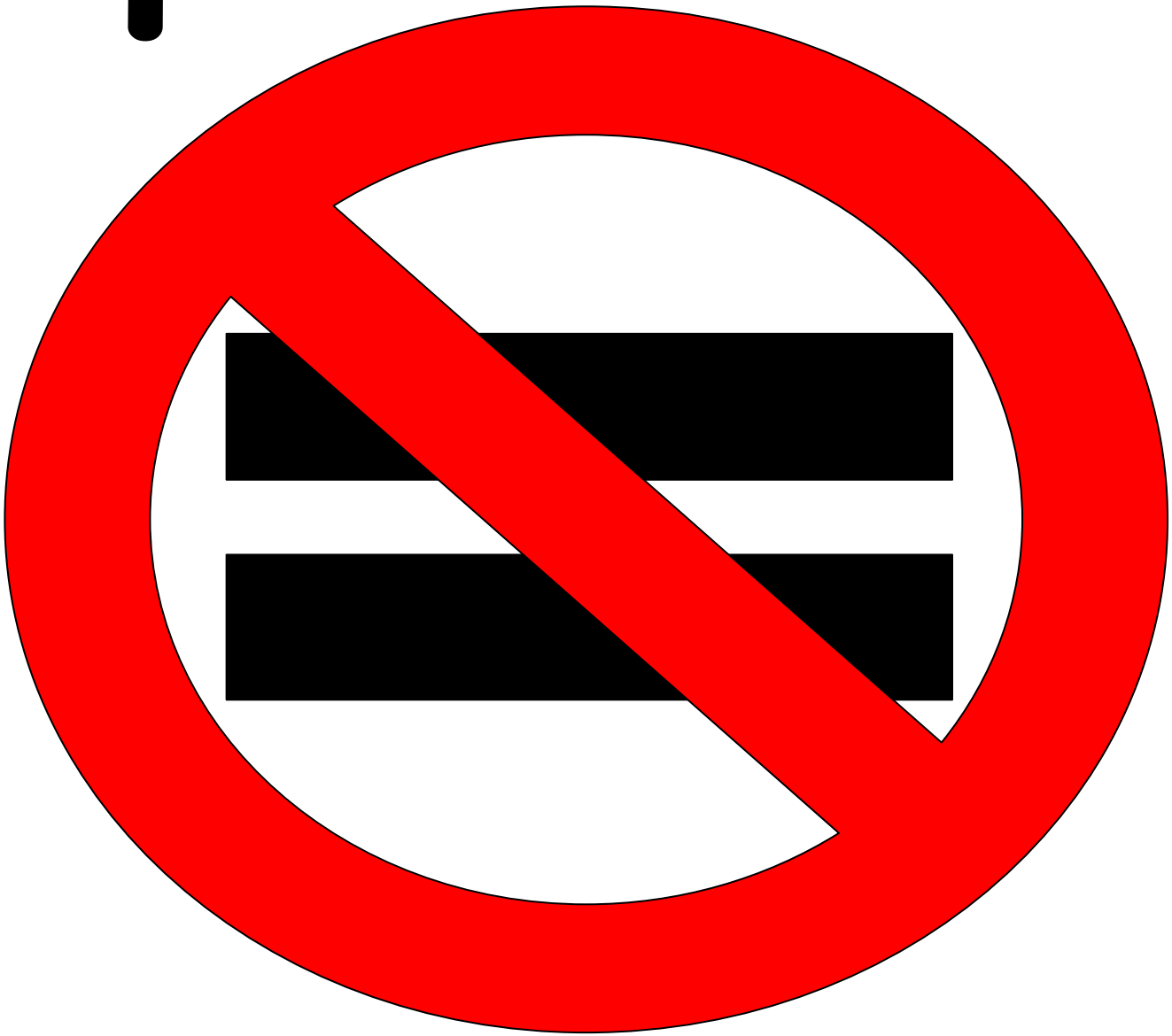
Question: What is an expression?

Answer: An expression is a number sentence *without* an equal sign. Two plus five, *that's it*!

Gesture: Hold your arms in the shape of an equal sign and lower your head and shake your head like you're saying no with a disappointed look on your face. Hold up two fingers on one hand and five on the other hand in front of you when saying, "two plus five." Then abruptly move arms like you're calling someone "safe" in baseball while energetically saying, "*that's it!*"

Examples: Write several expressions and equations on the board. Have students energetically say "yes" or "no" when you ask them, "Is this an expression?" If they say "no," erase the equal sign from the equation as the class emphatically says, "Get out of there!"

expression



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Face

Question: What is a face in math?

Answer: A face is the flat surface on a geometric shape.

Gesture: Smile as you use your straightened hands to mimic a frame around your face.

Examples: Give students 5 post-it notes each and have them draw faces on each one. Then have students walk around the room and put the face sticker on objects in the class that have faces. At the end of the activity, use any misplaced post it notes as a chance to review the definition and explain why it was mistakenly placed. There's no calling out students to correct mistakes.


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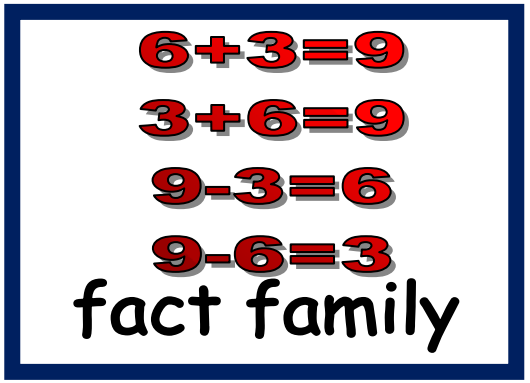
face

Fact Family

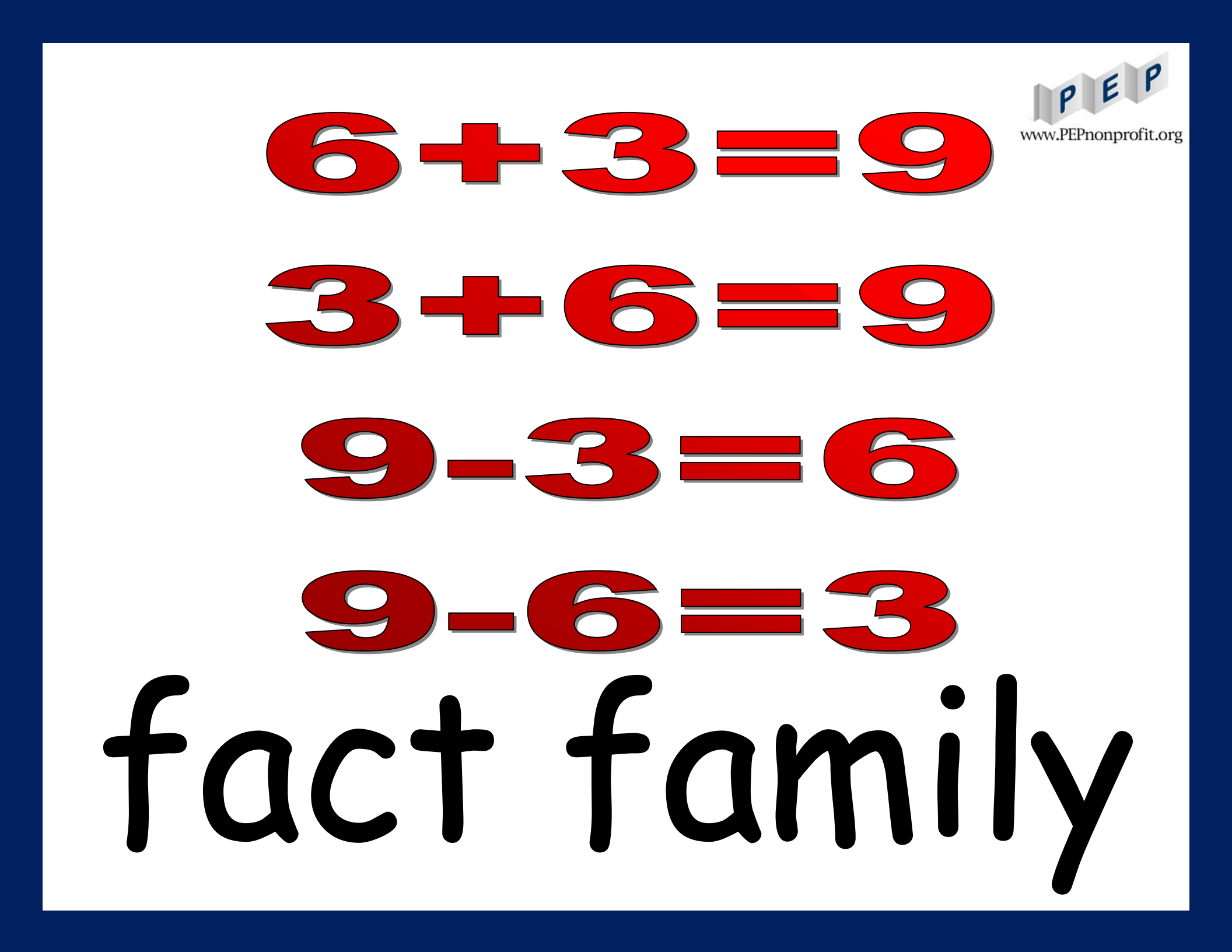


Question: What is a fact family?

Answer: A fact family is a 3 number family that shows their relationship to each other when adding and subtracting.

Gesture: Hold up three fingers on one hand in front of you and, using your other hand, press two fingers together, then point down at the two fingers pressed together and then the single finger to show a connection between all three numbers. Spread out the three fingers again and repeat above step with new groupings. When saying "adding" and "subtracting" in the answer frame, use arms to make an addition sign and one arm to make subtraction sign respectively.

Examples: Write out 3 sets of fact families, sharing some common numbers, with each part of each family set written on its own sentence strip. Have these spread out randomly on the white board and have students direct you how to group them, explaining why each part belongs to a particular fact family.


6+3=9
3+6=9
9-3=6
9-6=3
fact family
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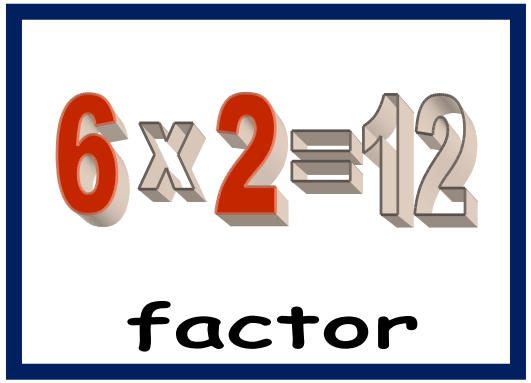
Factor



Question: What is a factor?

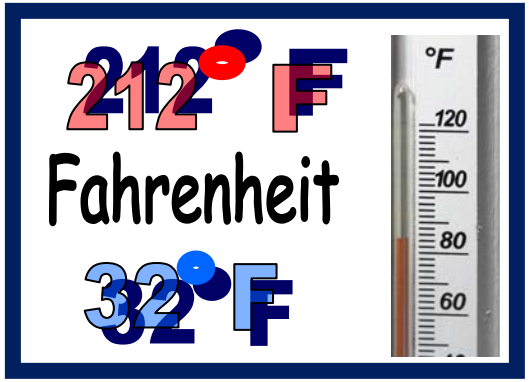
Answer: Factors are the numbers that are being multiplied to find a product.

Gesture: Wiggle four fingers on each hand on either side of you while saying, ""Factors are the numbers . . ." Then, moving arms into multiplication sign, say, ". . . that are being multiplied . . ." Finally, moves arms into shape of equal sing while saying, ". . . to find a product."

Examples: Write out 25 problems on the board with each one having a missing factor. On one side have 25 squares cut from sentence strips, each with a factor that will be used to fill in the missing factors in the problems. One problem at a time, have students solve and tell you which factors go where, proving their answers by checking with division on a personal white board and holding up to prove their answers.

factor

Fahrenheit



Question: What is Fahrenheit?

Answer: Fahrenheit is a scale for measuring temperature in which water freezes at 32 degrees and boils at 212 degrees.

Gesture: Standing tall and proud, pretend to adjust a tie on your neck right when you start the answer frame to represent the fact that Fahrenheit was a successful person. When saying, ". . . water freezes at 32 degrees," crouch down and shiver as though you are feeling very cold. When saying, " . . . boils at 212 degrees," stand up and fan yourself with one hand as though you are feeling very hot.

Examples: Show pictures of different outdoor settings and give students three choices of Fahrenheit temperatures to choose from for each. They have to determine what the temperature is in the picture based on the evidence in the picture (i.e., kids are wearing jackets, frozen pond, people in a Jeep on a safari, etc.). Do these one at a time with approximately ten examples. For an extension activity, also give three Celsius temperatures and have students identify both Fahrenheit and Celsius temperatures.

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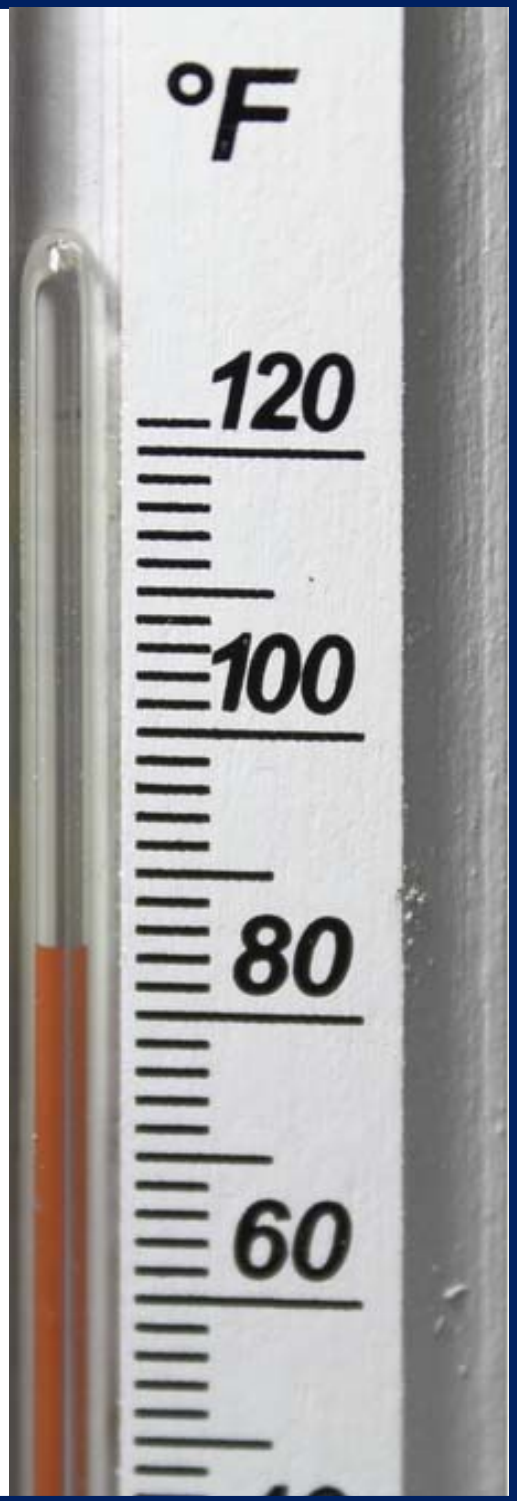
212° F

Fahrenheit

32° F



Foot

Question: What is a foot in math?

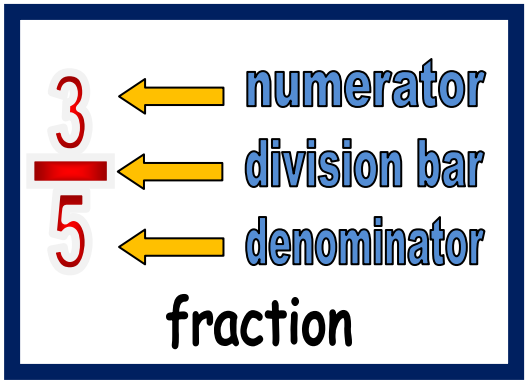
Answer: A foot is exactly 12 inches, which is barely taller than a piece of paper.

Gesture: Hold arms in front of you about one foot apart from side to side. Then, while saying, ". . . a piece of paper," hold one hand flat like a piece of paper and pretend to write on it with the other hand.

Examples: Bring in items from home that are about 1 foot in size (i.e., books, shoes, large remotes, magazines, etc.) and show them to the class. This will open up real life tidbits and stories to make a personal connection with the class. The next day each student should bring in two items from home that are approximately 1 foot in size.

foot

Fraction



Question: What is a fraction?

Answer: A fraction represents part of a whole and has a numerator, division bar, and a denominator.

Gesture: Hold out one arm and touch your wrist and then touch your should using your other hand to represent a part of your body. When saying, ". . . a whole," stand up straight motion yours arms straight up and down each side of your body to represent the whole of your body. Then, when saying, "numerator," hold one fist in front of you with elbow pointing straight out. When saying, "division bar," use your other arm to show a division bar just underneath your fist. Finally, when saying, "denominator," move your fist to the position below the arm making the division bar to represent the location of the denominator.

Examples: Give each student a handful of M&M's on a paper plate. Students will write out the fractional representation for each color. Once students successfully write out the proper fractional representation for each color, they may eat ONE of each color and repeat the activity. They can do this until they have finished eating all of the M&M's.

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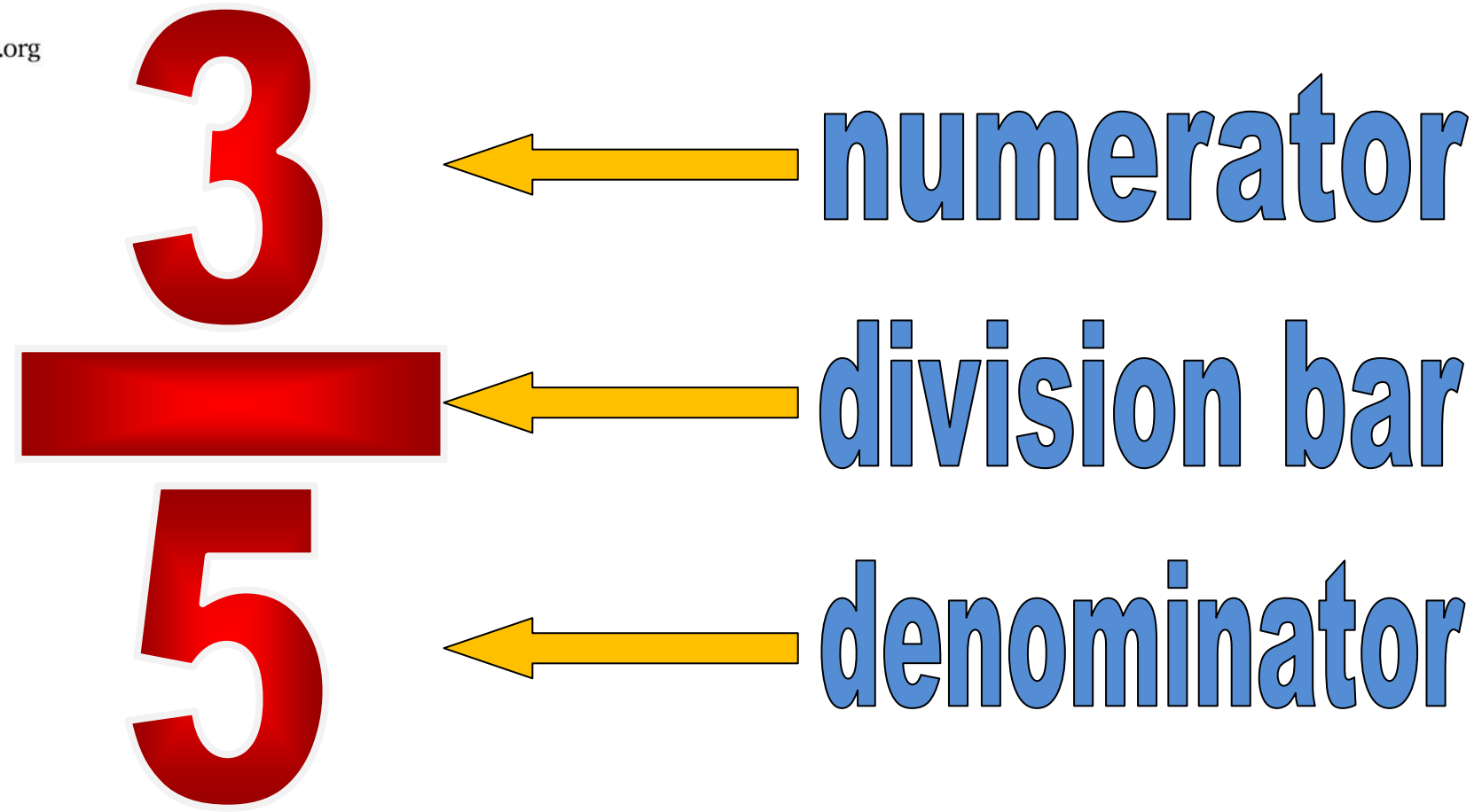
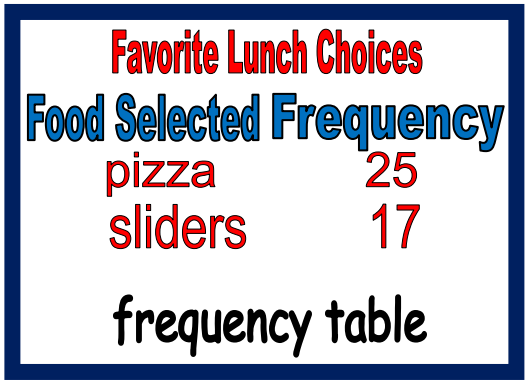


fraction

Frequency Table



Question: What is a frequency table?

Answer: A frequency table is a graph used to separate and show specific data.

Gesture: Draw an imaginary square in front of you to represent a "table." When saying the word "separate," move your hands apart and to show separation. Then, while saying "show specific data," move hands downwards while moving them in a way similar to putting letters into PO boxes to represent specified data.

Examples: Have four charts drawn and pre-titled on the board. Each chart title needs to be something the class can vote on right there (i.e.: favorite subject, favorite recess activity, favorite lunch choice, etc.). Fill in each chart and gather data via vote and complete each chart. An extension for this activity is to put each of category choice into fraction form in a final column.

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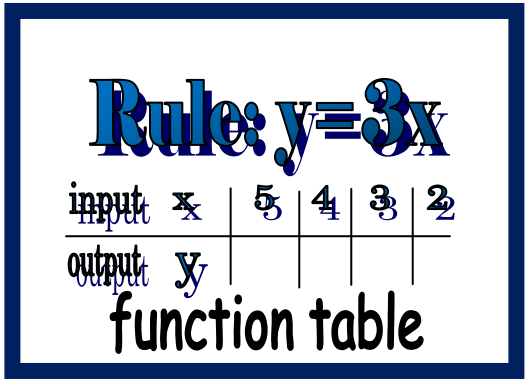
Favorite Lunch Choices

Food Selected	Frequency
pizza	25
sliders	17
burrito	32

frequency table

Function Table

Question: What is a function table?



Answer: A function table is a chart which shows the relationship between an input and an output.

Gesture: Draw an imaginary square in front of you to represent a "table." Interlace your fingers in front of you to demonstrate a "relationship." Then, point at yourself with both thumbs to represent "input" and point away from yourself to represent "output."

Examples: Borrow some large piece puzzles and pattern manipulatives (i.e.: colored bears, shapes, etc.) from Kindergarten. Complete each puzzle to the point of only having two pieces to add in. Students will tell you where each piece goes and explain why (shape, color, picture, etc.). Use the manipulatives to show patterns and ask what is next in the pattern. Then have students apply the "puzzle/pattern solving" strategies to function tables to illustrate that there is a specific output/input number that will fit the "pattern" for each part of the function table.

Rule: y=3x

Input	x	5	4	3	2
Output	y				

function table