**6th Grade MATH Knowledge Map**

**Multiplication and Division**

1. The number by which you are dividing in a division problem is the **divisor**. (30 ÷**2** = 15)
2. **Dividend** is the number into which you are dividing in a division problem. (**30** ÷2 = 15)
3. **Quotient** is the answer to a division problem. (30 ÷2 = **15**)
4. A **factor** is one of two or more whole numbers that are multiplied to get a product. (2, 3, and 5 are factors of 30).
5. **Product** is the answer to a multiplication problem, after multiplying two or more factors. (2 x15= **30**)
6. Finding an approximate answer that is relatively close to an exact amount is **estimation**.

**Prime Time**

1. The greatest factor that two or more numbers can share is their **greatest common factor (GCF)**. (The greatest common factor, or GCF, of 15 and 35 is 5.)
2. A number with exactly two factors, 1 and the number itself, is a **prime number**.
3. A **composite number** is a whole number with more than two factors.
4. A **multiple** is the product of a given whole number and another whole number. (Some multiples of 3 are 3, 6, 9, and 12)
5. The smallest (least) multiple that two or more numbers share is the **least common multiple (LCM)**. (The least common multiple, or LCM, for 12 and 36 is 36.)
6. A **prime factorization** breaks down a product into its prime factors. There is only one prime factorization for each product. (16= 2x2x2x2)
7. An **exponent** is a small raised number that tells how many times a factor is used. For example, $5^{3}$= 5x5x5= 125. 3 is the exponent.
8. **Consecutive** means “in order.” 8, 9, and 10 are consecutive whole numbers.
9. **Order of Operations** are the rules for carrying out arithmetic operations… (PEMDAS)
10. Work first inside parentheses or other grouping symbols.
11. Inside group symbols, or if there are not grouping symbols, follow this order:
	1. Compute all exponents.
	2. Do all multiplication or division in order from left to right.
	3. Do all addition or subtraction in order from left to right.
12. **Equivalent expressions** are expressions that represent the same quantity when the same number is substituted for the variable in each expression.
13. An **odd number** is any integer not divisible by 2; ends in 1, 3, 5, 7, or 9.
14. Any integer that is a multiple of 2 is an **even number**; ends in 0, 2, 4, 6, or 8.
15. A number that is a result of the product of a number multiplied by itself is a **square number**. (6x6 = $6^{2}$= 36. 36 is a square number).
16. A number that is a result of the product of a number multiplied by itself two times is a **cubed number.**

(2x2x2 = $2^{3}$= 8. 8 is a cubed number).

**Comparing Bits and Pieces**

1. A **ratio** is a number, often seen as a fraction, used to make comparisons between two quantities.
2. A **rational number** is a number that can be written as fractions or ratios. ($ \frac{1}{3}$ = 1 ÷ 3).
3. An **improper fraction** is a fraction in which the *numerator is larger than the denominator*. ($\frac{24}{5}$).
4. A number that is written with both a whole number and a fraction is called a **mixed number**. (2 $\frac{1}{2}$ represents 2 wholes and a $\frac{1}{2}$. Can be thought of as 2 + $\frac{1}{2}$).
5. *Fractions that are equal in value*, but may have different numerators and denominators are **equivalent fractions.**
6. **Percent** means “out of 100.” It can be written as a decimal or a fraction with a denominator of 100.

(3/100 =0.03= 3%)

1. The **absolute value** of a number is its distance from 0 on the number line. Numbers that are the same distance from 0 have the same absolute value, such as 8 and -8. (Absolute value bars indicate when you need to find a number’s absolute value, for example 8 ).
2. **Benchmark** is a reference number that can be used to estimate the size of other numbers. Benchmarks for fractions include 0, $\frac{1}{2}$, and 1.
3. The number written below the line in a fraction is called the **denominator**. (In the fraction $\frac{3}{5}$, 5 is the denominator).
4. The **numerator** is the number written above the line in a fraction. (In the fraction $\frac{3}{5}$, 3 is the numerator).
5. **Fraction** is a mathematical expression in the form $\frac{a}{b}$ where *a* and *b* are numbers. A fraction can indicate a part of a whole object or set, a ratio of two quantities, or a division.
6. Two numbers whose sum is 0 are **opposite**. For example, 3 and -3 are opposites.
7. A **unit rate** is a rate in which the second number (usually written as the denominator) is 1, or 1 of a quantity.
8. **Decimal** is a fraction written in base ten numeration. For example, $\frac{375}{1000}$= 0.375 and $\frac{7}{10}$= 0.7.
9. **Integers** include all whole numbers and their opposites.

**Let’s be Rational**

1. A set of rules for performing a procedure is an **algorithm**. *The procedure for long division and addition fractions are examples of algorithms.*
2. A **fact family** is a set of related addition-subtraction sentences or multiplication-division sentences. For example the set of numbers 3, 5, and 15 is part of this multiplication-division fact family:

3 x 5 = 15 5 x 3 = 15 15 ÷ 5 = 3 15 ÷ 3 = 5

1. A mathematical statement composed of numbers and operation signs is a **number sentence**.
2. A factor by which you multiply a given number so that their product is 1 is a **reciprocal**. For example, $\frac{3}{5}$ x $\frac{5}{3}$ = 1, therefore $\frac{3}{5}$ and $\frac{5}{3}$ are reciprocals.

**Decimal Operations**

1. A **repeating decimal** is a decimal with a pattern of digits that repeats over and over, such as 0.3333…
2. A **terminating decimal** is a decimal that ends, or terminates, such as 0.5 or 0.125.

**Variables and Patterns**

1. **X-axis** is the *horizontal line* used to make a coordinate graph.

2. **Y-axis** is the *vertical line* used to make a coordinate graph.

1. An ordered pair of numbers used to locate a point on a coordinate grid are called c**oordinates**; written in the form (x,y). (Also called an ordered pair).
2. **Coefficient** is the numerical factor in any term of an expression.
3. The **independent variable** is one of two variables in a relationship. Its value determines the value of the other variable called the dependent variable. If you organize a bike tour, for example, the number of people who register to go (independent variable) determines the total cost for renting bikes (dependent variable).
4. The **dependent variable** is one of the two variables in a relationship. Its value depends upon or is determined by the other variable called the independent variable. For example, the cost of trail mix (dependent variable) depends on how much you buy (independent variable.)
5. An **equation** is a rule containing variable(s) that represent a mathematical relationship; includes an equal sign. (3x=6)
6. A mathematical phrase containing numbers, variables, and operation symbols is called an **expression.** (3x)
7. A **term** is a number, variable, or the product of a number and a variable. (3, x, and 3x are all terms).
8. The size of the units on an axis of a graph or number line is the **scale**.
9. A **variable** is a quantity that can change. Letters are often used to represent variables in rules or equations that describe patterns.
10. An **ordered pair** is a set of numbers used to locate a point on a coordinate grid; written in the form (x, y). (Also called coordinates).
11. A **table** is a list of values for two or more variables that shows the relationship between them. Tables often represent data made from observations, experiments, or a series of arithmetic operations. A table may show a pattern of change between two variables that can be used to predict values not included in the table.

**Data About Us**

1. Values that are numbers collected in an experiment such as constants, measurements, and ratings are considered **numerical data**.
2. **Categorical data** are “words” that represent possible responses within a given category.
3. A **coordinate graph** is a way to show the relationship between two variables.
4. A **line plot** is a quick, simple way to organize data along a number line where the X (or other symbols) above a number represent how often each value is mentioned.
5. A **mean** is the value you would get if all the data were combined and then redistributed evenly. (Average)
6. The **median** is the number that marks the middle of an ordered set of data.
7. The **mode** is the category or numerical value that occurs most often.
8. The difference between the least value and the greatest value in a distribution is its **range**.
9. An **outlier** is a number in a set of data that is much larger or smaller than most of the other numbers in the set.
10. A **histogram** is a type of bar graph in which the labels for the bars are numerical intervals.
11. A **scatterplot** is a graph made by plotting ordered pairs on a coordinate plane to show the relationship between two sets of data.
12. A graph drawn with rectangular bars of varying lengths to show how large each value is called a **bar graph**.
13. A **box-and-whisker plot** is a display that shows the distribution of values in a data set separated into four equal-size groups. A box plot is constructed from a five-number summary of the data (minimum value, lower quartile, median, upper quartile, maximum value).
14. Values such as counts, ratings, measurements or opinions that are gathered to answer questions are called **data**.
15. A **frequency table** lists all data values, and uses tally marks or some other way to show the number of times each data value occurs.
16. A **quartile** is one of three points that divide a data set into four equal groups. The second quartile, Q2, is the median of the data set. The first quartile, Q1, is the median of the lower half of the data set. The third quartile, Q3, is the median of the upper half of the data set.
17. An **interval** is a consecutive group of numbers. For example, a survey might collect data about people’s ages. The responses could be grouped into intervals, such as 5-9, 10-12, and 13-16. The interval 5-9 would include all ages 5 and 9.

**Covering and Surrounding**

1. **Area** is the measure of the amount of surface enclosed by the boundary of the figure. (Examples: covering, painting a wall, carpeting a floor)
2. The measure of the distance around a figure is the **perimeter**. (Examples: surrounding, fencing a garden, trim along a wall)
3. A triangle with no sides of the same length is a **scalene triangle**.
4. **Surface area** is the total area of the faces including the bases and curved surfaces of a solid figure.
5. A **vertex** is a point (location) where two line segments, lines, or rays meet. The corner of a polygon is a vertex. (plural is vertices)
6. **Volume** is the amount of space occupied by a 3-dimensional shape or it is the number of unit cubes that will fit inside a 3-dimensional shape.
7. A line segment formed where two faces of a three-dimensional shape meet is called an **edge**.
8. A triangle with all three sides the same length is an **equilateral triangle**.
9. A flat, two-dimensional surface of a three-dimensional shape is called a **face**.
10. A triangle with two sides of the same length is an **isosceles triangle**.
11. A **net** is a two-dimensional pattern that can be folded into a three-dimensional figure.
12. A **regular polygon** has all of its sides AND all of its angles equal.
13. A triangle with one right angle is a **right triangle**.
14. A triangle with one obtuse angle is an **obtuse triangle**.
15. A triangle with all acute angles is an **acute triangle**.
16. An angle that measures *90 degrees* is a **right angle**.
17. Two lines that intersect to form right angles are **perpendicular lines**.
18. Lines in a plane that never meet are **parallel lines**.
19. A **polygon** is a closed shape formed by line segments, called sides. (Straight sides, closed figure)
20. A **prism** is a three-dimensional shape with a top and bottom (base) that are congruent polygons and lateral faces that are parallelograms.
21. A **pyramid** is a three-dimensional shape with one polygonal base and lateral sides that are all triangles that meet at a vertex opposite the base.
22. **Adjacent** means “next to”.
23. **Congruent** means having the exact same size and shape.
24. **Similar** describes figures that have the same shape, but not necessarily the same size. Corresponding sides of similar figures are proportional.
25. A quadrilateral with two sets of opposite sides that are parallel is a **parallelogram**.
26. A **trapezoid** is a quadrilateral with AT LEAST one pair of opposite sides that are parallel. This definition means that parallelograms are trapezoids.
27. A **rhombus** is a quadrilateral that has all sides the same length.
28. A **square** is a rectangle with all sides equal. Squares have four right angles and four equal sides.
29. A polygon with four sides is a **quadrilateral**.
30. The **altitude** (height) of a plane figure is the perpendicular distance from a vertex to the opposite side of the figure.