Knowledge Map for

6th Grade Math

CONFIDENCE LEVEL: Prime Time

Confidence Level	0	1	2	3
	I have no idea what this is.	I've heard of this, but I'm not sure what it means.	I know this.	I could teach this to a classmate
Total Before Unit				
Total After Unit				

Prime Time
(Factors and Multiples)

1. A **factor** is a whole numbers that is multiplied by another whole number to get a product. (Ex: 2 x 5 = 10; therefore, 2 and 5 are factors of 10.)
2. A **factor pair** is two whole numbers that are multiplied to get a product. (2 is a factor of 10, 5 is a factor of 10, and 2x5 is a factor pair for 10.)
3. A **common factor** is a factor that two or more numbers share. (7 is a factor of 35 and 7 is a factor of 49; therefore, 7 is a common factor of 35 and 49.)
4. All the factors of a number, *except the number itself* are **proper factors**. (The proper factors for 12 are 1,2,3,4 and 6)
5. 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**.)
6. 1 is a **factor** of every whole number.
7. A number with exactly two factors, 1 and the number itself, is a **prime number**. (2, 5, and 13 are examples of prime numbers, but there are many more!)
8. A **composite number** is a whole number with factors other than itself and 1. (24 is a composite number)
9. A **multiple** is the product of a given whole number and another whole number. (For example: Take any whole number, like the number 3. Multiply 3 by any other whole number, like 7, and you have found a multiple of 3. Since 3 x 7 = 21, we say that 21 is a multiple of 3.)
10. A **common multiple** is a multiple that two or more numbers share. (28 is a common multiple of 7 and 14 because 28 is a multiple of 7 and 28 is a multiple of 14.)
11. The 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 12)
12. A **factorization** breaks down a product into its factors. (For example, one factorization for 60 is 2x3x10. Another factorization for 60 is 3x20.)

13. A **prime factorization** breaks down a product into its prime factors. There is only one prime factorization for each product. (For example, the prime factorization for 60 is 2x2x3x5. Each factor is a prime number.)
14. An **exponent** is a small raised number that tells how many times a factor is used. For example, 5^3 means 5x5x5 = 125. 3 is the exponent.
15. A number that is a result of the product of a number multiplied by itself is a **square number**. (6x**6** = 6^2 = 36. 36 is a square number)
16. A number that is a result of the product of number multiplied by itself two times is a **cubed number**. (2x**2**x**2** = 2^3 = 8. 8 is a cubed number)
17. An **even number** is a whole number that can be split into two equal parts. It is a multiple of two and can be divided by two evenly. (2,4,6…are even numbers)
18. An **odd number** is a whole number that cannot be split into two equal parts. It is not a multiple of two and cannot be divided by two evenly. (1,3,5…are odd numbers)
19. **Whole numbers** are zero and the counting numbers: 1, 2, 3, 4, 5, 6,and so on. If a number has a negative sign, a decimal point, or a part that's a fraction, it's not a whole number.
20. **Integers** are the set of whole numbers and their opposites. (…-2,-1,0,+1,+2…)
21. **Consecutive** means "in order." 8, 9, and 10 are consecutive whole numbers.
22. A **digit** is any one of the ten symbols: 0,1,2,3,4,5,6,7,8,9.
23. **Order of Operations**
    The rules for carrying out arithmetic operations:
    a. Work first inside parentheses or other grouping symbols
    b. Inside grouping symbols or if there are no grouping symbols:
        i. First, take all powers;
        ii. Second, do all multiplications or divisions in order, from left to right;
        iii. Finally, do all additions or subtractions in order, from left to right

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Bits and Pieces I
(Understanding Fractions, Decimals and Percents)

24. A number in the form that has a numerator and a denominator is a **fraction**. A **fraction** can represent (1) a part of a whole object, set or unit; (2) a ratio of two quantities; or (3) a division.

25. A **ratio** is a number, often seen as a fraction, used to make comparisons between two quantities.

26. A **rational number** is a number than can be written as a quotient of two positive numbers (ratio). (For example, ½ really means 1 ÷ 2). A rational number can be terminating or non-terminating. If a rational number is non-terminating, then it will repeat.

27. An **irrational** number is a number that cannot be written as a ratio. An irrational number does not terminate and does not repeat. (Ex: π and $\sqrt{2}$)

28. The number written below the fraction bar in a fraction is the **denominator**.

29. The number written above the fraction bar in a fraction is the **numerator**.

30. A **unit fraction** is a fraction with a numerator of 1.

31. A **proper fraction** is a fraction in which the numerator is *smaller than* the denominator.

32. An **improper fraction** is a fraction in which the numerator is *larger than* the denominator.

33. *Fractions that are equal in value*, but may have different numerators and denominators are **equivalent fractions**.

34. A **decimal** is a special form of a fraction. Decimals (or decimal fractions) are fractions with denominators equal to 10, 100, 1000, and so on. (For example, 3/100 = .03)

35. A **percent** is a special decimal fraction in which the denominator is 100. (For example, 3/100 = .03 = 3%) Percent means "out of 100."

36. A **proportion** is an equation showing that two ratios are equivalent. (Ex: ½ = 2/4)

CONFIDENCE LEVEL: Shapes and Designs

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Shapes and Designs
(Two-Dimensional Geometry)

37. A **line segment** consists of two points of a line and all the points between these two points.
38. Lines in a plane that never meet are **parallel lines**.
39. Two lines that intersect to form right angles are **perpendicular lines**.
40. A part of a line consisting of a point and all the points on the line on one side of the endpoint is called a **ray**.
41. A **vertex** is a point (location) where two line segments, lines, or rays meet.
42. A corner of a polygon is a **vertex**. The plural for vertex is **vertices**.
43. A **diagonal** is a line segment connecting two non-adjacent vertices of a polygon.
44. The figure formed by two rays or line segments that have a common vertex is called an **angle**.
45. A **degree** is a unit of measure of angles and is also equal to 1/360 of a complete circle.
46. An **acute angle** is an angle whose measure is *less than 90 degrees*.
47. An **obtuse angle** is an angle whose measure is *more than 90 degrees and less than 180 degrees*.
48. A **straight angle** is an angle whose measure *equals 180 degrees*.
49. An angle that measures *90 degrees* is a **right angle**.
50. An **angle sum** is the sum of all the measures of the interior angles of a polygon.
51. An **exterior angle** is an angle at a vertex of a polygon where the sides of the angle are one side of the polygon and the extension of the other side meeting at the vertex.
52. An **interior angle** is the angle inside a polygon formed by two adjacent sides of the polygon.
53. A **polygon** is a shape formed by line segments, called sides.
54. A **regular polygon** has all of its sides AND all of its angles equal.
55. A polygon which has at least two sides with different lengths or two angles with different measures is an **irregular polygon**.
56. A polygon with three sides is a **triangle**.

57. A triangle with all three sides the same length is an **equilateral triangle**.
58. A triangle with two sides the same length is an **isosceles triangle**.
59. A triangle with no sides the same length is a **scalene triangle**.
60. A triangle with one right angle is a **right triangle**.
61. A triangle with all acute angles is an **acute triangle**.
62. A triangle with one obtuse angle is an **obtuse triangle**.
63. A polygon with four sides is a **quadrilateral**.
64. A quadrilateral with opposite sides that are parallel is a **parallelogram**.
65. A **rectangle** is a parallelogram with all right angles. **Squares** are a special type of rectangle.
66. A **square** is a rectangle with all sides equal. Squares have four right angles and four equal sides.
67. A **trapezoid** is a quadrilateral with AT LEAST one pair of opposite sides that are parallel. This definition means that parallelograms are trapezoids.
68. A **rhombus** is a quadrilateral that has all sides the same length.
69. A **transversal** is a line that intersects two or more lines.
70. A flat surface that extends infinitely in all directions is a **plane**.
71. The number of points needed to identify a plane in space is 3.
72. **Planes** can be parallel, perpendicular, or intersect in space.
73. The covering of a plane surface with geometric shapes without gaps or overlaps is a **tiling** or a **tessellation**.
74. A **line of symmetry** is a line such that if a shape is folded over this line the two halves of the shape match exactly.
75. A shape with **reflection symmetry** has two halves that are mirror images of each other. (This is also called a FLIP)
76. A shape has **rotation symmetry** if it can be rotated *less than a full turn* about its center point to a position where it looks exactly as it did before it was rotated. (This is also called a TURN)
77. A shape that moves across a plane but does not turn or flip is a **translation**. (This is also called a SLIDE)
78. A transformation that preserves the shape of a figure, but allows the size to change is a **dilation**.
79. A shape that contracts to become smaller is a **contraction**.
80. Translations, reflections, and rotations are all called **transformations**.
81. **Congruent** means having the exact same size and shape.
82. **Similar** describes figures that have the same shape, but not necessarily the same size. Corresponding sides of similar figures are proportional.
83. A **property** is a characteristic or an attribute of a shape. (Ex: all 90 degree angles)
84. The **altitude** (height) of a plane figure is the distance from a vertex to the opposite side.
85. **Adjacent** means next to.
86. **Opposite** means directly across from.

CONFIDENCE LEVEL: Bits and Pieces II

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Bits and Pieces II
(Using Fraction Operations)

87. A set of rules for performing a procedure is an **algorithm**. Some examples of algorithms are the *rule for long division* or the *rule for adding fractions*.
88. A **fact family** is a set of related addition-subtraction sentences or multiplication-division sentences. (Here is an entire addition-subtraction fact family: 1+2=3, 2+1=3, 3-1=2, and 3-2=1.)
89. A **reciprocal** is a factor by which you multiply a given number so that their product is 1. (For example, 2/3 x 3/2 = 1; so 2/3 is the reciprocal of 3/2)
90. Be able to **add** fractions or mixed numbers with **like denominators**.
91. Be able to **subtract** fractions or mixed numbers with **like denominators**.
92. Be able to **add** fractions or mixed numbers with **unlike denominators**.
93. Be able to **subtract** fractions or mixed numbers with **unlike denominators**.
94. Be able to **multiply fractions**.
95. Be able to **divide fractions**.
96. Be able to **simplify fractions**.

CONFIDENCE LEVEL: Covering and Surrounding

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Covering and Surrounding
(Two-Dimensional Measurement)

97. Linear measurements, such as length, width, base, and height, which describe the size of figures, are **linear dimensions**.
98. **Area** is the measure of the amount of surface enclosed by the boundary of a figure. (covering) (painting a room)
99. The measure of the distance around a figure is the **perimeter**. (surrounding) (fencing a garden)
100.   The distance around (or perimeter of) a circle is its **circumference**.
101.   A **circle** is a two-dimensional object in which every point is the same distance from a point called the center.
102.   The **diameter** is a segment that goes from one point on a circle through the center of the circle to another point on the circle.
103.   The **chord** is a segment that goes from one point on a circle and *not necessarily through the center* of the circle to another point on the circle.
104.   A **radius** is a segment from the center of a circle to a point on the circle. A radius is half of the measurement of the diameter.
105.   **Pi (π)** is the mathematical name for the ratio of a circle's circumference to its diameter. This ratio is the same for every circle, and is approximately equal to 3.1416.
106.   A **sector** is a part of a circle bounded by two radii and the arc they create.

CONFIDENCE LEVEL: Bits and Pieces III

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Total Before Unit				
Total After Unit				

Bits and Pieces III
(Computing with Decimals and Percents)

107. A **dividend** is the name for the number into which you are dividing in a division problem. For example, 72 is the dividend in the problem **72** ÷ 8.

108. A **divisor** is the name for the number you are dividing by in a division problem. For example, 8 is the divisor in the problem 72 ÷ **8**.

109. **Quotient** is the name for the answer to a division problem. For example, 9 is the quotient to 72 ÷ 8 = **9**.

110. A **repeating decimal** is a decimal with a pattern of digits that repeats over and over, such as 0.33333….

111. A **terminating decimal** is a decimal that ends, or terminates, such as 0.5 or 0.125.

112. Be able to **add decimals**.

113. Be able to **subtract decimals**.

114. Be able to **multiply decimals**.

115. Be able to **divide decimals**.

116. Be able to **round decimals** to the nearest tenth or hundredth.

CONFIDENCE LEVEL: How Likely Is It?

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How Likely Is It?
(Understanding Probability)

117.   **Possible** is a word used to describe an outcome or result that can happen.
118.   A possible result of an action is an **outcome**.
119.   A set of outcomes is an **event**.
120.   Two or more events that have the same chance of happening are **equally likely events**.
121.   A result of an event that is certain to happen is a **certain outcome**.
122.   An outcome that gives a desired result is a **favorable outcome**.
123.   An outcome that cannot happen is an **impossible outcome**.
124.   The likelihood that something will happen is a **chance**.
125.   A number with a value from 0 to 1 that describes the likelihood that an event will occur is a **probability**.
126.   A probability found by analyzing a situation is a **theoretical probability**.
127.   A probability found as a result of an experiment is an **experimental probability.**
128.   A game is **fair** when each player has the same chance of winning.

CONFIDENCE LEVEL: Data About Us

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Total Before Unit				
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Data About Us
(Statistics)

129.   **Data** are values such as counts, ratings, measurements, or opinions that are gathered to answer questions.

130.   Values that are numbers such as counts, measurements, and ratings are considered **numerical data**.

131.   **Categorical data** are "words" that represent possible responses within a given category.

119.   A **table** is a tool for organizing information in rows and columns.

120.   A **bar graph** is a graphical representation of a table of data in which the height or length of each bar indicates its frequency.

121.   A **coordinate graph** is a way to show the relationship between two variables.

122.   The **x-axis** is the horizontal line used to make a coordinate graph.

123.   The **y-axis** is the vertical line used to make a coordinate graph.

124.   The size of the units on an axis of a graph or number line is the **scale**.

125.   A **line plot** is a quick, simple way to organize data along a number line where the X's (or other symbols) above a number represent how often each value is mentioned.

126.   A **mean** is the value you would get if all the data are combined and then redistributed evenly. (average)

127.   The **median** is the number that marks the middle of an ordered set of data.

128.   The **mode** is the category or numerical value that occurs most often.

129.   The difference between the least value and the greatest value in a distribution is its **range**.

130.   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.

131.   A **histogram** is a graph in which the labels for the bars are numerical intervals.

CONFIDENCE LEVEL: Miscellaneous

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Total Before Unit				
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Filling and Wrapping

132.   **Surface area** is the total area of the faces including the bases and curved surfaces of a solid figure.

133.   **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.

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Algebra

134.   **The Commutative Property** of addition and multiplication (but not of subtraction or division) says that changing the order of the numbers being added or multiplied doesn't change the answer. (For example, $5 + 10 = 15$ and $10 + 5 = 15$)

135.   **The Associative Property** of addition and multiplication (but not of subtraction and division) says that when you add or multiply three numbers, it doesn't matter which two are added or multiplied first. For example, $(4 + 3) + 7 = 4 + (3 + 7)$

136.   **The Distributive Property** is a property that relates multiplication and addition or subtraction. This property gets its name because it "distributes" a factor over terms inside parentheses. Distributive property of multiplication over addition: $1 \times (2 + 3) = (1 \times 2) + (1 \times 3)$

Before Unit	After Unit
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