

## Eureka Squared - 6<sup>th</sup> Grade Objectives

<b>Module 1 – Ratios, Rates, &amp; Percents</b>	
5 Topics / 26 Lessons	
<b>Topic A – Ratios (5 Lessons)</b>	
1	Use multiplicative reasoning to estimate the solution to a real-world problem.
2	Write ratios that relate two quantities as an ordered pair of numbers.  Use ratio language to compare two quantities.
3	Write multiple ratios to describe the same situation.  Represent ratios with tape diagrams.
4	Create ratios by making batches of different quantities.  Use tape diagrams to determine unknown quantities in ratios.
5	Find equivalent ratios by multiplying both numbers in a given ratio by the same nonzero number.  Use equivalent ratios to find unknown quantities.
<b>Topic B – Collections of Equivalent Ratios (6 Lessons)</b>	
6	Represent equivalent ratios by using ratio tables and double number lines.  Use representations of ratio relationships to solve problems.
7	Plot points in the coordinate plane that each represent a ratio.  Identify characteristics of graphs, tables, and double number lines representing ratio relationships.
8	Use addition patterns in tables and graphs of equivalent ratios to describe ratio relationships and find unknown quantities.
9	Use graphs and tables to explore multiplication patterns in ratio relationships.  Use multiplication to complete ratio tables.
10	Write and use equivalent ratios when one of the numbers in the ratio is 1.
11	Solve multi-step ratio problems by reasoning about equivalent ratios.
<b>Topic C – Comparing Ration Relations (4 Lessons)</b>	

12	Compare ratio relationships by using graphs, tables, and double number lines.
13	Compare ratio relationships by using ratio tables.
14	Compare ratio relationships by creating equivalent ratios.
15	Compare ratio relationships by using the value of the ratio.
<b>Topic D - Rates (6 Lessons)</b>	
16	Find distance and time corresponding to a given speed.  Identify real-world examples of rates and interpret their meanings in context.
17	Identify rates and unit rates.  Calculate one quantity when given another quantity and a constant rate.
18	Compare rates with like units of measurement by using unit rate.
19	Convert units of measurement by applying rate reasoning.
20	Apply rate reasoning to solve real-world ratio problems involving speed, unit pricing, and unit conversions.  Find an unknown quantity when given a rate and a known quantity.
21	Solve problems involving multiple constant rates.
<b>Topic E - Percents (5 Lessons)</b>	
22	Relate percents to a part-to-whole relationship where the whole is 100.  Model percents and write percents in fraction and decimal forms.
23	Calculate a percent when given a part and the whole.  Discover that if multiple parts make a whole, then the percents representing the parts should total 100%.
24	Calculate a part when given the whole and a percent.
25	Calculate the whole when given a part and a percent.
26	Solve multi-step percent problems.

## Module 2- Operations with Fractions & Multi-Digit Numbers

6 Topics / 24 Lessons

Topic A - Factors, Multiples, & Divisibility (5 Lessons)

1	Use visual models to determine common factors and common multiples of pairs of numbers.
2	Determine whether numbers are divisible by other numbers.
3	Determine the greatest common factor of two whole numbers less than or equal to 100.
4	Find the least common multiple of two whole numbers less than or equal to 12.
5	Find the greatest common factor of large numbers by using the Euclidean algorithm.  Find the least common multiple of large numbers by using the greatest common factor.
<b>Topic B – Dividing Fractions (3 lessons)</b>	
6	Divide a whole number by a fraction by using tape diagrams and reasoning about division.
7	Divide a fraction by a whole number.  Divide a mixed number by a whole number.
8	Divide a fraction by a fraction by using a common denominator.  Divide a mixed number by a fraction by using a common denominator.
<b>Topic C – Dividing Fractions Fluently (4 Lessons)</b>	
9	Use a tape diagram to divide a fraction by a fraction.  Relate division of a fraction by a fraction to an unknown factor problem.
10	Use the invert and multiply strategy to divide a fraction by a fraction.
11	Solve real-world problems by dividing fractions and mixed numbers.
12	Add, subtract, multiply, and divide fractions and mixed numbers to solve real-world problems.
<b>Topic D – Decimal Addition, Subtraction, &amp; Multiplication (4 Lessons)</b>	
13	Add and subtract decimals by using the standard algorithms for each operation.
14	Recognize and apply patterns in factors when multiplying whole numbers and decimals.

15	Multiply decimals by using the standard algorithm.
16	Create a model of a building and use decimal operations to calculate cost, revenue, and profit or loss.
<b>Topic E - Division of Multi-Digit Numbers (4 Lessons)</b>	
17	Divide multi-digit whole numbers by using the partial quotients method, and express quotients as mixed numbers.
18	Divide multi-digit whole numbers by using the standard algorithm.
19	Divide multi-digit whole numbers by using the standard algorithm, and express quotients as decimals.
20	Create and solve real-world division problems.
<b>Topic F - Decimal Division (4 Lessons)</b>	
21	Divide a decimal by a multi-digit whole number by using the standard division algorithm.
22	Divide a decimal by a decimal greater than 1 by using the standard algorithm.
23	Divide a decimal by a decimal less than 1 by using the standard algorithm.  Solve real-world problems by dividing a decimal by a decimal.
24	Solve real-world problems by performing operations with decimals.

<b>Module 3- Rational Numbers</b>	
4 Topics / 17 Lessons	
<b>Topic A - Integers &amp; Rational Numbers (4 Lessons)</b>	
1	Represent quantities in real-world situations by using positive and negative numbers.  Plot positive numbers, negative numbers, and 0 on horizontal and vertical number lines.
2	Plot integers and their opposites on horizontal and vertical number lines and identify 0 as its own opposite.

	Identify the opposite of the opposite of a number.
3	Plot rational numbers on horizontal and vertical number lines.  Identify the locations of rational numbers plotted on horizontal and vertical number lines.
4	Represent opposite quantities in real-world situations by using rational numbers.
<b>Topic B - Ordering &amp; Magnitude (5 Lessons)</b>	
5	Represent opposite quantities in real-world situations by using rational numbers.
6	Order rational numbers.  Write, interpret, and explain statements of order for rational numbers in real-world situations.
7	Determine the absolute values of rational numbers.
8	Explain the relationship between the order of rational numbers and the order of their absolute values.  Order and compare the absolute values of rational numbers and the magnitudes of real-world quantities.
9	Distinguish between comparisons of absolute value and statements of order in real-world situations.  Determine and interpret distance between rational numbers.
<b>Topic C - The Coordinate Plane (5 Lessons)</b>	
10	Use ordered pairs to identify the locations of points in the coordinate plane.  Relate the signs of $x$ - and $y$ -coordinates to each of the four quadrants of the coordinate plane.
11	Use ordered pairs to plot points in the coordinate plane.
12	Graph points and their reflections in the coordinate plane.

	Recognize that when two ordered pairs differ only by the sign of one or both coordinates, the locations of the points are related by reflections across one or both axes.
13	Draw and label a coordinate plane, choosing a reasonable scale for a given set of points.  Plot points and describe how a graph changes when the scale changes.
14	Create time graphs in the coordinate plane.  Solve real-world problems by using time graphs.
<b>Topic D – Solving Problems in the Coordinate Plane (3 Lessons)</b>	
15	Find the lengths of horizontal and vertical line segments with rational number coordinates as endpoints in the coordinate plane by counting the number of units between endpoints and by using absolute value.
16	Graph geometric figures in all four quadrants of the coordinate plane.  Use distance and symmetry to solve geometric problems in the coordinate plane.
17	Solve geometric and real-world problems by using the coordinate plane.

<b>Module 4– Expressions &amp; One-Step Equations</b>	
5 Topics / 25 Lessons	
<b>Topic A – Numerical Expressions (6 Lessons)</b>	
1	Evaluate expressions with addition and subtraction.
2	Evaluate expressions with multiplication and division.
3	Write numerical expressions by using exponential notation.
4	Evaluate numerical expressions written in exponential notation.
5	Identify the relationships between operations and apply those relationships when evaluating expressions.
6	Evaluate numerical expressions with exponents by using the conventional order of operations.

Topic B – Expressions & Real-World Problems (5 Lessons)	
7	<p>Write algebraic expressions to represent descriptions involving addition and subtraction.</p> <p>Write descriptions of algebraic expressions involving addition and subtraction.</p>
8	<p>Write algebraic expressions to represent descriptions involving addition, subtraction, multiplication, and division.</p> <p>Write descriptions of algebraic expressions involving addition, subtraction, multiplication, and division.</p>
9	<p>Define variables precisely.</p> <p>Write algebraic expressions involving addition and subtraction to represent real-world situations.</p>
10	<p>Write and interpret algebraic expressions involving multiplication and division that represent real-world situations.</p>
11	<p>Write algebraic expressions with two terms to represent real-world situations involving addition and multiplication.</p>
Topic C – Equivalent Expressions Using the Properties of Operations (5 Lessons)	
12	<p>Write and identify equivalent algebraic expressions involving multiplication and division by using the properties of operations.</p> <p>Write algebraic expressions that represent real-world situations.</p>
13	<p>Use the distributive property to write the product of two factors as a sum or difference.</p>
14	<p>Use the distributive property to write a sum or difference as the product of two factors.</p>
15	<p>Add and subtract like terms by using the distributive property.</p> <p>Write an algebraic expression that represents a geometric situation.</p>
16	<p>Write equivalent expressions by using the properties of operations and combining like terms.</p>

	Write algebraic expressions that represent real-world situations.
<b>Topic D - Equations &amp; Inequalities (5 Lessons)</b>	
17	Determine whether a number sentence is true.  Determine whether a number is a solution to an equation by using substitution.
18	Represent solutions to inequalities on number lines.  Identify whether a number is a solution to an inequality by using substitution.
19	Solve addition and subtraction equations by using tape diagrams and algebraic reasoning.
20	Solve multiplication and division equations by using tape diagrams and algebraic reasoning.
21	Solve problems by writing and solving equations.
<b>Topic E - Relating Variables by Using Tables, Graphs, &amp; Equations (4 Lessons)</b>	
22	Represent a ratio relationship with a table and a two-variable equation.  Identify the independent and dependent variables in a real-world or mathematical situation.
23	Analyze the relationship between the independent and dependent variables in the graph of a ratio relationship.  Represent a ratio relationship with a table, a graph, and a two-variable equation.
24	Represent a real-world situation with a table, a graph, and a two-variable equation.  Analyze the relationship between the variables in a real-world situation.
25	Use tables, graphs, and equations to estimate the solution to a real-world problem.



## Module 5— Area, Surface Area, & Volume

4 Topics / 19 Lessons

### Topic A – Areas of Polygons (4 Lessons)

1	<p>Compose parallelograms into rectangles to derive the formula for the area of a parallelogram.</p> <p>Compute the area of a parallelogram by using the formula <math>A = bh</math></p>
2	<p>Compose two identical right triangles into a rectangle to derive the formula for the area of a right triangle.</p> <p>Compute the area of a right triangle by using the formula <math>A = \frac{1}{2} bh</math>.</p>
3	<p>Compose two identical triangles into a parallelogram to derive the formula for the area of a triangle.</p> <p>Compute the area of any triangle by using the formula <math>A = \frac{1}{2} bh</math>.</p>
4	<p>Use composition or decomposition to write equivalent expressions that represent the area of a triangle.</p> <p>Solve real-world and mathematical problems involving the areas of triangles.</p>

### Topic B – Problem Solving with Area (4 Lessons)

5	<p>Determine the perimeters of rectangles and polygons graphed in the coordinate plane.</p> <p>Determine the areas of parallelograms, rectangles, and polygons graphed in the coordinate plane.</p>
6	<p>Determine the areas of triangles graphed in the coordinate plane.</p> <p>Determine the areas of polygons composed of triangles and parallelograms graphed in the coordinate plane.</p>

7	<p>Calculate the areas of trapezoids and other polygons by using composition and decomposition.</p> <p>Use composition or decomposition to write equivalent expressions for the areas of polygons.</p>
8	<p>Determine the areas of real-world composite figures.</p> <p>Solve problems in real-world situations involving rates and areas.</p>
<b>Topic C - Nets &amp; Surface Area (6 Lessons)</b>	
9	<p>Identify the shapes of the faces of right prisms and pyramids.</p> <p>Name parallel and perpendicular edges and faces of solids.</p>
10	Represent solids by using nets composed of triangles and rectangles.
11	<p>Draw and label nets for three-dimensional objects.</p> <p>Determine the surface area of a solid by using its net.</p>
12	<p>Determine the surface area of a solid.</p> <p>Develop the surface area formula for right rectangular prisms and use it to calculate surface area.</p>
13	Solve real-world problems involving rates and surface area of right prisms and pyramids.
14	Design different boxes for a product and calculate each box's surface area.
<b>Topic D - Volumes of Right Rectangular Prisms (5 Lessons)</b>	
15	Find the volumes of right rectangular prisms that have fractional edge lengths by packing with cubes that have fractional edge lengths.
16	Solve real-world and mathematical problems by applying the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths.
17	Solve real-world and mathematical problems by applying ratio reasoning to find volumes of right rectangular prisms.
18	Determine the volumes of solids composed of right rectangular prisms.
19	Solve real-world problems that involve surface area and volume.

# Module 6– Statistics

4 Topics / 22 Lessons

## Topic A – Understanding Distributions (6 Lessons)

1	Identify and write statistical questions.  Identify the types of data that can be collected to answer a statistical question.
2	Given a dot plot, describe the center, spread, and other characteristics of the data distribution.
3	Create a dot plot and describe a data distribution.
4	Use a frequency table to construct a frequency histogram for a data distribution.
5	Identify the differences between bar graphs and histograms.  Construct relative frequency histograms.
6	Display data by using a dot plot or a histogram and describe the data distribution.

## Topic B – Mean & Mean Absolute Deviation (5 Lessons)

7	Describe the center of a data distribution by using an equal share value called the mean.  Connect the concept of equal shares with the mathematical formula for finding the mean.
8	Describe the center of a distribution by using the mean and interpret the mean as a balance point.
9	Describe a data distribution by using the mean and variability.
10	Calculate and interpret the mean absolute deviation for a data distribution.
11	Use the mean and mean absolute deviation to describe a data distribution.

## Topic C – Median, Interquartile Range, & Box Plots (5 Lessons)

12	Calculate and interpret the median of a data distribution.
13	Calculate quartiles of a data distribution and describe the variability by using the interquartile range.

14	Describe a data distribution by using the five-number summary and the interquartile range.  Construct and interpret a box plot from a five-number summary.
15	Construct and use box plots to analyze data distributions.
16	Summarize a data distribution by using a box plot, the median, and the interquartile range.  Use box plots to compare two data distributions.
<b>Topic D – Answering Statistical Questions by Analyzing Data (6 Lessons)</b>	
17	Develop a statistical question to guide data collection.  Develop a plan to collect a data set to answer a proposed statistical question.
18	Find exact and approximate features of data distributions from data displays.  Compare the effectiveness of data displays at communicating different features of data distributions.
19	Compare data distributions by using relative frequency histograms and box plots.
20	Choose a measure of center for a data distribution.  Justify the choice of a measure of center based on the shape of the distribution and the context.
21	Recognize measurement variability and its causes.  Assess variability visually and by using the range, mean absolute deviation, and interquartile range.
22	Present statistical projects that use the investigative process and critique the work of others by using the tools learned in this module.

