HARFORD COUNTY PUBLIC SCHOOLS
MATHEMATICS 6 CURRICULUM

CLICK HERE for the Maryland College and Career Ready Standards for Grade 6 Mathematics.

Topic 1: Use Positive Rational Numbers

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson Savvas, 2017.

Enduring Understandings

- Topic 1 focuses on the deep understanding of our number system through fluency in computations with decimals and fractions. Students use all four operations with decimals before multiplying and dividing with fractions and mixed numbers. Students apply these skills to solve real-world problems.

Essential Questions

- How can you fluently add, subtract, multiply and divide decimals?
- How can you multiply and divide fractions?

Lesson Title	Lesson Overview	Standards
Fluently Add, Subtract, and Multiply Decimals	Algorithms can be used to add, subtract, and multiply decimals fluently.	6.NS.B.3
Fluently Divide Whole Numbers and Decimals	An algorithm can be used to divide whole numbers and decimals fluently.	6.NS.B.2 6.NS.B.3
Multiply Fractions	Visual models such as area models and number lines can be used to multiply fractions. The product of two fractions can be found by multiplying the numerators and then the denominators. Multiplying mixed numbers is an extension of multiplying fractions.	6.NS.A.1
Stocking up	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.NS.B.3

Understand Division with Fractions	Visual models, such as area models and number lines, and equations can be used to represent and solve problems that involve division of fractions. Dividing a whole number by a fraction is equivalent to multiplying the whole number by the reciprocal of the fraction.	6.NS.A.1
Divide Fractions by Fractions	Visual models, such as area models and number lines, can be used to represent and solve problems that involve division of a fraction by a fraction. Dividing by a fraction is equivalent to multiplying by the fraction's reciprocal.	6.NS.A.1
Divide Mixed Numbers	The quotient of mixed numbers can be found by writing the mixed numbers as fractions and multiplying the dividend by the divisor's reciprocal. Students estimate and multiply to check their answers.	6.NS.A.1
Solve Problems with Rational Numbers	Multi-step problems require students to carefully plan the steps they follow to find the solution. Fraction and decimal problems require precision for students to identify the steps needed to solve the problem, use correct information, and calculate accurately.	6.NS.A.1

Topic 2: Integers and Rational Numbers

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 2 focuses on applying and extending previous understandings of numbers to the system of rational numbers, including developing a deep understanding of integers and other rational numbers, and locating points associated with rational number ordered pairs on the coordinate plane.

Essential Questions

- What are integers and rational numbers?
- How are points graphed on a coordinate plane?

Lesson Title	Lesson Overview	Standards
Understand Integers	Integers are the counting numbers, their opposites, and zero. Integers can be compared, ordered, and used to describe real-world contexts.	6.NS.C.5 6.NS.C.6a 6.NS.C.6c
Represent Rational Numbers on the Number Line	Each rational number can be associated with a unique point on the number line. A number to the right of another on the number line is the greater number.	6.NS.C.7a 6.NS.C.7b
Absolute Values of Rational Numbers	The absolute value of a number can be described as the number's distance from zero on the number line. Absolute value can be interpreted as the magnitude of a positive or negative quantity in a real-world situation.	6.NS.C.7c 6.NS.C.7d
Represent Rational Numbers on the Coordinate Plane	The absolute value of a number can be described as the number's distance from zero on the number line. Absolute value can be interpreted as the magnitude of a positive or negative quantity in a real-world situation.	6.NS.C.6b 6.NS.C.6c
Find Distances on the Coordinate Plane	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.NS.C.5 6.NS.C.7d

Find Distances on the Coordinate Plane	The distance between two points on the coordinate plane with the same first coordinate or the same second coordinate can be found by adding or subtracting the absolute values of the coordinates that differ.	6.NS.C.8
Represent Polygons on the Coordinate Plane	The coordinates of the vertices of a polygon on the coordinate plane can be used to find the lengths of the sides of the polygon and its perimeter.	6.G.A.3 6.NS.C.8

Topic 3: Numeric and Algebraic Expressions

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 3 applies and extends previous understandings of arithmetic and numerical expressions to greatest common factors, least common multiples, and algebraic expressions. Students interpret, evaluate, and write algebraic expressions, including expressions with exponents, in both mathematical and real-world contexts.

Essential Questions

- What are integers and rational numbers?

Lesson Title	Lesson Overview	Standards
Understand and Represent Exponents	A whole number exponent can be used to represent repeated multiplication of a number.	6.EE.A.1
Find Greatest Common Factor and Least Common Multiple	Any number can be written as its prime factorization. The greatest common factor (GCF) is the greatest factor that two or more whole numbers have in common. The least common multiple (LCM) is the smallest multiple that two or more non-zero whole numbers have in common.	6.NS.B.4
Write and Evaluate Numerical Expressions	There is an agreed-upon order in which operations are carried out in a numerical expression.	6.EE.A.1 6.EE.A.3
Write Algebraic Expressions	Algebraic expressions use variables to describe situations in which some of the information is not known. Parts of expressions can be described using words such as term, coefficient, product, and factor.	6.EE.A.2a 6.EE.A.2b 6.EE.B.6
Evaluate Algebraic Expressions	The value of an algebraic expression can be found by replacing the variables with given numbers and doing the calculation that results.	6.EE.A.2c 6.EE.B.6
Modeling the Field Trip	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	

Generate Equivalent Expressions	The Distributive Property and other properties of operations are used to identify and write equivalent expressions.	6.EE.A.3 6.EE.A.4
Simplify Algebraic Expressions	The Distributive Property and other properties of operations are used to identify and write equivalent expressions.	6.EE.A.3 6.EE.A.4

Topic 4: Represent and Solve Equations and Inequalities

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 4 focuses on solving one-step equations and simple inequalities as well as analyzing the relationship between two quantities when one quantity, the dependent variable, changes in relationship to the other quantity, the independent variable. Students develop a deep understanding of algebraic equations and solve them by applying properties of equality and inverse operations. Solutions to inequalities are graphed on a number line. Students represent the relationships between the dependent and independent variables in tables, graphs, and equations.

Essential Questions

- What procedures can be used to write and solve equations and inequalities?

Lesson Title	Lesson Overview	Standards
Understand Equations and Solutions	A solution of an equation is a value for the variable that makes the equation true. An equation is true when the expressions or numbers on both sides of the equal sign have the same value.	6.EE.B.5
Apply Properties of Equalities	The same number can be added to, subtracted from, or multiplied on both sides of an equation and equality is maintained. Dividing both sides of an equation by the same nonzero number also maintains equality.	6.EE.A.4 6.EE.B.7
Write and Solve Addition and Subtraction Equations	A problem situation can be represented by an equation with a variable. The equation can be solved by using the inverse operation and a property of equality.	6.EE.B.7 6.EE.B.6
Write and Solve Multiplication and Division Equations	A multiplication or division problem situation can be represented by an equation with a variable. The equation can be solved using the inverse operation.	6.EE.B.7 6.EE.B.6
Write and Solve Equations with Rational numbers	Inverse relationships and properties of equality can be used to solve equations with fractions, mixed numbers, and decimals.	6.EE.B.7 6.EE.B.6

Understand and Write Inequalities	An inequality is a mathematical sentence that contains the inequality symbol < (is less than), > (is greater than), ≤ (is less than or equal to), ≥ (is greater than or equal to), or ≠ (is not equal to). An inequality describes a situation that has an infinite number of numerical possibilities.	6.EE.B.8 6.EE.B.5
Solve Inequalities	An inequality is a mathematical sentence that contains the inequality symbol < (is less than), > (is greater than), ≤ (is less than or equal to), ≥ (is greater than or equal to), or ≠ (is not equal to). An inequality describes a situation that has an infinite number of numerical possibilities.	6.EE.B.8 6.EE.B.5
Checking a Bag	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.EE.B.8 6.EE.B.5 6.EE.B.6
Understand Dependent and Independent Variables	Variables can be used to represent quantities that change in relationship to one another. The dependent variable changes in response to the independent variable.	6.EE.C.9
Use Patterns to Write and Solve	Patterns can be used to identify the relationship between quantities and write an equation that describes the relationship.	6.EE.C.9
Relate Tables, Graphs, and Equations	Tables, graphs, and equations can be used to analyze the relationship between dependent and independent variables.	6.EE.C.9

Topic 5: Understand and Use Ratio and Rate

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 5 focuses on developing an understanding of ratios and rates and the ways that they can be used to solve problems.

Essential Questions

- What are ratios and rates?
- How can you use ratios and rates to describe quantities and solve problems?

Lesson Title	Lesson Overview	Standards
Understanding Ratios	Ratios can be used to describe the relationship between two quantities where for every x unit of one quantity, there are y units of another quantity.	6.RP.A.1
Generate Equivalent Ratios	Equivalent ratios can be found by multiplying or dividing both terms by the same nonzero number.	6.RP.A.3a
Comparing Ratios	Ratio tables can be used to compare ratios and solve problems.	6.RP.A.3a
Represent and Graph Ratios	Equivalent ratios can be represented in a table, and the pairs of values can be plotted on a coordinate plane.	6.RP.A.3a
Understand Rates and Unit Rates	A rate is a special type of ratio that compares two quantities with different units of measure. A unit rate is a special rate that compares a quantity to one unit of another quantity.	6.RP.A.2 6.RP.A.3a 6.RP.A.3b
Compare Unit Rates	Rates are easily compared when they are expressed as unit rates.	6.RP.A.3a 6.RP.A.3b
Solve Unit Rate problems	Unit rates, including unit prices, can be used to solve problems.	6.RP.A.3b

Get in Line	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.RP.A.2 6.RP.A.3b
Ratio Reasoning: Convert Customary Unit	Unit rates and conversion factors can be used to convert customary units of measure.	6.RP.A.3d
Ratio Reasoning: Convert Metric Units	Unit rates and conversion factors can be used to convert metric units of measure.	6.RP.A.3d
Relate Customary and Metric Units	Unit rates and conversion factors can be used to convert between customary and metric units of measure.	6.RP.A.3d

Topic 6: Understand and Use Percent

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 6 focuses on understanding percent and using percent to solve problems. Students use models to represent percents. They use reasoning, equivalent rates, and division to find the relationship among fractions, decimals, and percents. Students use this relationship to find percents greater than 100 and less than one.

Essential Questions

- What is the meaning of percent?
- How can percent be estimated and found?

Lesson Title	Lesson Overview	Standards
Understand Percent	A percent is a rate in which the first term is compared to 100. The percent is the number of hundredths that represent the part of the whole.	6.RP.A.3c
Relate Fractions, Decimals, and Percents	Fractions, decimals, and percents are three ways to show parts of a whole.	6.RP.A.3c
Represent Percents Greater Than 100 or Less Than 1	A percent greater than 100 is equivalent to more than the whole. A percent less than 1 is equivalent to less than 1/100 of the whole.	6.RP.A.3c
Estimate to Find a Percent	Equivalent fractions and compatible numbers can be used to estimate the percent of a number.	6.RP.A.3c
Find the Percent of a Number	Finding the percent of a whole is like finding the fractional part of a whole.	6.RP.A.3c
Find the whole given a part and the percent	Models and equations can be used to find the whole amount when the percent and a part are known.	6.RP.A.3c
Ace the Test	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.RP.A.3c 6.RP.A.1

Topic 7: Solve Area, Surface Area, and Volume Problems

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 7 focuses on a deep understanding of areas of polygons, surface areas of solids, and volumes of right rectangular prisms with fractional side lengths.

Essential Questions

- How can the areas of certain shapes be found?
- What are the meanings of surface area and volume?
- How can surface area and volume be found?

Lesson Title	Lesson Overview	Standards
Find Areas of Parallelograms and Rhombuses	The formula for the area of a parallelogram, $A = bh$, can be derived from the formula for the area of a rectangle.	6.G.A.1 6.EE.A.2c
Solve Triangle Area Problems	The formula for the area of a triangle, $A = \frac{1}{2}bh$, can be derived from the formula for the area of a parallelogram.	6.G.A.1 6.EE.A.2c
Find Areas of Trapezoids and Kites	The areas of trapezoids and kites can be found by decomposing the trapezoids and kites into shapes for which the area formulas are known.	6.G.A.1 6.EE.A.2c
Find Areas of Polygons	The areas of polygons, including polygons on the coordinate plane, can be found by composing or decomposing the polygons into shapes for which the area formulas are known.	6.G.A.1 6.EE.A.2c
Represent Solid Figures Using Nets	A solid figure can be classified based on the number of bases, the shape of the base(s), and the shape of the other faces. A net can be used to represent a polyhedron.	6.G.A.4
That's a Wrap	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.G.A.4 6.EE.A.2c

Find Surface Areas of Prisms	The surface area of a prism is the sum of the areas of its faces.	6.G.A.4 6.EE.A.2a 6.EE.A.2c 6.EE.B.6
Find Surface Areas of Pyramids	The surface area of a pyramid is the sum of the areas of its faces.	6.G.A.4 6.EE.A.2a 6.EE.A.2c 6.EE.B.6
Find Volumes with Fractional Edge Lengths	Unit cubes or formulas can be used to find the volume of rectangular prisms and cubes.	6.G.A.4 6.EE.A.2a 6.EE.A.2c 6.EE.B.6

Topic 8: Display, Describe, and Summarize Data

Primary Resource: *enVisionmath2.0 Grade 6,* Pearson, 2017.

Enduring Understandings

- Topic 8 focuses on developing an understanding of variability and the concept of statistical measures. Students learn to recognize statistical questions, describe, and summarize data using measures of center and variability, and display data using boxplots and histograms.

Essential Questions

- How can data be described by a single number?
- How can tables and graphs be used to represent data and answer questions?

Lesson Title	Lesson Overview	Standards
Recognize Statistical Questions	A statistical question anticipates variability in responses and can be answered by collecting and analyzing data.	6.SP.A.1 6.SP.B.4
Summarize Data using Mean, Median, Mode and Range	The mean, median, and mode are measures that can be used to describe the center of a data set. The range is a measure that can be used to describe the variability of a data set.	6.SP.A.3 6.SP.B.5c
Display Data in Box Plots	A box plot is a good choice for displaying a distribution of numerical data values on a number line.	6.SP.A.4
Display Data in Frequency Tables and Histograms	Data values can be organized into equal intervals and displayed in a frequency table or histogram.	6.SP.A.4 6.SP.B.5a
Summarize Data Using Measures of Variability	Measures of variability, such as the mean absolute deviation (MAD) and interquartile range (IQR), describe the spread and clustering of data in a set.	6.SP.B.5c 6.SP.B.4
Choose Appropriate Statistical Measures	Data sets may best be described using different measures of center and variability.	6.SP.B.5d 6.SP.B.5c

Summarize Data Distributions	A set of numerical data collected to answer a statistical question has a distribution that can be described by its center, spread, and overall shape.	6.SP.A.2 6.SP.B. 4 6.SP.B.5b 6.SP.B.5c
Vocal Range	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	6.SP.A.2 6.SP.A.3 6.SP.B.5a 6.SP.B.5b 6.SP.B.5c 6.SP.B.5d