HARFORD COUNTY PUBLIC SCHOOLS
MATHEMATICS 7 CURRICULUM

[CLICK HERE](#) for the Maryland College and Career Ready Standards for Grade 7 Mathematics.

Topic 1: Rational Number Operations

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 1 focuses on applying the number sense learned in Grade 6 to extending operations with integers and fractions.

Essential Questions
- How do operations with integers relate to the same operations with rational numbers?
- How can you determine the correct operation to use to solve problems?

Lesson Title	Lesson Overview	Standards
Relate Integers and Their Opposites	An integer and its opposite are the same distance from 0 on a number line and have a sum of 0.	7.NS.A.1a
Understand Rational Numbers	Rational numbers expressed as fractions can be written in decimal form.	7.NS.A.2d
Add Integers	Adding integers requires adding or subtracting their absolute values and understanding the sign of the sum.	7.NS.A.1b 7.NS.A.1c 7.NS.A.1d
Subtract Integers	Subtracting a number is the same as adding that number's additive inverse.	7.NS.A.1c 7.NS.A.1d
Add and Subtract Rational Numbers	Adding or subtracting integers is related to adding and subtracting other rational numbers.	7.NS.A.1b 7.NS.A.1c 7.NS.A.1d

Multiply Integers	The sign of a product is determined by the signs of the factors in a multiplication expression.	7.NS.A.2a 7.NS.A.2c
Multiply Rational Numbers	The same properties used to multiply integers also apply when multiplying rational numbers.	7.NS.A.2a 7.NS.A.2c
Divide Integers	The relationship between multiplication and division can be useful when dividing positive and negative integers.	7.NS.A.2b 7.NS.A.2c
Divide Rational Numbers	Dividing rational numbers is similar to dividing integers. The sign of the quotient depends on the signs of the dividend and divisor.	7.NS.A.2b 7.NS.A.2c
Solve Problems with Rational Numbers	Problems involving rational numbers can be solved by making sense of the quantities and their relationships to each other.	7.EE.B.3 7.NS.A.3
Win Some, Lose Some	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	

Topic 2: Analyze and Use Proportional Relationships

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 1 focuses on applying the number sense learned in Grade 6 to extending operations with integers and fractions.
- Topic 2 focuses on extending the ratio reasoning of Grade 6 to recognizing and representing proportional relationships in verbal descriptions, tables, equations, and graphs.

Essential Questions
- How do operations with integers relate to the same operations with rational numbers?
- How can you determine the correct operation to use to solve problems?
- How can you recognize and represent proportional relationships and use them to solve problems?

Lesson Title	Lesson Overview	Standards
Connect Ratios, Rates, and Unit Rates	Equivalent ratios and unit rates can be used to compare ratios and solve problems.	7.RP.A.1 7.RP.A.3
Determine Unit Rates with Ratios of Fractions	A unit rate can be easier to use to solve problems than a ratio of fractions.	7.RP.A.1 7.RP.A.3
Understand Proportional Relationships: Equivalent Ratios	Quantities in a proportional relationship can be described by equivalent ratios.	7.RP.A.2a
Describe Proportional Relationships: Constant of Proportionality	Equations in the form $y = kx$, where k is the constant of proportionality, can be used to represent proportional relationships and solve problems.	7.RP.A.2b 7.RP.A.2c
Mixin' it up	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.RP.A.1 7.RP.A.2a

Graph Proportional Relationships	The graph of a proportional relationship is a straight line through the origin.	7.RP.A.2a 7.RP.A.2b 7.RP.A.2d
Apply Proportional Reasoning to Solve Problems	By recognizing proportional quantities, you can use what you know about proportional relationships to solve problems.	7.RP.A.2a 7.RP.A.2b 7.RP.A.2c 7.RP.A.2d 7.RP.A.3

Topic 3: Analyze and Solve Percent Problems

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 3 focuses on extending the topic of ratios and proportions from Grade 6 to learning that a percent is a specific type of ratio or proportion that represents a *part* out of the *whole*, where the whole is measured in hundredths.

Essential Questions
- How can percents show proportional relationships between quantities and be used to solve problems?

Lesson Title	Lesson Overview	Standards
Analyze Percent of Numbers	Equivalent ratios can be used to find the percent of a number. Percent is a ratio out of 100 that relates the ratio of two quantities.	7.RP.A.3
Connect Percent and Proportion	The part divided by the whole and the percent divided by 100 are equivalent ratios.	7.RP.A.2c 7.RP.A.3
Represent and Use the Percent Equation	Proportional reasoning can be used to develop the percent equation, which in turn, can be used to find the percent, part, or whole.	7.RP.A.2c 7.RP.A.3
Solve Percent Change and Percent Error Problems	Both the percent change and percent error involve finding the ratio of a difference of two values to one of those values.	7.RP.A.3
The Smart Shopper	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.RP.A.3
Solve Markup and Markdown Problems	A markup is the same as a percent increase, and a markdown is the same as a percent decrease. The method used to calculate percent change can be used to calculate markups and markdowns.	7.RP.A.3
Solve Simple Interest Problems	Each value in the annual simple interest formula, $I = p \cdot r$ corresponds to a value in the percent equation, part = percent times whole. The part corresponds to the interest, the whole to the principal (initial amount), and the percent to the interest rate.	7.RP.A.3

Topic 4: Generate Equivalent Expressions

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 4 focuses on extending the use of properties of operations from writing and evaluating algebraic expressions to analyzing equivalent expressions.
- Topic 5 focuses on extending the students' understanding of the relationship between the independent and dependent variables, the coefficient, and the constant to lead students into writing and solving equations and inequalities, including graphing the solutions of inequalities.

Essential Questions
- How can properties of operations help to generate equivalent expressions that can be used in solving problems?
- How can you solve real-world and mathematical problems with numerical and algebraic equations and inequalities?

Lesson Title	Lesson Overview	Standards
Write and Evaluate Algebraic Expressions	Algebraic expressions can be used to represent and solve problems in real-world contexts.	7.EE.B.3 7.EE.B.4a 7.EE.B.4b
Generate Equivalent Expressions	Rearranging or combining like terms does not change the value of an expression.	7.EE.A.1
Simplify Expressions	All like terms must be combined in order for expressions to be simplified.	7.EE.A.1 7.EE.A.2
Expand Expressions	Expanded expressions represent an equivalent way to represent the original expression.	**7**.EE.A.1 7.EE.A.2
Factor Expressions	The Distributive Property and common factors are used to factor expressions.	7.EE.A.1 7.EE.A.2

I've Got You Covered	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.EE.A.1 7.EE.A.2
Add Expressions	The same rules apply for coefficients and constants when adding expressions.	7.EE.A.1 7.EE.A.2
Subtract Expressions	Add the inverse when subtracting expressions.	7.EE.A.2
Analyze Equivalent Expressions	Understanding mathematical structure is important for solving deeper, unconventional expressions.	7.EE.A.2

Topic 5: Solve Problems Using Equations and Inequalities

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 5 focuses on extending the students' understanding of the relationship between the independent and dependent variables, the coefficient, and the constant to lead students into writing and solving equations and inequalities, including graphing the solutions of inequalities.

Essential Questions
- How can you solve real-world and mathematical problems with numerical and algebraic equations and inequalities?

Lesson Title	Lesson Overview	Standards
Write Two-Step Equations	Equations with more than one operation can be used to represent a situation.	7.EE.B.4a 7.EE.B.4b
Solve Two-Step Equations	One- and two-step problems are both solved using the properties of equality.	7.EE.B.3 7.EE.B.4a
Solve Equations Using the Distributive Property	The Distributive Property can be used to solve equations in the form $p(x + q) = r$.	7.EE.B.3 7.EE.B.4a
Solve Inequalities Using Addition or Subtraction	Solving inequalities with addition and subtraction is the same as solving equations. The inverse relationship between addition and subtraction is used to isolate the variable.	7.EE.B.4b
Solve Inequalities Using Multiplication or Division	Solving inequalities with multiplication and division is very similar to solving equations. In an inequality, when multiplying or dividing by a negative value, the inequality symbol is reversed.	7.EE.B.4b
Digital Downloads	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.EE.B.3 7.EE.B.4b
Solve Two-Step Inequalities	To solve a two-step inequality, add or subtract the constant, and then multiply or divide to isolate the variable.	7.EE.B.4b
Solve Multi-Step Inequalities	Multi-step inequalities, like two-step inequalities, have more than one step and more than one operation.	7.EE.B.4b

Topic 6: Use Sampling to Draw Inferences About Populations

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 6 focuses on extending students' understanding of how to display, describe, and summarize numerical data by introducing the concepts of populations and samples, making inferences about a population using a sample, and how to informally compare two populations.

Essential Questions
- How can sampling be used to draw inferences about one or more populations?

Lesson Title	Lesson Overview	Standards
Populations and Samples	Representative samples must reflect the entire population. The best way to determine a representative sample is to make sure the sample is randomly chosen.	7.SP.A.1
Draw Inferences from Data	Data from random samples can be used to make valid inferences about a population by looking for patterns or trends in the distribution of the data, using measures of center and variation in the data, or by writing a proportion given the number of items in the entire population.	7.EE.B.3 7.RP.A.2c 7.SP.A.1 7.SP.A.2
Make Comparative Inferences About Populations	Data displays, such as box plots, can be used to make informal comparative influences about two populations. One can compare the shapes of the data displays or the measures of center and variability.	7.SP.B.3 7.SP.B.4
Make More Comparative Inferences About Populations	You can use dot plots to compare populations based on measures of center and variability. You can use statistical measures, such as mean and MAD, to make inferences and predictions about populations.	7.SP.B.3 7.SP.B.4
Raising Money	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.RP.A.3 7.SP.A.1 7.SP.A.2

Topic 7: Probability

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 7 focuses on applying the data analysis learned in Grade 6 to extend an understanding of how data is used to determine the probability of an event occurring.

Essential Questions
- How can you investigate chance processes and develop, use, and evaluate probability models?

Lesson Title	Lesson Overview	Standards
Understand Likelihood and Probability	Probability is the likelihood an event will occur. Probability can be described using a ratio such as 1 out of 2. The closer the ratio is to 0 the less likely it is to occur. The closer the value is to 1 is more likely the event will occur.	7.EE.B.3 7.SP.C.5
Understand Theoretical Probability	Theoretical probability of an event is the number of favorable outcomes divided by the number of possible outcomes, when all outcomes are equally likely.	7.RP.A.2c 7.SP.C.5
Understand Experimental Probability	Theoretical probability is calculated based on an equation. Experimental probability consists of the results of an actual experiment. These probabilities are often very close but are usually not identical.	7.SP.C.6 7.SP.C.7a 7.SP.C.7b
Use Probability Models	A probability model can be used to evaluate a chance process and its outcomes to develop theoretical or experimental probability. The model has a sample space, a list of events, and the probability of each event.	7.EE.B.3 7.SP.C.7a 7.SP.C.7b
Photo Finish	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.SP.C.5 7.SP.C.6 7.SP.C.7a 7.SP.C.7b
Determine Outcomes of Compound Events	The possible outcomes of a compound event (a combination of two or more events) can be represented using a tree diagram, a table, or an organized list.	7.SP.C.8b

Find Probabilities of Compound Events	A model, such as a table, organized list, or tree diagram, can represent the sample space of a compound event. The sample space can then be used to determine the probability of a favorable outcome.	7.SP.C.8a
Simulate Compound Events	The experimental probability of an outcome can be found by first assigning outcomes to devices such as spinners, coins, and number cubes. These can then be used to model the experimental probability of an event.	7.SP.C.8c

Topic 8: Solve Problems Involving Geometry

Primary Resource: *enVisionmath2.0 Grade 7*, Pearson Savvas, 2017.

Enduring Understandings
- Topic 8 focuses on extending the ratio reasoning of Grade 6 to representing proportional relationships in scale drawings. Topic 8 also extends students' understanding of area from Grade 6 to include solving problems involving circumference and area of circles, as well as finding surface area and volume of two-dimensional and three-dimensional figures.

Essential Questions
- How can geometry be used to solve problems?

Lesson Title	Lesson Overview	Standards
Solve Problems Involving Scale Drawings	Use a scale drawing to calculate measurements and reproduce proportional scale drawings.	7.G.A.1
Draw Geometric Figures	Understand that drawing a unique quadrilateral needs a combination of side lengths, angle measures, and side angle relationships.	7.G.A.2
Draw Triangles with Given Conditions	Understand how to construct triangles with given conditions and determine whether it is a unique triangle, more than one triangle, or no triangle.	7.G.A.2
Solve Problems Using Angle Relationships	The measure of angles that are formed by intersecting lines and rays can be determined when the relationships between different types of angles are known.	7.G.B.5
Solve Problems Involving Circumference of a Circle	The circumference and diameter of a circle, regardless of size, have a unique and constant ratio that is an irrational number symbolized by π.	7.EE.B.4a 7.G.B.4
Solve Problems Involving Area of a Circle	The formula for the area of a circle, $A = \pi r^2$, can be used to solve problems by substituting the known values for area (A) and/or radius (r) to solve for the unknown value.	7.EE.B.3 7.EE.B.4a 7.G.B.4
Whole Lotta Dough	Many real-world problem situations can be represented with a mathematical model, but that model may not represent a real-world situation exactly.	7.G.B.4

Describe Cross Sections	A cross section is a two-dimensional figure that is exposed when a three-dimensional figure is sliced by a plane.	7.G.A.3
Solve Problems Involving Surface Area	The surface area of a composite figure is the sum of the areas of its surfaces. The surface area of a 3-dimensional figure is the combined surface area of all the faces of the figure.	7.EE.B.3 7.EE.B.4a 7.G.B.6 7.NS.A.3
Volume of a Prism	To find the volume of a prism, find the area of the base (B) and multiply it by its height.	7.EE.B.3 7.EE.B.4a 7.G.B.6 7.NS.A.3