

# SEVENTH GRADE CURRICULUM GUIDE

## **Enduring Understanding:**

Mathematics is a system for organizing the world quantitatively. It gives us tools to analyze, problem solve, and communicate about ourselves and our world.

Math is a tool for understanding and modeling relationships

Comparisons allow us to make informed decisions about our world.

Measuring is a tool for efficiently using 2D and 3D shapes.

Rational numbers allow us to make sense of situations that involve numbers that are not whole.

Seventh Grade Math Units (Page 1)

UNIT and ESSENTIAL QUESTIONS ■ Timeline	STANDARDS: Students will:	Accelerated Standards:	Assessments:	Frameworks
<b>Expressions (19 days – 5 weeks)</b> - How are the four basic operations related to one another? - When are algebraic and numeric expressions used?	<ul style="list-style-type: none"> <li>■ Be able to use variables to write expressions and represent problems in life</li> <li>■ Understand and be able to use order of operations appropriately</li> <li>■ Be able to use flowcharts to build expressions and solve equations using backtracking</li> <li>■ Be able to use expressions to solve problems</li> <li>■ Know how to use a formula to find specific quantities</li> <li>■ Understand and be able to apply the distributive property</li> </ul>		<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	7.N.5 7.N.8 7.P.1 7.P.2
<b>Exponents (20 days – 5 weeks)</b>	<ul style="list-style-type: none"> <li>■ Be able to understand and apply the product and quotient laws of exponents</li> <li>■ Be able to understand and apply the power of a power law of exponents</li> <li>■ Be able to identify exponential growth and decay</li> <li>■ Be able to compare exponential growth with other kinds of growth (linear, quad., etc.)</li> </ul>		<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	7.N.9 7.N.5 8.P.4
<b>Signed Numbers (9 days – 2 weeks)</b> - How are integers and whole numbers alike and different? - What do negative numbers represent?	<ul style="list-style-type: none"> <li>■ Know what a negative number (integer) is</li> <li>■ Know what an opposite is and its relationship to subtraction</li> <li>■ Know the concepts behind addition, subtraction, multiplication, and division (number line, chips, kinesthetic activities)</li> <li>■ Be able to use the operations to solve problems in life.</li> <li>■ Be able to predict the sign of a sum, difference, quotient, or product involving negative and positive numbers</li> <li>■ Know what absolute value is</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to solve first degree equations that have signed numbers.</li> <li>■ Be able to apply the commutative and distributive properties on both sides of the equation to solve for x.</li> <li>■ Be able to simplify expressions that have signed numbers in them using the associative, commutative, and distributive properties.</li> <li>■ Know the multiple uses of <math>-x</math>.</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	7.N.1 7.N.4 7.N.6 7.N.9 7.P.2

UNIT and ESSENTIAL QUESTIONS ■ Timeline	STANDARDS: Students will:	Accelerated Standards:	Assessments:	Frameworks
<p><b>Geometry in Three Dimensions</b> (11 days – 3 weeks)</p> <ul style="list-style-type: none"> <li>- How do we use three-dimensional objects in our world?</li> <li>- How can three-dimensional objects be used efficiently?</li> <li>- How can surface area and volume help you make decisions in your life?</li> </ul>	<ul style="list-style-type: none"> <li>■ Know what surface area (nets, wrapping) and volume (stacking, filling) are.</li> <li>■ Be able to find the volume of any prism as area of base times height</li> <li>■ Understand that a cube is a rectangular prism with the minimum surface area for the given volume</li> <li>■ Be able to use the surface area and volume formulas to solve problems in life.</li> <li>■ Be able to decide if a given net will fold into a closed 3D solid</li> <li>■ Be able to create nets that will fold into given shapes</li> <li>■ Be able to use information about the nets of an object to find surface area and volume</li> <li>■ Know what the appropriate units are for surface area and volume (relate to dimensions and 2D geometry)</li> <li>■ Be able to use the vocabulary associated with 3D figures (edge, face, and vertex)</li> <li>■ Be able to identify prisms</li> </ul>	<ul style="list-style-type: none"> <li>■ Solve for any unknown in a formula</li> <li>■ Be able to find the volume and surface area for cones, spheres and pyramids.</li> <li>■ Be able to find the difference of volumes to find volumes of complex shapes</li> <li>■ Be able to write expressions for volumes and surface area of figures when one or more dimensions are variables</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>7.N.9</li> <li>7.P.2</li> <li>7.G.7</li> <li>7.M.1</li> <li>7.M.3</li> <li>8.G.8</li> <li>8.M.3</li> </ul>
<p><b>Data and Probability</b> (12 days – 3 weeks)</p> <ul style="list-style-type: none"> <li>- How can probabilities be calculated?</li> <li>- When is a game fair?</li> <li>- How can you use probabilities to make predictions?</li> </ul>	<ul style="list-style-type: none"> <li>■ Know what probability is (chance, fairness, a way to observe our random world, the different representations)</li> <li>■ Know what the difference between experimental and theoretical probability is</li> <li>■ Be able to find the probability of a single event</li> <li>■ Be able to calculate the probability of sequential events, with and without replacement</li> <li>■ Understand what a fair game is and be able to determine if a game is fair</li> <li>■ Be able to make a game fair</li> <li>■ Be able to use different approaches (such as tree diagrams, area models, organized lists) to solve probability problems in life.</li> <li>■ Be able to predict the characteristics of an entire population from a representative sample</li> <li>■ Be able to analyze a representative sample for flaws in its selection</li> <li>■ Be able to create and interpret different statistical</li> </ul>		<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>7.D.1</li> <li>7.D.2</li> <li>7.D.3</li> <li>8.D.4</li> </ul>

	<p>representations of data (bar graphs, line graphs, circle graphs, stem-and-leaf)</p> <ul style="list-style-type: none"> <li>■ Be able to choose an appropriate way to display various sets of data</li> <li>■ Know why the Fundamental Counting Principle works and be able to use it to solve counting problems.</li> </ul>			
<p><b>Linear Relationships</b> (16 days – 4 weeks)</p> <ul style="list-style-type: none"> <li>- What is a variable?</li> <li>- What is a relationship?</li> <li>- How can we use mathematics to represent relationships?</li> <li>- How can we use relationships to make decisions?</li> <li>- How can an equation express a relationship we see in the everyday world?</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to describe and recognize rates in both symbolic and graphic forms</li> <li>■ Be able to recognize, compare and represent proportional and non-proportional relationships using words, tables, symbols, and graphs</li> <li>■ Be able to relate speed to the slope of a distance vs. time graph</li> <li>■ Understand the meaning of a negative slope and a negative constant term</li> <li>■ Be able to recognize linear relationships in different forms: symbolic rules, graphs, patterns and tables</li> <li>■ Be able to convert one form of representation into another</li> <li>■ Be able to recognize the symbolic representation of a linear relationship in more than one form</li> <li>■ Understand the connection between the constant difference, the slope of the graph, and the symbolic representation of the relationship ( the a in <math>y = ax + b</math>)</li> <li>■ Be able to determine the y-intercept in the rule <math>y = ax + b</math> from a graph</li> <li>■ Know how to make a coordinate graph correctly (iv/dv, scale, connecting dots)</li> <li>■ Know the relationship of an ordered pair to tables, graphs, equations, and situations</li> <li>■ Be able to find the value of one variable when given the other value using a table, graph, and an equation.</li> <li>■ Know what a relationship is: <ul style="list-style-type: none"> <li>○ Math vs. non math</li> <li>○ One thing affecting another</li> <li>○ Independent/dependent (input/output)</li> <li>○ Variable/constants</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Know how a variable is used in an equation</li> <li>■ Be able to write equations to represent relationships</li> <li>■ Be able to solve simple two-step equations</li> <li>■ Be able to solve equations that have variables on both sides, parentheses, integers, fractions, and decimals</li> <li>■ Be able to set up equations that have variables on both sides, parentheses, integers, fractions, and decimals from situations</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<p>7.N.6 7.P.1 7.P.3 7.P.4 7.P.5 7.P.6 7.G.4 8.P.5 8.P.6 8.P.8 8.P.10</p>

<p><b>Equations</b> (15 days – 4 weeks)</p> <ul style="list-style-type: none"> <li>- What does it mean to solve an equation?</li> <li>- How are the four basic operations related to one another?</li> <li>- What are the tools needed to solve linear equations and inequalities?</li> <li>- What strategies can be used to solve for unknowns in algebraic equations?</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to solve equations using guess and check or backtracking</li> <li>■ Be able to use variables to write algebraic expressions for different situations</li> <li>■ Understand and be able to use the balance model for solving equations</li> <li>■ Be able to assign variable and translate problems into algebraic sentences</li> <li>■ Be able to solve equations by adding, subtracting, multiplying, and dividing both sides by the same quantity</li> <li>■ Be able to solve simple word problems by writing and solving equations</li> <li>■ Be able to simplify more complex equations including those that have parentheses and signed numbers</li> <li>■ Be able to solve one-step inequalities</li> </ul>	<ul style="list-style-type: none"> <li>■</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<p>7.N.6 7.P.4 8.P.7</p>
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<b>UNIT and ESSENTIAL QUESTIONS</b> ■ Timeline	<b>STANDARDS:</b>  Students will:	<b>Accelerated Standards:</b>	<b>Assessments:</b>	<b>Frameworks</b>
<b>Proportional Reasoning and Percents</b> <b>(14 days – 4 weeks)</b>  - When is a situation proportional? - How can proportions increase our understanding of the real world? - How does the mathematical use of the word similar differ from the everyday use? - How can similarity help us solve measurement problems? - What are the connections between similarity, geometry and algebra?	<ul style="list-style-type: none"> <li>■ Know what a ratio is                             <ul style="list-style-type: none"> <li>○ Ratio can be part to part and part to whole (fraction is only part to whole)</li> <li>○ Multiple representations (fraction bar, colon, to, and percents)</li> </ul> </li> <li>■ To recognize and express ratios in different situations</li> <li>■ Be able to determine whether two values are equivalent (ratios, decimals, percents)</li> <li>■ Be able to solve problems by using unit rates.</li> <li>■ Be able to compare ratios by converting to common units</li> <li>■ To recognize proportions as pairs of equivalent ratios</li> <li>■ Be able to set up and use proportions (related to equivalent fractions) to find the missing part and solve problems</li> <li>■ Be able to use proportions to explore applications such as similarity, data analysis, solving for x</li> <li>■ To recognize percents as ratios with a common scale of 100</li> <li>■ Be able to set up and use proportions to solve percentage problems</li> <li>■ Be able to determine whether two figures are mathematically similar</li> <li>■ Find and use the scale factor between mathematically similar figures</li> <li>■ Use the relationship between scale factors and dimensions to solve 1-D and 2-D problems</li> <li>■ Computation Skills:                             <ul style="list-style-type: none"> <li>○ Multiplication of whole numbers, fractions and decimals</li> <li>○ Division of whole numbers, fractions and decimals</li> <li>○ Finding equivalent fractions</li> <li>○ Converting between fractions, decimals and percents</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to write equations to represent the relationship in a ratio.</li> <li>■ Be able to use an equation to find unknowns in a proportion.</li> <li>■ Be able to use rates to convert units.</li> <li>■ Be able to explain why the “cross multiply and divide” method of solving proportions works.</li> <li>■ Be able to write equations to solve similarity problems</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	7.N.2 7.N.6 7.N.8 7.N.9 7.M.1 7.M.2 7.G.2 8.N.3 8.M.4

<p><b>Positive Rational Numbers –</b></p> <ul style="list-style-type: none"> <li>■ This is not a stand alone unit – it will be incorporated throughout the other units.</li> </ul>	<ul style="list-style-type: none"> <li>■ Know what a fraction is (Equal parts of a whole, fraction bar related to division, where they are used, number line)</li> <li>■ Know the concepts that will allow them to compare fractions (equivalent fractions)</li> <li>■ Know the concepts behind addition and subtraction (equal parts), multiplication (<math>1/2</math> of <math>1/3</math>), and division (two types of division) of fractions (area models)</li> <li>■ Know what a decimal number is</li> <li>■ Know the concepts that will allow them to compare decimals</li> <li>■ Know the concepts behind the addition, subtraction, multiplication, and division of decimals.</li> <li>■ Be able to use decimal and fraction operations to solve problems in life.</li> <li>■ Know how a decimal is related to a fraction and when to use which in solving a problem.</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to solve first degree equations that have fractions.</li> <li>■ Know how to use the area model to explain how to solve first degree equations with fractions.</li> <li>■ Know that <math>x/2</math> means <math>1/2</math> of <math>x</math>, and <math>x \div 2</math></li> <li>■ Be able to simplify expressions that have fractions in them using the associative, commutative, and distributive properties.</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<p>7.N.1 7.N.6 7.N.7</p>
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<p><b>Coordinate Transformations –</b></p> <ul style="list-style-type: none"> <li>- How can we use math to make transformations?</li> <li>- 3 weeks</li> </ul>	<ul style="list-style-type: none"> <li>■ Recognize reflections over the x- and y-axes, and translations</li> <li>■ Perform reflections and translations of figures on the coordinate plane</li> <li>■ Describe how an algebraic rule transforms a set of points on the coordinate plane</li> <li>■ Write an algebraic rule to translate a set of points on the coordinate plane</li> </ul>	<ul style="list-style-type: none"> <li>■ Write algebraic rules to reflect, stretch, and shrink figures on the coordinate plane</li> </ul>	<ul style="list-style-type: none"> <li>■ Tests</li> <li>■ Classwork</li> <li>■ Problem of the Week</li> <li>■ Homework</li> <li>■ Projects</li> <li>■ Portfolio</li> </ul>	<p>7.G.4 7.G.6</p>
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