

# EIGHTH GRADE CURRICULUM GUIDE:

## **Enduring Understanding:**

Math is a system for organizing the world quantitatively. It gives us tools to describe and predict change in order to make informed decision in our world.

Linear, quadratic, and exponential relationships are algebraic functions which allow us to organize data and make decisions in our world.

Simplifying expressions and solving equations allows us to take a complex situation and make it simple.

Measuring angles and using their properties allow us to navigate through and build our world.

<b>UNIT and ESSENTIAL UNDERSTANDING</b> ■ CMP Book ■ Timeline	<b>STANDARDS:</b>  Students will:	<b>Accelerated Standards:</b>	<b>Assessments:</b>	<b>Frameworks</b>
<p><b>Linear Relationships</b> –</p> <ul style="list-style-type: none"> <li>- How can an equation express a relationship we see in the everyday world?</li> <li>- When two related quantities change, how can we tell whether the change is predictable?</li> <li>- What has constant change?</li> <li>- How can math be used to model these changes?</li> <li>- What does it mean to solve an equation?</li> </ul> <ul style="list-style-type: none"> <li>■ <i>Moving Straight Ahead</i></li> <li>■ 7 weeks</li> </ul>	<ul style="list-style-type: none"> <li>■ Know what a linear pattern is in life (constant rate, examples, etc.)</li> <li>■ Be able to recognize and make tables, graphs, and equations (y-form only) of linear relationships.</li> <li>■ Know the relationship of a 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 simple examples with an equation.</li> <li>■ Be able to use graphing calculators to analyze linear equations using graphs and tables.</li> <li>■ Be able to use all four quadrants and decide which quadrants are appropriate for a given situation</li> <li>■ Know how the slope and y-intercept relate to the table, graph, equation, and context.</li> <li>■ Be able to use slope and y-intercept to go between table, graph, and equation.</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to recognize and write linear equations in Point-Slope form.</li> <li>■ Know circumstances/ situations that produce negative, zero and undefined slopes</li> <li>■ Be able to write equations that are perpendicular or parallel to a given line</li> <li>■ Know how to use coordinates to calculate intercepts</li> <li>■ Be able to recognize and solve a system of linear equations by graphing, substitution and linear combinations</li> <li>■ Be able to set up, solve, and graph solutions on a number line for simple and compound inequalities</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>8.N.3 8.N.9 8.P.1 8.P.2 8.P.4 8.P.5 8.P.6 8.P.7 8.P.9 8.P.10 8.M.5</p>

<b>UNIT and ESSENTIAL UNDERSTANDING</b> <ul style="list-style-type: none"> <li>■ CMP Book</li> <li>■ Timeline</li> </ul>	<b>STANDARDS:</b>  Students will:	<b>Accelerated Standards:</b>	<b>Assessments:</b>	<b>Frameworks</b>
<b>Symbol Manipulation –</b>  <ul style="list-style-type: none"> <li>■ <i>Say it with Symbols</i></li> <li>■ 6 Weeks</li> </ul>	<ul style="list-style-type: none"> <li>■ Know why we have an order of operations.</li> <li>■ Be able to use order of operations to solve problems.</li> <li>■ Be able to write equivalent expressions (using area models).</li> <li>■ Know the distributive, commutative, and associative properties, and how they help us to solve problems.</li> <li>■ Be able to simplify expressions</li> <li>■ Be able to solve 2-step equations that involve all types of rational numbers.</li> <li>■ Know how to clearly show work when simplifying expressions and solving equations.</li> </ul>	<ul style="list-style-type: none"> <li>■ Know how to name the degree and order of polynomials</li> <li>■ Be able to add, subtract, and multiply polynomials</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>	8.N.7 8.N.8 8.P.2 8.P.3
<b>Geometry – Angles</b> - What is an angle? - How do we use an angle?  <ul style="list-style-type: none"> <li>■ No CMP book</li> <li>■ 6 Weeks</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to measure angles.</li> <li>■ Know what an angle is (relationship to 360 degrees)</li> <li>■ Know the relationships of interior and exterior angles of polygons</li> <li>■ Solve real world problems involving angles.</li> <li>■ Vocabulary: Adjacent, Acute, Obtuse, Right, Complimentary, Supplementary, Vertical, Transversal, Corresponding angles</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to find missing angles in terms of 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>	8.G.1 8.G.3
<b>Geometry –Pythagorean Theorem</b> - How can we find the distance between two points? - How does the Pythagorean Theorem help us solve real problems?  <ul style="list-style-type: none"> <li>■ <i>Looking for Pythagoras</i></li> <li>■ 4 weeks</li> </ul>	<ul style="list-style-type: none"> <li>■ Be able to find the distance between two points on a coordinate grid</li> <li>■ Be able to find the area of figures on a coordinate grid</li> <li>■ Know how to demonstrate the Pythagorean Theorem works.</li> <li>■ Be able to solve real world problems requiring application of Pythagorean Theorem</li> <li>■ Be able to calculate and understand squares and square roots.</li> <li>■ Vocabulary: Irrational/rational numbers, square root, square, Pythagorean Theorem</li> </ul>	<ul style="list-style-type: none"> <li>■ Use coordinates to calculate distances, midpoints, and solve 2D geometry problems.</li> <li>■ Be able to manipulate and evaluate expressions with square roots.</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>	8.N.7 8.G.4

Eighth Grade Math Units (Page 3)

<b>UNIT and ESSENTIAL UNDERSTANDING</b> ■ CMP Book ■ Timeline	<b>STANDARDS:</b>  Students will:	<b>Accelerated Standards:</b>	<b>Assessments:</b>	<b>Frameworks</b>
<b>Nonlinear Relationships</b> – - What is the relationship between different components of your mathematical model and the real life situation? - How do you find out if a relationship is proportional, linear or nonlinear? ■ <i>Thinking with Mathematical Models</i> ■ 5 weeks	■ Know how to recognize whether experimental data is linear or nonlinear. ■ Know how to recognize direct and inverse proportional patterns. ■ Know how to draw a best fit line (linear vs. non-linear, starting point) ■ Know how to pick the appropriate range of an equation that makes sense for a given context. ■ Make predictions using line of best fit or the equation of that line	■ Be able to model and calculate average rates ■ Be able to recognize the equation forms and graphs of inverse and direct variation ■ Know how to find the constant in inverse and direct variation problems and apply them to another situation ■ Know the definition of a function and be able to use function notation. ■ Be able to solve literal equations	■ Tests ■ Classwork ■ Problem of the Week ■ Homework ■ Projects ■ Portfolio	8.N.1 8.N.10 8.P.1 8.P.4 8.P.7 8.P.9
<b>3D Geometry</b> - How do we use three-dimensional objects in our world? - How can three-dimensional objects be used efficiently? - How can surface area and volume help you make decisions in your life? ■ <i>Filling and Wrapping</i> ■ 2 Weeks	■ Know what surface area (nets, wrapping) and volume (stacking, filling) are. ■ Know what the appropriate units are for surface area and volume (relate to dimensions and 2D geometry). ■ Know the differences between prisms and pyramids (focus on right prisms/pyramids). ■ Be able to explain why the formulas for finding the volumes and surface areas of prisms and pyramids work. ■ Be able to use the surface area and volume formulas to solve problems in life. ■ Be able to rotate and visualize 3D figures. ■ Be able to identify spheres. ■ Be able to use the vocabulary associated with 3D figures (edge, face, and vertex)	■ Solve for any unknown in a formula ■ Be able to find the volume and surface area for cones, spheres and pyramids. ■ Be able to find the difference of volumes to find volumes of complex shapes ■ Be able to write expressions for volumes and surface area of figures when one or more dimensions are variables	■ Tests ■ Classwork ■ Problem of the Week ■ Homework ■ Projects ■ Portfolio	8.G.8 8.M.1 8.M.3 8.P.8

Eighth Grade Math Units (Page 4)

<b>UNIT and ESSENTIAL UNDERSTANDING</b> ■ CMP Book ■ Timeline	<b>STANDARDS:</b>  Students will:	<b>Accelerated Standards:</b>	<b>Assessments:</b>	<b>Frameworks</b>
<b>Qualitative Graphing</b> – - Why is it important to be able to predict change? - How can you use a pattern to predict outcomes? ■ <i>Thinking with Mathematical Models</i> ■ 3 weeks	■ Know how to recognize whether experimental data is linear or nonlinear. ■ Be able to make and interpret qualitative graphs. ■ Know how to pick the appropriate range of an equation that makes sense for a given context.	■	■ Tests ■ Classwork ■ Problem of the Week ■ Homework ■ Projects ■ Portfolio	8.N.1 8.N.10 8.P.1 8.P.4 8.P.7 8.P.9
<b>Statistics</b> – - What is an average? - How do you make a good survey? - Can numbers lie? ■ No CMP book ■ 2 weeks	■ Be able to find measures of central tendency (mean, median, and mode) and range. ■ Know when to use the appropriate measure of central tendency ■ Know how a sample relates to a population ■ Be able to use multiple tabular and graphical representations of data		■ Tests ■ Classwork ■ Problem of the Week ■ Homework ■ Projects ■ Portfolio	7.D.1 8.D.1 8.D.2 8.D.3
<b>Exponential and Quadratic Relationships</b> – - How do I know if a relationship is quadratic or exponential? - How does a change in one variable affect the change in another? - How do exponential and quadratic relationships compare to other relationships? ■ <i>Growing, Growing, Growing. Frogs, Fleas &amp; Painted Cubes</i> ■ 4 weeks	■ Know what exponential growth is and be able to recognize it in a table, graph, equation ( $y=ab^x$ form), and situation. ■ Know what exponents and square roots are. ■ Be able to solve exponential problems in life (particularly interest problems) ■ Know what a quadratic equation is and be able to recognize it in a table, graph, equation, and situation. ■ Be able to recognize and use triangular, rectangular, and diagonal number patterns to find formulas for a variety of problems (painted cube problem). ■ Be able to use quadratic functions to solve gravity and maximizing area problems.	■ Know and use the laws of exponents (including negative exponents) ■ Be able to recognize and write the vertex form of a quadratic equation ■ Be able to complete the square and know what it is useful ■ Be able to derive and use the quadratic formula ■ Be able to solve quadratic equations by factoring	■ Tests ■ Classwork ■ Problem of the Week ■ Homework ■ Projects ■ Portfolio	8.N.12 8.P.1 8.P.4 8.P.6