

<b>Lavallette Elementary School</b>	
<b>Content Area: Mathematics</b> <b>Course Title: Mathematics</b>	<b>Grade Level: Eighth Grade</b>
<b>Unit Plan 1</b> Number System	September - October Ongoing
<b>Unit Plan 2</b> Expressions and Equations	November - January Ongoing
<b>Unit Plan 3</b> Functions	January - February Ongoing
<b>Unit Plan 4</b> Geometry	March - April Ongoing
<b>Unit Plan 5</b> Statistics and Probability	April - June Ongoing
Updated: August 2018 by Sharon Carroll	Board Approved: October 16, 2018

<b>Standards for Mathematical Practice</b>	
<i>The following standards for mathematical practice should be incorporated in all units.</i>	
MP.1 Make sense of problems and persevere in solving them.	<ul style="list-style-type: none"> <li>Find meaning in problems</li> <li>Look for entry points</li> <li>Analyze, conjecture and plan solution pathways</li> <li>Monitor and adjust</li> <li>Verify answers</li> <li>Ask themselves the question: "Does this make sense?"</li> </ul>

<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Make sense of quantities and their relationships in problems  Learn to contextualize and decontextualize  Create coherent representations of problems</p>
<p>MP.3 Construct viable arguments and critique the reasoning of others.</p>	<p>Understand and use information to construct arguments  Make and explore the truth of conjectures  Recognize and use counterexamples  Justify conclusions and respond to arguments of others</p>
<p>MP 4 Model with mathematics.</p>	<p>Apply mathematics to problems in everyday life  Make assumptions and approximations  Identify quantities in a practical situation  Interpret results in the context of the situation and reflect on whether results make sense</p>
<p>MP.5 Use appropriate tools strategically</p>	<p>Consider the available tools when solving problems  Are familiar with tools appropriate for their grade or course (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer programs, digital content located on a website and other technological tools)  Make sound decisions of which of these tools might be helpful</p>
<p>MP.6 Attend to precision.</p>	<p>Communicate precisely to others  Use clear definitions, state the meaning of symbols and are careful specifying units of measure and labeling axes  Calculate accurately and efficiently</p>
<p>MP.7 Look for and make use of structure</p>	<p>Discern patterns and structures  Can step back for an overview and shift perspective  See complicated things as single objects or as being composed of several objects</p>
<p>MP.8 Look for and express regularity in repeated reasoning.</p>	<p>Notice if calculations are repeated and look for both general methods and shortcuts.  In solving problems, maintain oversight of the process while attending to detail  Evaluate the reasonableness of their immediate results</p>

**Lavallette School  
MATHEMATICS CURRICULUM  
Unit Overview**

**Content Area:** Mathematics

**Grade Level:** Eighth Grade

**Domain (Unit Title):** The Number System

**Cluster:** 8.NS

**Cluster Summary:**

- Know that there are numbers that are not rational, and approximate them by rational numbers

**Primary Interdisciplinary Connections:**

<b>Science</b>	measurement (distance, weight, and growth), data analysis and collection, experiments relating to <b>Energy, Earth and Human Activity</b> and <b>Engineering and Design</b> .
<b>Social Studies</b>	economics & money, weather patterns, geography & map skills, and graphing
<b>Language Arts</b>	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
<b>Technology</b>	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.  interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

**21st Century Themes:**

<b>Global Awareness</b>	Students work with word problems containing names of people
-------------------------	-------------------------------------------------------------

	and locations around the world to develop understanding of diverse cultures and lifestyles.
<b>Communication and Collaboration</b>	Students will use mathematical arguments to articulate thoughts and ideas with peers and teachers.

**College and Career Readiness**

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

**Learning Targets**

**Content Standards: NS**

Number	Standard for Mastery
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. <i>For example, by truncating the decimal expansion of <math>\sqrt{2}</math>, show that <math>\sqrt{2}</math> is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>

**Unit Essential Questions**

- How are decimals, fractions, and percents related?
- How do you compare and order rational and irrational numbers?

**Unit Enduring Understandings**

*Students will understand that...*

- Every number belongs to a set(s) and how the number compares to other numbers.
- There are differences between each set of real numbers, particularly between rational and irrational.

**Unit Objectives**

*Students will know...*

- That every rational number is either a terminating or a repeating decimal and be able to convert terminating decimals into reduced fractions.
- How to read, write, classify, and compare rational numbers.
- Differentiate between rational and irrational numbers.

**Unit Objectives**

*Students will be able to...*

- Understand the real number system and how the subsets relate to one another.
- Understand the differences between the subsets of the real number system.
- Compare real numbers and order them on a number line.
- Use rational approximations or irrational numbers to compare numbers.

**Lavallette School  
MATHEMATICS CURRICULUM  
Unit Overview**

**Content Area:** Mathematics

**Grade Level:** Eighth Grade

**Domain (Unit Title):** Expressions and Equations

**Cluster:** 8.EE

**Cluster Summary:**

- Work with radicals and integer exponents.
- Understand the connections between proportional relationships, lines, and linear equations
- Analyze and solve linear equations and pairs of simultaneous linear equations.

**Primary Interdisciplinary Connections:**

<b>Science</b>	measurement (distance, weight, and growth), data analysis and collection
<b>Social Studies</b>	economics & money, weather patterns, geography & map skills, and graphing
<b>Language Arts</b>	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
<b>Technology</b>	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.  interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

**21st Century Themes:**

<b>Global Awareness</b>	Students work with word problems containing names of people and locations around the world.
<b>Communication and Collaboration</b>	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers

**Critical Thinking and Problem Solving**

Students use various types of reasoning as appropriate to solve a mathematical problem.

**College and Career Readiness**

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

**Learning Targets****Content Standards: EE**

Number	Standard for Mastery
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ , where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as 3 times <math>10^8</math> and the population of the world as 7 times <math>10^9</math>, and determine that the world population is more than 20 times larger.</i>
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

8.EE.6	Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$ .
8.EE.7	Solve linear equations in one variable. A. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent, equation of the form $x = a$ , $a = a$ , or $a = b$ results (where $a$ and $b$ are different numbers) B. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.8	Analyze and solve pairs of simultaneous linear equations. A. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. B. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i> C. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i>
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points <math>(1, 1)</math>, <math>(2, 4)</math> and <math>(3, 9)</math>, which are not on a straight line.</i>
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

Number	Standard for Introduction
MA.9-12.HSA -SSE.B	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.9-12.HSA -SSE.1.a	Interpret expressions that represent a quantity in terms of its context.*
MA.9-12.HSA -CED.1	Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i>
MA.9-12.HSA -REI.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MA.9-12.HSA -CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law <math>V = IR</math> to highlight resistance <math>R</math>.</i>

<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>• How do you add, subtract, multiply, and divide very large and small numbers?</li> <li>• How can linear equations be used to represent real-life situations?</li> <li>• What are the connections between proportional relationships, lines, and linear equations?</li> <li>• What is equivalence?</li> <li>• How can you communicate mathematical ideas effectively?</li> <li>• Why are equations helpful?</li> </ul>	<p><b>Unit Enduring Understandings</b> <i>Students will understand that...</i></p> <ul style="list-style-type: none"> <li>• Equation solving is working backwards and undoing operations.</li> <li>• An ordered pair is a solution to an equation, then it must be on the graph of the equation.</li> <li>• A solution to an equation (or a system of equations) is the value of the variable that makes the equation (or both equations) true.</li> <li>• Like terms must be combined.</li> <li>• The distributive property can be used to simplify expressions and solve equations.</li> </ul>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Unit Objectives**

*Students will know...*

- Expressions are simplified by various means.
- Equations can be solved using the properties of equality.
- Slope is a constant change.
- The solution of a one variable equation can be represented on a number line.
- Expressions are simplified by various means.

**Unit Objectives**

*Students will be able to...*

- Simplify real number expressions by multiplying and dividing monomials.
- Use the law of exponents to find powers of monomials.
- Write and evaluate expressions using negative exponents.
- Use scientific notation to write small and large numbers.
- Compute with numbers written in scientific notation.
- Find square roots and cube roots.
- Identify proportional and nonproportional linear relationships by finding a constant rate of change.
- To find rate of change.
- Find slope of a line.
- Compare and contrast proportional and nonproportional linear relationships.
- Use direct variation to solve problems.
- Graph linear equations using the slope and y- intercept.
- Graph a function using x-and y-intercepts.
- Use technology to investigate situations to determine if they display linear behavior.
- Find one solution for a set of two equations.
- Solve systems of equations by graphing.

	<ul style="list-style-type: none"> <li>• Solve systems of equations by substitution.</li> <li>• Students will use the Pythagorean Theorem to solve problems.</li> <li>• Graph and analyze slope triangles.</li> <li>• Solve one and two-step equations using inverse operations.</li> <li>• Solve equations with variables on both sides.</li> <li>• Solve multi-step equations.</li> <li>• Compare distance-time graphs to speed-time graphs.</li> </ul>
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Lavallette School  
MATHEMATICS CURRICULUM  
Unit Overview**

**Content Area:** Mathematics **Grade Level:** Eighth Grade

**Domain (Unit Title):** Functions

**Cluster:** 8.F

**Cluster Summary:**

- Define, evaluate, and compare functions
- Use functions to model relationships between quantities

**Primary Interdisciplinary Connections:**

<b>Science</b>	measurement (distance, weight, and growth), data analysis and collection
<b>Social Studies</b>	economics & money, weather patterns, geography & map skills, and graphing
<b>Language Arts</b>	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature

<b>Technology</b>	<p>8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.</p> <p>interactive whiteboard lessons, independent centers, classroom websites, online resources and apps</p>
-------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**21st Century Themes:**

<b>Global Awareness</b>	Students work with word problems containing names of people and locations around the world to develop understanding of diverse cultures and lifestyles.
<b>Communication and Collaboration</b>	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers

**College and Career Readiness**

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

**Learning Targets**

**Content Standards: F**

Number	Standard for Mastery
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions) <i>For example, given a linear function represented by a table of values and a</i>

	<i>linear function represented by an algebraic expression, determine which function has the greater rate of change.</i>
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points (1, 1), (2, 4) and (3, 9), which are not on a straight line.</i>
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
<b>Number</b>	<b>Standard for Introduction</b>
MA.9-12.HS A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.9-12.HS A-REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
MA.9-12.HS A-REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
MA.9-12.HS A-REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
MA.9-12.HS A-REI.11	Explain why the $x$ -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic

functions.\*

### Unit Essential Questions

- Which representation of a pattern more clearly shows whether or not the pattern is linear: a table of values or a graph of the pattern?
- Are all functions linear? Are all lines functions?
- What do you expect to see in this graph given its equations?

### Unit Enduring Understandings

*Students will understand that...*

- Students will model real-life data with equations and graphs and will be able to interpret what is shown.
- Students will compare graphs and analyze the corresponding tables to understand why the graphs are as they are.
- Students will be able to make predictions about graphs based on the equations/tables that correspond to them.

### Unit Objectives

*Students will know...*

- Determine whether a relation is a function.
- Complete function tables.
- Represent linear functions using tables and graphs.
- Identify proportional and non-proportional linear relationships by finding a constant rate of change.
- Find rate of change.
- Find slope of a line.
- Use direct variation to solve problems.
- Graph linear equations using slope and y-intercept.
- Use technology to investigate situations to determine if they

### Unit Objectives

*Students will be able to...*

- Determine if relations are functions.
- Understand the rules of functions.
- Analyze the change in x-value and how it changes the y-value.
- Compare functions in their different forms (tables, graphs, and equations).
- Describe functional relationships (linear vs. nonlinear).
- Translate verbal expressions to create function equations.
- Graph equations in two variables by making a table of values and plotting points.
- Interpret unit rate as slope.
- Understand slope-intercept form and

<p>display linear behavior.</p> <ul style="list-style-type: none"> <li>Graph and analyze slope triangles.</li> </ul>	<p>its components.</p> <ul style="list-style-type: none"> <li>Interpret <math>y = mx + b</math> as a linear function.</li> <li>Graph an equation using the slope and y-intercept.</li> <li>Write an equation from the given graph using the slope and y-intercept.</li> </ul>
----------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>Lavallette School MATHEMATICS CURRICULUM Unit Overview</b>	
<b>Content Area:</b> Mathematics	<b>Grade Level:</b> Eighth Grade
<b>Domain (Unit Title):</b> Geometry	
<b>Cluster:</b> 8G	
<b>Cluster Summary:</b> <ul style="list-style-type: none"> <li>Understand congruence and similarity using physical models, transparencies, or geometry software</li> <li>Understand and apply the Pythagorean Theorem</li> <li>Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres</li> </ul>	
<b>Primary Interdisciplinary Connections:</b>	

<b>Science</b>	measurement (distance, weight, and growth), data analysis and collection, experiments relating to <b>Waves, Earth's Place in the Universe</b> and <b>Earth's Systems</b> .
<b>Social Studies</b>	economics & money, weather patterns, geography & map skills, and graphing
<b>Language Arts</b>	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
<b>Technology</b>	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.  interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

**21st Century Themes:**

<b>Global Awareness</b>	Students work with word problems containing names of people and locations around the world to develop understanding of diverse cultures and lifestyles.
<b>Communication and Collaboration</b>	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers

**College and Career Readiness**

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

**Learning Targets**

**Content Standards: G**

Number	Standard for Mastery
8.G.1	Verify experimentally the properties of rotations, reflections, and translations: <ul style="list-style-type: none"> <li>A. Lines are taken to lines, and line segments to line segments of the same length</li> <li>B. Angles are taken to angles of the same measure</li> <li>C. Parallel lines are taken to parallel lines</li> </ul>
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. <i>For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Number	Standard for Introduction
MA.9-12.HS G-CO.9	Prove theorems about lines and angles. <i>Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.</i>

MA.9-12.HS G-CO.10	Prove theorems about triangles. <i>Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.</i>
MA.9-12.HS G-CO.11	Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.</i>
MA.9-12.HS G-CO.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). <i>Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.</i>

<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>● Will a transversal always create a pair of congruent obtuse angles and a pair of congruent acute angles?</li> <li>● Why must you find the area of a figure base and multiply that by its height in order to find its volume?</li> <li>● How do you know if two shapes are similar? What's the difference between similar shapes and congruent shapes?</li> <li>● When is the Pythagorean Theorem applicable?</li> </ul>	<p><b>Unit Enduring Understandings</b> <i>Students will understand that...</i></p> <ul style="list-style-type: none"> <li>● Students will be able to find the missing angles in shapes and sets of lines using their vocabulary knowledge.</li> <li>● Students will be able to explain how to obtain an image from its pre-image and vice versa.</li> <li>● Students will be able to solve real world problems using the Pythagorean Theorem</li> <li>● Students will know that volume is the same as area but in three-dimensions instead of two-dimensions. Knowing this, they will understand that in order to determine a shapes volume, they must multiply the area of the shapes' base by the height of the</li> </ul>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

shape.

### **Unit Objectives**

*Students will know...*

- Examine angle relationships formed by parallel lines and a transversal.
- Identify relationships of angles formed by two parallel lines cut by a transversal.
- Explore the relationship among the angles of triangles.
- Identify similar polygons and find missing measures of similar polygons.
- Investigate parallel lines and similar triangles.
- Use the Pythagorean Theorem.
- Solve problems using the Pythagorean Theorem.
- Use special right triangles to solve problems.
- Graph translations on the coordinate planes.
- Identify rotational symmetry.
- Graph rotations on the coordinate plane.
- Use scale factor to graph dilations on the coordinate plane.
- Draw compositions of translations, reflections and rotations.
- Find volume of prisms and cylinders.
- Find volume of pyramids, cones, and spheres.

### **Unit Objectives**

*Students will be able to...*

- Identify types of angles.
- Find missing angles in shapes and sets of lines.
- Understand and apply a rotation about the origin.
- Understand and apply a reflection about the x-axis or y-axis.
- Understand and apply translations.
- Understand and apply dilations.
- Describe the effects of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- Determine that the image and pre-image are congruent
- Identify parallel and perpendicular lines.
- Identify angles formed by a transversal t figures or similar figures.
- Use scale factors to create scale drawings.
- Set up and solve proportions to find missing sides of similar shapes.
- Determine if a triangle is a right triangle using the Pythagorean Theorem.
- Apply the Pythagorean Theorem to determine unknown side lengths.
- Apply the Pythagorean Theorem to

- solve real world problems.
- Determine the volume of cylinders and spheres.
- Apply the Pythagorean Theorem to determine the volume of cones.

**Lavallette School  
MATHEMATICS CURRICULUM  
Unit Overview**

**Content Area:** Mathematics

**Grade Level:** Eighth Grade

**Domain (Unit Title):** Statistics and Probability

**Cluster:** 8SP

**Cluster Summary:**

- Investigate patterns of association in bivariate data

**Primary Interdisciplinary Connections:**

<b>Science</b>	measurement (distance, weight, and growth), data analysis and collection, experiments relating to <b>Molecules to Organisms</b> .
<b>Social Studies</b>	economics & money, weather patterns, geography & map skills, and graphing
<b>Language Arts</b>	math journals, word problem comprehension, math stories, open-ended math questions, multi-step problems, math literature
<b>Technology</b>	8.1- Educational Technology: use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.  interactive whiteboard lessons, independent centers, classroom websites, online resources and apps

**21st Century Themes:**

<b>Global Awareness</b>	Students work with word problems containing names of people and locations around the world to develop understanding of diverse cultures and lifestyles.
<b>Communication</b>	Students use mathematical arguments to articulate thoughts and ideas with peers and teachers
<b>Civic Literacy</b>	Students understand the skills of mapping, gridding, and compass directions

**College and Career Readiness**

Mathematics programs develops a deep understanding of mathematics by building a strong foundation of number sense at the elementary level before moving into more advanced content. Students will learn to make sense of problems and persevere in problem solving, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of a structure, and look for and express regularity in repeated reasoning.

**Learning Targets****Content Standards: SP**

<b>Number</b>	<b>Standard for Mastery</b>
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line
8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>
8.SP.4	Understand that patterns of association can also be seen in bivariate

categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

### Unit Essential Questions

- What do you expect to see in the scatter plot based on the predicted correlation from the data?
- Using the best-fit-line equation, find the x-value(s) for the given y-value and vice versa.
- Is the y-intercept of the best-fit-line equation reasonable for the given situation?
- Why do you think the data does/doesn't have a linear trend?

### Unit Enduring Understandings

*Students will understand that...*

- Scatter plots can be created by both hand and technology.
- Scatter plots can be used to analyze real-world data to make predictions about future data.

### Unit Objectives

*Students will know...*

- Use a scatter plot to investigate the relationship between two sets of data.
- Construct and make conjectures about scatter plots.
- Use models to predict.
- Draw lines of best fit and use them to make predictions about data.
- Create scatter plots and calculate lines of best fit using technology.

### Unit Objectives

*Students will be able to...*

- Create and interpret scatter plots.
- Make predictions of correlations based on the data topics.
- Identify correlations of scatter plots.
- Determine the best-fit lines for the data.
- Find the equation of the best-fit lines.
- Use the best-fit line to predict values of data.

- Solve problems in the context of bivariate measurement data interpreting the slope and intercept.
- Use scatter plots to represent and interpret real data.

## Evidence of Learning

### **Suggested Formative Assessments:**

- |                                                                                                                                                                                                           |                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Performance Assessment</li> <li>• Exit Slips/Slate Assessment</li> <li>• Portfolios/Journals</li> <li>• Pre-Assessment</li> </ul> | <ul style="list-style-type: none"> <li>· Games</li> <li>· Anecdotal Records</li> <li>· Oral Assessment/Conferencing</li> <li>· Daily Classwork</li> </ul> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|

### **Suggested Summative Assessments:**

- Tests
- Quizzes
- National/State/District Assessments

### **Suggested Modifications (ELLs, Special Education, Gifted and Talented):**

#### Low Level Strategies:

- Modified classroom and homework assignments
- Teacher tutoring
- Parent - teacher communication
- Anchor charts and visual aids
- Flexible grouping
- Teacher - student goal setting
- Technology integration
- Centers
- Response to intervention

#### High Level Strategies

- Multi-step and higher level math problems
- Enrich problems
- Extend activities
- Centers
- Student driven activities
- Student choice activities
- Peer tutoring

**Suggested activities for lesson plans:**

- <http://teachers.henr.co.k12.va.us/math/hcpsalgebra1>
- [www.purplemath.com](http://www.purplemath.com)
- [www.Kutasoftware.com](http://www.Kutasoftware.com)
- [www.Khanacademy.com](http://www.Khanacademy.com)
- [www.mathworksheetsite.com](http://www.mathworksheetsite.com)
- [www.studyisland.com](http://www.studyisland.com)
- [www.brightstorm.com](http://www.brightstorm.com)
- [www.funbrain.com](http://www.funbrain.com)
- [www.coolmath.com](http://www.coolmath.com)

**Teacher Notes:**