

## Grade 9 Integrated Mathematics 1 Annual Curriculum Map

**Overview:** The 9<sup>th</sup> grade math program integrates Algebra, Geometry, Statistics and Probability, Logical Reasoning, Measurement, and Discrete mathematics. The math program is spiraled and incorporates skills within its frameworks: Number Sense and Operations; Patterns, Relations, and Algebra; Geometry; Measurement; and Data Analysis, Statistics, and Probability. Emphasis is placed on problem solving, critical thinking, communication, and connections among the mathematical topics and other subject areas. Through the integration of different strategies including visual and hands-on approaches, real life applications, exploratory activities and projects, use of technology, group work and open-ended problem solving, students develop stronger conceptual and problem solving skills.

	<b>September-November (Term 1)</b>	<b>November-January (Term 2)</b>	<b>January-March (Term 3)</b>	<b>March-June (Term 4)</b>	<b>July-August (Term 5)</b>
<b>Units/ Big Ideas</b>	<p><b>Simplify Expressions and Solve Linear Equations:</b></p> <ul style="list-style-type: none"> <li>-Evaluate expressions using the order of operations Section(s): 1-4, 2-2</li> <li>- Simplify expressions by combining like terms Section(s): 1-5, 2-6</li> <li>-Perform the distributive property Section(s): 1-5, 5-2</li> <li>- Solve linear equations with variable on one side (include distributive property) by adding/subtracting/multiplying/dividing Section(s): 2-7, 2-8, 5-2</li> <li>- Graph and solve linear inequalities Section(s): 3-3</li> <li><b>-Project</b></li> <li>- Recognize patterns and rules of exponents and scientific notation Section(s): 1-2, 1-3, 2-3</li> <li><b>-Project</b></li> </ul>	<p><b>Linear Equations in Depth and Proportionality</b></p> <ul style="list-style-type: none"> <li>-Solve equations and inequalities with fraction and decimal coefficients Section(s): 5-6</li> <li>-Solve equations and inequalities with variables on one or both sides Section(s): 5-3, 5-4</li> <li>- Solve equations for a single variable Section(s): 5-5</li> <li>-Write and solve equations involving properties of 2D figures</li> <li><b>-Assess on solving equations</b></li> <li>-Investigate similar figures Section(s): 6-3, 6-5</li> <li>- Solve direct proportions using properties of similar figures Section(s): 6-3, 6-5</li> <li>- Apply properties of direct proportion to a variety of problem situations</li> </ul>	<p><b>Coordinate Transformational Geometry</b></p> <ul style="list-style-type: none"> <li>- Plot 2D figures on the coordinate plane Section(s): 4-2</li> <li>-Translate 2D figures on the coordinate plane Section(s): 4-3</li> <li>-Rotate 2D figures on the coordinate plane and polar plane Section(s): 4-4</li> <li>-Dilate 2D figures using scale factors on the coordinate plane Section(s): 6-6</li> <li>- Reflect 2D figures on the coordinate plane Section(s): 10-1</li> <li><b>*Note: Many cultures and artists incorporate transformational geometry. Examples include Escher and Bev Doolittle.</b></li> <li><b>Linear Graphing Theory</b></li> <li>- Create scatter plots of linear data Section(s): 4-5</li> <li>- Identify graphs of functions Section(s): 4-6</li> <li>- Determine domain and range Section(s): 4-6</li> <li><b>*Note: The teacher can decide on how to introduce the concept of domain and range. The text uses “control variable” and “dependent</b></li> </ul>	<p><b>Right Triangle Theory</b></p> <ul style="list-style-type: none"> <li>-Use the Pythagorean Theorem to solve for lengths in right triangles Section(s): 9-1</li> <li>- Simplify radical expressions Section(s): 9-2</li> <li><b>*Note: The trig ratios must be introduced and defined here.</b></li> <li>- Use the trigonometric ratios to solve for lengths in right triangles Section(s): 6-7, 7-1</li> <li>- Use the trigonometric ratios to solve for angles in right triangles Section(s): 7-1</li> <li><b>Solving Linear Systems of Linear Equations and Inequalities</b></li> <li>- Solve systems of linear equations by graphing Section(s): 8-5</li> <li>-Solve systems of linear equations by substitution Section(s): 5-8</li> <li>- Graph solution regions of linear equalities Section(s): 8-6</li> <li>- Graph solution regions of systems of linear inequalities Section(s): 8-7</li> </ul>	<p><b>Quadratics</b></p> <ul style="list-style-type: none"> <li>- Apply the rules of exponents Section(s): 10-4</li> <li>- Multiply a polynomial by a polynomial (including FOIL) Section(s): 10-6</li> <li>- Factor binomials and trinomials Section(s): 10-5, 10-7</li> <li>- Solve quadratic equations by factoring Section(s): 10-3</li> <li>- Solve quadratic equations by graphing and investigate properties of parabolas Section(s): 10-8</li> <li>- Investigate solving quadratics using the quadratic formula Section(s): 10-8</li> <li><b>-Project</b></li> </ul>

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<b>Units/ Big Ideas</b>	<p><b>Geometry of 2-Dimensional Figures</b></p> <ul style="list-style-type: none"> <li>- Explore angle relationships Section(s): 2-5</li> <li>- Identify and classify 2D figures Section(s): 1-7- Describe and use properties of 2D figures Section(s): 1-7</li> <li>- Find the line of symmetry of 2D figures Section(s): 1-7</li> </ul> <p><b>*Note: solving equations will be incorporated with these geometry ideas</b></p> <ul style="list-style-type: none"> <li>- Use conditionals to describe and analyze 2D figures Section(s): 9-3</li> <li>- Calculate area and perimeter of 2D figures Section(s): 4-2, 5-7, 7-3, 7-6</li> <li>- Calculate geometric probability Section(s): 9-4</li> </ul> <p><b>-Project</b></p>	<p><b>*Note: The teacher may want to separate the geometry/proportion topics above from the probability topics below for assessment purposes.</b></p> <ul style="list-style-type: none"> <li>- Calculate theoretical and experimental probability Section(s): 6-1, 6-2, 6-4</li> </ul> <p><b>- Project</b></p>	<p><b>variable.” There is a good supplement for domain and range on textbook page 670.</b></p> <ul style="list-style-type: none"> <li>- Create tables of values for functions Section(s): 4-7</li> <li>- Convert linear equations and inequalities to <math>y=mx+b</math> and graph Section(s): 8-2, 8-6</li> </ul> <p><b>*Note: A huge amount of time needs to be spent on this unit so that the students master these ideas.</b></p> <ul style="list-style-type: none"> <li>- Calculate the slope of linear functions Section(s): 7-1, 7-2, 7-4, 7-5</li> <li>- Investigate and write equations for vertical and horizontal lines Section(s): 8-3, 8-4</li> <li>- Write linear functions in form <math>y=mx+b</math> given a table of values Section(s): 8-3, 8-4</li> <li>- Write linear functions in form <math>y=mx+b</math> given a point and the slope Section(s): 8-3, 8-4</li> <li>- Write linear functions in form <math>y=mx+b</math> given two points Section(s): 8-3, 8-4</li> <li>- Write linear functions in the form <math>y=mx+b</math> given intercepts Section(s): 8-3, 8-4</li> <li>- Model linear data with and without technology</li> <li>- Introduce nonlinear functions Section(s): 4-7</li> </ul> <p><b>-Project</b></p>	<p><b>Volume and Surface Area of 3-Dimensional Figures</b></p> <ul style="list-style-type: none"> <li>- Identify and name: prisms, pyramids, cylinders, and cones</li> <li>- Create nets and construct prisms, pyramids, cylinders, and cones</li> </ul> <p><b>* Note: Include lots of applications.</b></p> <ul style="list-style-type: none"> <li>- Calculate the surface area of pyramids Section(s): 9-5</li> <li>- Calculate the surface area of cylinders Section(s): 9-5</li> <li>- Calculate the surface area of cones</li> <li>- Calculate the volume of prisms Section(s): 9-6</li> <li>- Calculate the volume of pyramids Section(s): 9-7</li> <li>- Calculate the volume of cylinders Section(s): 9-6</li> <li>- Calculate the volume of cones Section(s): 9-7</li> </ul> <p><b>-Project</b></p>	

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<b>Major Projects</b>	<i>Suggested projects for review:</i> - Chapter 3: Plan a Music Store -Designing a Logo or Personal Logo Project -Theme poster	<i>-Suggested Project: Golden Ratio Project</i>	<i>Suggested Project: Designing a Skateboard Ramp</i>	<i>Suggested project: Building Boxes</i>	<i>Suggested Project: Adventure Education Based-Math Story</i>
<b>Materials</b>	McDougal Littell; <i>Integrated Mathematics1 text</i> <i>Study Guide</i> <i>Assessment Book</i> <i>Warm-up Transparencies</i> <i>Skills Bank</i> <i>Teacher's Resource for Transfer Students</i> <i>Explorations Lab Manual</i> <i>Activity Bank</i> <i>Practice Bank</i> <i>Project Book</i>  <a href="http://www.mcdougallittell.com">www.mcdougallittell.com</a>	McDougal Littell; <i>Integrated Mathematic 1 text</i> <i>Study Guide</i> <i>Assessment Book</i> <i>Warm-up Transparencies</i> <i>Skills Bank</i> <i>Teacher's Resource for Transfer Students</i> <i>Explorations Lab Manual</i> <i>Activity Bank</i> <i>Practice Bank</i> <i>Project Book</i>  <a href="http://www.mcdougallittell.com">www.mcdougallittell.com</a>	McDougal Littell; <i>Integrated Mathematics1 text</i> <i>Study Guide</i> <i>Assessment Book</i> <i>Warm-up Transparencies</i> <i>Skills Bank</i> <i>Teacher's Resource for Transfer Students</i> <i>Explorations Lab Manual</i> <i>Activity Bank</i> <i>Practice Bank</i> <i>Project Book</i>  <a href="http://www.mcdougallittell.com">www.mcdougallittell.com</a>	McDougal Littell; <i>Integrated Mathematic 1 text</i> <i>Study Guide</i> <i>Assessment Book</i> <i>Warm-up Transparencies</i> <i>Skills Bank</i> <i>Teacher's Resource for Transfer Students</i> <i>Explorations Lab Manual</i> <i>Activity Bank</i> <i>Practice Bank</i> <i>Project Book</i>  <a href="http://www.mcdougallittell.com">www.mcdougallittell.com</a>	McDougal Littell; <i>Integrated Mathematic 1 text</i> <i>Study Guide</i> <i>Assessment Book</i> <i>Warm-up Transparencies</i> <i>Skills Bank</i> <i>Teacher's Resource for Transfer Students</i> <i>Explorations Lab Manual</i> <i>Activity Bank</i> <i>Practice Bank</i> <i>Project Book</i>  <a href="http://www.mcdougallittell.com">www.mcdougallittell.com</a>
<b>Assessment</b>	-Journals -Projects -Demonstration/Performance -Problem Solving -Portfolio	-Journals -Projects -Demonstration/ Performance -Problem Solving -Portfolio	-Journals -Projects -Demonstration/Performance -Problem Solving -Portfolio	-Journals -Projects -Demonstration/Performance -Problem Solving -Portfolio	-Journals -Projects -Demonstration/ Performance -Problem Solving -Portfolio

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**Grade 9-Learning Standard Checklist (Also used for MCAS Alternative Assessment)**

Strand/Standard	Essence of the Standard(s)	Learning Standards as written	
<p><b>Strand: Number Sense and Operations</b> <i>-Understand numbers, ways of representing numbers, relationships among numbers, and number systems</i> <i>-Understand meanings of operations and how they relate to one another</i> <i>-Compute fluently and make reasonable estimates</i></p>	<p>-Use properties of operations on real numbers, including:</p> <ul style="list-style-type: none"> <li>• Associative, commutative and distributive properties</li> <li>• Identify and inverse elements</li> <li>• <math>n^{\text{th}}</math> roots, including the inverse relationship between the <math>n^{\text{th}}</math> root and the <math>n^{\text{th}}</math> power</li> </ul> <p>-Simplify expressions involving:</p> <ul style="list-style-type: none"> <li>• Positive integer exponents</li> <li>• Absolute value</li> </ul> <p>-Continue to solve problems with accuracy, efficiency, and simplicity</p>	<p><input type="checkbox"/> 10.N.1 Identify and use the properties of operations on real numbers, including associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; the existence of the <math>n^{\text{th}}</math> roots of positive real numbers for any positive integer <math>n</math>; and the inverse relationship between taking the <math>n^{\text{th}}</math> root and the <math>n^{\text{th}}</math> power of a positive real number.</p>	<p><input type="checkbox"/> 10.N.2 Simplify numerical expressions, including those involving positive integer exponents or the absolute value; apply such simplifications in the solution of problems.</p>
<p><b>Strand: Patterns, Relations, and Algebra</b> <i>-Understand patterns, relations, and functions</i> <i>-Represent and analyze mathematical situations and structures using algebraic symbols</i> <i>-Analyze change in various contexts</i></p>	<p>-Identify, reproduce, create, continue, represent, and extend patterns (e.g. “What comes next?”) with fluency and increased complexity of patterns</p> <p>-Understand the relationship between number operations and patterns (using number lines, tables, graphs)</p> <p>-Relate various representations of a line</p>	<p><input type="checkbox"/> 10.P.2 Demonstrate an understanding of the relationship between various representations of a line. Determine a line’s slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line. Explain the significance of a positive, negative, zero, or undefined slope.</p>	<p><input type="checkbox"/> 10.P.4 Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms; factoring; identify and canceling factors in rational expressions; and applying the properties of positive integer exponents.</p>
	<p>-Solve quadratic equations</p> <p>-Demonstrate the symbolic manipulation of polynomial rational expressions</p>	<p><input type="checkbox"/> 10.P.5 Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate an understanding of the equivalence of the methods.</p>	<p><input type="checkbox"/> 10.P.7 Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. Use technology when appropriate.</p>

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<p><b>Strand: Geometry</b></p> <p><i>-Analyze characteristics and properties of two-and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</i></p>	<p><b>Learning Standard for: Characteristics of Geometric Shapes</b></p> <ul style="list-style-type: none"> <li>-Identify more complex figures and determine types of symmetry</li> <li>-Draw congruent and similar figures using a variety of tools</li> <li>-Recognize and solve problems associated with radii, chords, and arcs</li> <li>-Use congruence and similarity to find missing quantities in geometric figures</li> <li>-Justify answers/prove results</li> </ul>	<p><input type="checkbox"/> 10.G.1 Identify figures using properties of sides, angles, and diagonals. Identify the figures' type(s) of symmetry.</p> <p><input type="checkbox"/> 10.G.2 Draw congruent and similar figures using a compass, straightedge, protractor and other tools such as computer software. Make conjectures about methods of construction. Justify the conjectures by logical arguments.</p>	<p><input type="checkbox"/> 10.G.3 Recognize and solve problems involving angles formed by transversals of coplanar lines. Identify and determine the measure of central and inscribed angles and their associated minor and major arcs. Recognize and solve problems associated with radii, chords, and arcs within or on the same circle.</p> <p><input type="checkbox"/> 10.G.4 Apply congruence and similarity correspondences and properties of the figures to find missing parts of geometric figures, and provide logical justification.</p>
<p><i>-Specify locations and describe spatial relationships using coordinate geometry and other representational systems</i></p>	<p><b>Learning Standard for: Spatial Relationships/Coordinate Geometry</b></p> <ul style="list-style-type: none"> <li>-Apply coordinate geometry</li> <li>-Perform calculations involving: <ul style="list-style-type: none"> <li>• Midpoints of segments</li> <li>• Slopes of lines/segments</li> <li>• Distances between two points</li> </ul> </li> <li>-Solve problems using above calculations</li> <li>-Find linear equations for lines</li> </ul>	<p><input type="checkbox"/> 10.G.7 Using rectangular coordinates, calculate midpoints of segments, slopes of lines and segments, and distances between two points, and apply the results to the solutions.</p>	<p><input type="checkbox"/> 10.G.8 Find linear equations that represent lines either perpendicular or parallel to a given line and through a point e.g. by using the "point-slop" form of the equation.</p>
<p><i>-Apply transformations and use symmetry to analyze mathematical situations</i></p>	<p><b>Learning Standard for: Transformation/Symmetry</b></p> <ul style="list-style-type: none"> <li>-Identify types of symmetry using properties of : <ul style="list-style-type: none"> <li>• Sides</li> <li>• Angles</li> <li>• Diagonals</li> </ul> </li> <li>-Interpret and draw transformations on figures using a coordinate plane</li> <li>-Apply transformations to the solutions of problems</li> </ul>	<p><input type="checkbox"/> 10.G.1 Identify figures using properties of sides, angles, and diagonals. Identify the figures' type(s) of symmetry.</p>	<p><input type="checkbox"/> 10.G.9 Draw results and interpret transformations on figures in the coordinate plane e.g. translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformation to the solutions of problems.</p>
<p><i>-Use visualization, spatial reasoning, and geometric modeling to solve problems</i></p>	<p><b>Learning Standard for: Visualization/Spatial Reasoning/Geometric Modeling</b></p> <ul style="list-style-type: none"> <li>-Solve simple triangle problems</li> <li>-Use properties of special triangles (i.e. isosceles, equilateral) when solving problems</li> <li>_Visualize solid objects and recognize cross sections and projections</li> <li>-Solve problems using vertex-edge graphs</li> </ul>	<p><input type="checkbox"/> 10.G.5 Solve simple triangle problems using the triangle sum property and/or the Pythagorean theorem.</p> <p><input type="checkbox"/> 10.G.6 Use the properties of special triangles to solve problems. (Must show at least 30°-60°-90° and 45°-45°-90°)</p>	<p><input type="checkbox"/> 10.G.10 Demonstrate the ability to visualize solid objects and recognize their projections and cross sections.</p> <p><input type="checkbox"/> 10.G.11 Use vertex-edge graphs to model and solve problems (i.e. network).</p>

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Strand/Standard	Essence of the Standard(s)	Learning Standards as written	
<p><b>Strand: Measurement</b> <i>-Understand measurable attributes of objects and the units, systems, and processes of measurement</i> <i>-Apply appropriate techniques, tools, and formulas to determine measurements</i></p>	<p>-Determine surface area, perimeter, circumference, and volume of more complex shapes -Describe how a change in one attribute causes changes in other attributes of an object -Estimate measurements and determine situations in which to apply estimations</p>	<p><input type="checkbox"/> 10.M.1 Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles. (Include a variety of figures). <input type="checkbox"/> 10.M.2 Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g. find the volume of a sphere with a specified surface area.</p>	<p><input type="checkbox"/> 10.M.3 Relate changes in the measurement of one attribute of an object to changes in other attributes, e.g. how changing radius or height of a cylinder affects area or volume.</p>
<p><b>Strand: Data Analysis, Statistics, &amp; Probability</b> <i>-Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</i> <i>-Select and use appropriate statistical methods to analyze data</i> <i>-Develop and evaluate inferences and predictions that are based on data</i> <i>-Understand and apply basic concepts of probability</i></p>	<p>-Select, create, and interpret the appropriate graphical representation for a set of data -Compare sets of data using different graphical representations -Identify the trend line for a set of data -Use technology to represent data in graphical format(s)</p>	<p><input type="checkbox"/> 10.D.1 Select, create, and interpret an appropriate graphical representation (e.g. scatterplot, table, stem-and-leaf plots, box-and-whisker plot, circle graph, line graph, line plot) for a set of data and use appropriate statistics (e.g. mean, median, range, mode) to communicate information about the data. Use these notions to compare different sets of data. <input type="checkbox"/> 10.D.2 Approximate a line of best fit (i.e. <b>draw a trend line</b>) given a set of data (e.g. scatterplot). Use technology when appropriate.</p>	

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**Possible Entry Points to Learning Standard(s)**

<b>Strand /General Standard</b>	<b>←Less Complex</b>		<b>More Complex⇒</b>
<p><b>Strand:</b> <b>Strand:</b> <b>Number Sense and Operations</b> <i>-Understand numbers, ways of representing numbers, relationships among numbers, and number systems</i> <i>-Understand meanings of operations and how they relate to one another</i> <i>-Compute fluently and make reasonable estimates</i></p>	<p><b>The student will:</b></p> <ul style="list-style-type: none"> <li>• Select the appropriate operation to perform to solve simple problems involving integers, one operation, and one calculation</li> </ul>	<p><b>The student will:</b></p> <ul style="list-style-type: none"> <li>• Select the appropriate operations when solving increasingly complex numerical problems involving more than one operation and more than one calculation</li> <li>• Use the correct order of operations when solving problems</li> <li>• Given a simple number sentence, demonstrate the associative, commutative, and distributive properties</li> <li>• Define, order, compare, and apply the following: -Irrational numbers -Ratios/proportions -Prime numbers</li> </ul>	<p><b>The student will:</b></p>

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<b>Strand: Composition</b>	The student will:	The student will:	The student will:
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**Possible Entry Points to Learning Standard(s)**

<b>Strand /General Standard</b>	<b>←Less Complex</b>		<b>More Complex⇒</b>
Strand:	The student will:	The student will:	The student will: