

Curriculum Map for:	APPLIED MATH III
Prepared August 7, 2006 by:	Stacey Adams and Patricia Johnson

Prerequisites: Successful completion of Course II-R or Math A-II

Scope:

Applied Math III is designed for students who struggled in 9th and 10th grade mathematics. This course not only works on the basic algebraic concepts in the abstract, it makes the concepts more concrete using tangible examples and application problems. Key topics include solving equations, solving inequalities, solving systems of equations and inequalities, quadratics, parabolas, applications of geometry, trigonometry, and statistics. Emphasis is placed on general problem solving techniques and graphical representations. Students will refine their use of a graphing calculator throughout the course of the year.

Assessment:

Assessment comes in a variety of forms and wherever possible should be used to reflect and enhance the teaching and learning process that occurs in a classroom. Assessment should not be seen as a separate activity, but as an integral part of the teaching and learning process. Alternative assessments apply to any and all assessments that differ from multiple choice, timed, one-shot approaches that characterize most standardized and classroom assessment. Authentic assessments are assessments that engage students in applying knowledge and skills in the same way they are used in the real-world. Performance assessment is a broad term, encompassing many of the characteristics of both authentic and alternative assessments.

As this course of study demonstrates, it is clear that no single type of assessment could provide an accurate measurement of the learning experience. Students should have the best opportunity to demonstrate their understanding of the learning experience. Therefore, it is suggested that a variety of data gathering methods be used such as objective tests, observations, products, written reports, performances and a collection of student works.

The **TIME** column offers a suggested time-line so that all topics listed in the **CONTENT/SKILLS** column are feasibly met. It is understood that times will need adjustments as the course develops. The **APPLICATION/PROJECT IDEAS** column offers suggestions and sources for the teacher. This column should be updated periodically to keep current and as new ideas are generated. The **KEY IDEA/PERFORMANCE INDICATOR** column coordinates topics with the NYS standards.

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
September (9 days)	<p><u>Equations and Inequalities</u></p> <ul style="list-style-type: none"> • Simplifying & Evaluating Expressions • Order of Operations • Solving Linear Equations • Rewriting Formulas • Algebraic Problem Solving • Solve and Graph linear Inequalities • Solve and Graph Compound Inequalities 	<p>A.A.3 Distinguish the difference between an algebraic expression and an algebraic equation</p> <p>Solve expressions using the proper order of operations</p> <p>A.A.22 Solve all types of linear equations in one variable</p> <p>A.A.23 Solve literal equations for a given variable</p> <p>A.A.5 Write algebraic equations or inequalities that represent a situation</p> <p>A.A.6 Analyze and solve verbal problems whose solution requires solving a linear equation in one variable or linear inequality in one variable</p> <p>A.A.24 Solve linear inequalities in one variable</p> <p>A.G.6 Graph linear inequalities (in one variable using a number line)</p>	<p>McDougal Littell Algebra 2, Chapter 1</p>
Sept. / Oct. (19 days)	<p><u>Linear Equations</u></p> <ul style="list-style-type: none"> • Slope • Slope – Intercept form • Applications of Slope • Writing Equations of Lines 	<p>A.A.32 Explain slope as a rate of change between dependent and independent variables</p>	<p>McDougal Littell Algebra 2, Chapter 2</p> <p>Amsco's Mathematics A, Chapter 16</p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
	<ul style="list-style-type: none"> • Parallel and Perpendicular lines • Determine if a point is on a given line • Graphing Vertical and Horizontal lines • Solving and Graphing Inequalities in 2 variables by hand and by using a graphing calculator. 	<p>A.A.33 Determine the slope of a line, given the coordinates of two points on the line</p> <p>Using slope, determine if two sets of points represent parallel or perpendicular lines</p> <p>Write any equation in slope – intercept form</p> <p>Graph a line using tables</p> <p>A.A.37 Determine the slope of a line, given its equation in any form</p> <p>Determine the y-intercept of a line given its equation in any form</p> <p>Graph a line using slope and y-intercept from an equation in any form</p> <p>Analyze and solve verbal problems whose solution requires using slopes, ie. average rate of change, and writing and solving a linear equation in two variables</p> <p>A.A.34 Write the equation of a line, given its slope and the coordinates of a point on the line</p> <p>A.A.35 Write the equation of a line, given the coordinates of two points on the line</p> <p>A.A.38 Determine if two lines are</p>	<p><i>Cars and Ramps Project</i></p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
<p>Oct. / Nov. (19 days)</p>	<p><u>Linear Systems</u></p> <ul style="list-style-type: none"> • Solving Systems of Equations by Graphing • Examine the possible solutions of systems including one solution, no solution, and infinite solutions • Solve Systems of Equations Algebraically using Substitution • Solve Systems of Equations Algebraically using Addition Elimination • Solve Systems of Inequalities Graphically • Solve Systems of Equations and Inequalities using the Graphing Calculator • Use Systems in Problem Solving <p><u>Quadratics</u></p> <ul style="list-style-type: none"> • Degree of Polynomials 	<p>parallel, given their equations in any form</p> <p>Write the equation of a line through a given point which is either parallel or perpendicular to a given line</p> <p>A.A.39 Determine whether a given point is on a line, given the equation of the line</p> <p>A.A.36 Write the equation of a line parallel to the x- or y-axis</p> <p>A.G.6 Graph linear inequalities (in two variables)</p> <p>A.G.7 Graph and solve systems of linear equations and inequalities with rational coefficients in two variables (See A.A.10)</p> <p>A.A.7 Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables</p> <p>A.A.10 Solve systems of two linear equations in two variables algebraically (See A.G.7)</p> <p>A.A.40 Determine whether a given point is in the solution set of a system of linear inequalities</p>	<p>Amsco's Mathematics A, Chapter 17</p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
Nov. / Dec. (15 days)	<ul style="list-style-type: none"> • Standard Form of Polynomials • Adding, Subtracting, Multiplying and Dividing Monomials and Polynomials • Factor by taking out a GCF • Factor binomials that are the difference of two perfect squares • Factor trinomials with a leading coefficient $a \geq 1$ • Solve Quadratic Equations by factoring • Use Quadratic Equations in Problem Solving 	<p>A.A.8 Analyze and solve verbal problems that involve quadratic equations</p> <p>A.A.11 Solve a system of one linear and one quadratic equation in two variables, where only factoring is required <i>Note: The quadratic equation should represent a parabola and the solution(s) should be integers.</i></p> <p>A.A.13 Add, subtract, and multiply monomials and polynomials</p> <p>A.A.14 Divide a polynomial by a monomial or binomial, where the quotient has no remainder</p> <p>A.A.19 Identify and factor the difference of two perfect squares</p> <p>A.A.20 Factor algebraic expressions completely, including trinomials with a lead coefficient of one (after factoring a GCF)</p> <p>A.A.26 Solve algebraic proportions in one variable which result in linear or quadratic equations</p> <p>A.A.27 Understand and apply the multiplication property of zero to solve quadratic equations with integral coefficients and integral roots</p>	<p>Glencoe McGraw Hill Algebra 1, Chapter 10</p> <p>Amsco's Mathematics A, Chapter 18 and Chapter 21</p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
Dec. / Jan. (15 days)	<p><u>Parabolas</u></p> <ul style="list-style-type: none"> • Given the equation of a Parabola: <ol style="list-style-type: none"> a. Tell if the graph opens up or down. b. Find and name the Axis of Symmetry c. Find and name the Vertex Point d. Find and name the y-intercept e. Graph the Parabola by picking points and by using the Graphing Calculator • Parabola Transformations • Solve Quadratic / Linear Systems Graphically • Solve Quadratic / Linear Systems Algebraically • Use the Graphing Calculator to solve Quadratic Applications. Include: <ol style="list-style-type: none"> a. Finding the Axis of Symmetry b. Finding the Maximum or Minimum Turning Point c. Setting Windows appropriately d. Using the calculator to answer questions based on the graph <p><u>Geometry Applications</u></p> <ul style="list-style-type: none"> • Area of Rectangles and Squares • Area of Parallelograms • Area of Trapezoids 	<p>A.A.28 Understand the difference and connection between roots of a quadratic equation and factors of a quadratic expression</p> <p>A.A.41 Determine the vertex and axis of symmetry of a parabola, given its equation (See A.G.10)</p> <p>A.G.8 Find the roots of a parabolic function graphically <i>Note: Only quadratic equations with integral solutions.</i></p> <p>A.G.9 Solve systems of linear and quadratic equations graphically <i>Note: Only use systems of linear and quadratic equations that lead to solutions whose coordinates are integers.</i></p> <p>A.G.10 Determine the vertex and axis of symmetry of a parabola, given its graph (See A.A.41) <i>Note: The vertex will have an ordered pair of integers and the axis of symmetry will have an integral value.</i></p>	<p>Amsco's Mathematics A, Chapter 21</p> <p>New York State Mathematics B Regents Exam Questions</p> <p>ExamGen Computer Database</p> <p><i>Parabola Transformation Project</i></p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
Feb. / Mar. (28 days)	<ul style="list-style-type: none"> • Area of Regular Polygons • Area and Circumference of Circles • Shaded Areas and Composite Figures • Scale Drawings • Scale Drawing Project <p><u>Triangle Trigonometry</u></p> <ul style="list-style-type: none"> • Right Triangle Trigonometry to include: <ol style="list-style-type: none"> a. Naming trig. ratios b. Using trig. to find a missing 	<p>A.G.1 Find the area and/or perimeter of figures composed of polygons and circles or sectors of a circle <i>Note: Figures may include triangles, rectangles, squares, parallelograms, rhombuses, trapezoids, circles, semi-circles, quarter-circles, and regular polygons (perimeter only).</i></p> <p>G.CN.5 Understand how quantitative models connect to various physical models and representations</p> <p>G.CN.6 Recognize and apply mathematics to situations in the outside world</p> <p>G.CN.7 Recognize and apply mathematical ideas to problem situations that develop outside of mathematics</p> <p>G.R.4 Select appropriate representations to solve problem situations</p> <p>G.R.5 Investigate relationships between different representations and their impact on a given problem</p> <p>G.R.6 Use mathematics to show and understand physical phenomena (e.g., determine the number of gallons of water in a fish tank)</p>	<p>CORD Geometry, Chapter 8</p> <p>Sequential Mathematics 2 , WestSea Publications</p> <p><i>Bedroom Design Project</i></p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
<p>Apr. / May (28 days)</p> <p>May (10 days)</p>	<p>side or a missing angle c. Using trig. to solve application questions with "angle of depression", "angle of elevation" and "eye-level"</p> <ul style="list-style-type: none"> • Law of Sines (find missing side only - no ambiguous case) • Law of Cosines (find missing angles and sides) • Force applications • Area of a Triangle • Applications involving non-right triangles <p><u>Statistics</u></p> <ul style="list-style-type: none"> • Summations • Measures of Central Tendency • Standard Deviation • Normal Curve • Scatter Plots • Linear Regressions 	<p>A.A.42 Find the sine, cosine, and tangent ratios of an angle of a right triangle, given the lengths of the sides</p> <p>A.A.43 Determine the measure of an angle of a right triangle, given the length of any two sides of the triangle</p> <p>A.A.44 Find the measure of a side of a right triangle, given an acute angle and the length of another side</p> <p>A.A.45 Determine the measure of a third side of a right triangle using the Pythagorean theorem, given the lengths of any two sides</p> <p>A2.A.73 Solve for an unknown side or angle, using the Law of Sines or the Law of Cosines</p> <p>A2.A.74 Determine the area of a triangle or a parallelogram, given the measure of two sides and the included angle</p> <p>A2.N.10 Know and apply sigma notation</p> <p>A2.S.3 Calculate measures of central tendency with group frequency distributions</p>	<p>Amsco's Mathematics A, Chapter 22</p> <p>Amsco's Mathematics B, Chapter 18</p> <p>Houghton Mifflin Unified Mathematics 3, Chapter 10</p> <p><i>Outdoor Trigonometry Project</i> (Projects to Enrich High School Mathematics p. 128-129)</p>

TIME	CONTENT/SKILLS	KEY IDEA/PERFORM INDICATOR	APPLICATIONS/PROJECT IDEAS
		<p>A2.S.4 Calculate measures of dispersion (range, quartiles, interquartile range, standard deviation, variance) for both samples and populations</p> <p>A2.S.5 Know and apply the characteristics of the normal distribution</p> <p>A.S.7 Create a scatter plot of bivariate data</p> <p>A2.S.7 Determine the function for the regression model, using appropriate technology, and use the regression function to interpolate and extrapolate from the data</p>	<p>New York State Mathematics B Regents Exam Questions</p> <p>ExamGen Computer Database</p>