



Pine Grove Area

SCHOOL DISTRICT

Mathematics

Integrated Math Course III

September 18, 2008

I. PHILOSOPHY

The Integrated Math Course III of the Pine Grove Area School District has been structured to reinforce the 11th grade state standards. Students will be instructed on the use of numbers and operations, problem solving, statistics and data analysis, probability, algebra, graphing, geometry, and measurement. These skills will be practiced in order for students to become proficient according to the Pennsylvania Academic Standards. Technology will also be integrated into the course to accommodate the many learning styles, motivational levels, and academic abilities.

II. CORE CONCEPTS

1. Numbers and Operations – Perform basic operations using signed numbers, fractions, decimals, percents, scientific notation, ratio, and proportion.
2. Problem Solving – Decide on a method to solve mathematical problems and communicate results.
3. Statistics and Data Analysis - Calculate measures of central tendency, and read and interpret charts and graphs.
4. Probability - Calculate probability using the fundamental counting principle, permutations, combinations and independent and mutually exclusive events.
5. Algebra – Review basic algebraic concepts.
6. Graphing – Graph linear and quadratic equations using a variety of methods.
7. Geometry – Define terms, identify figures, and solve problems using circles, triangles, and two dimensional and three – dimensional shapes.
8. Measurement – Identify appropriate tools to measure and convert between units.

III. COURSE OF STUDY

A. Course Name: Integrated Math Course III

B. Grade Level: 12

C. Length of Course: Full Year

1. Frequency: Daily

2. Duration: 42 minutes

D. Academic Level: Post Secondary

E. Credits: 1.0

F. Prerequisites: None

G. Course Description: This Math course is designed to reinforce all of the Pennsylvania state Math standards for twelfth grade students. This course is mandatory for any student who scored **Basic** or **Below Basic** on the eleventh grade Mathematics portion of the PSSA. This course must be passed in order for a student to be eligible to graduate.

IV. CONTENT: Integrated Math Course III

CORE CONCEPT 1: Numbers and Operations

MAJOR OBJECTIVE: Perform basic operations using signed numbers, fractions, decimals, percents, scientific notation, ratio, and proportion.

CURRICULUM STANDARD:			
PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.1.11.A</p> <p>Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots).</p>	<p>Teacher will guide students to:</p> <p>Represent and use numbers in equivalent forms (square roots and scientific notation)</p> <p>Examples</p> <ul style="list-style-type: none"> - Find the square root of an integer using a calculator - Express numbers and simplify expressions using scientific notation <p>Evaluate absolute value.'</p> <p>Order numbers from least to greatest.</p> <p>Simplify/ evaluate expressions involving positive and negative exponents and roots.</p> <p>Simplify expressions using the properties of exponents.</p>	<p>Teacher evaluation of:</p> <p>Student board work</p> <p>Student written calculations</p> <p>Homework</p> <p>Teacher observation</p> <p>Oral question and answer</p> <p>Journal writing</p> <p>Test/quiz</p> <p>Pass to leave</p> <p>Station activities</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 1: Numbers and Operations

MAJOR OBJECTIVE: Perform basic operations using signed numbers, fractions, decimals, percents, scientific notation, ratio, and proportion.

CURRICULUM STANDARD:			
PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.2.11.A Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.	Teacher will guide students to: Use the order of operations to evaluate an expression. Add, subtract, multiply, and divide signed numbers, fractions, mixed numbers, and decimals. Represent quantities using ratios. Solve proportions.	Teacher evaluation of: Student board work In-class assignments Student written work Oral questions and answers Homework Journal Writing Hands on activities such as projects with proportions Test/quiz Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 1: Numbers and Operations

MAJOR OBJECTIVE: Perform basic operations using signed numbers, fractions, decimals, percents, scientific notation, ratio, and proportion.

CURRICULUM STANDARD:			
PA State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.2.11.B Use estimation to solve problems for which an exact answer is not needed.	Teacher will guide students to: Solve problems using estimation.	Teacher evaluation of: Student written work on board or on paper Question and Answer Homework Journal Writing Independent activities Test/quiz Pass to leave	Textbook resources Workbook resources Student notebooks Journal Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 2: Problem Solving

MAJOR OBJECTIVE: Decide on a method to solve mathematical problems and communicate results.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.5.11.A</p> <p>Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.</p>	<p>Teacher will guide students to:</p> <p>Create a list of possible methods to solve problems.</p> <p>Discuss the pros and cons of the various methods of problem solving.</p> <p>Choose the most appropriate method and solve the problem.</p>	<p>Teacher evaluation of:</p> <p>Oral presentation</p> <p>Group discussion</p> <p>Homework</p> <p>Journal writing</p> <p>Homework</p> <p>Pass to leave</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Promethean Board/ laptops</p> <p>Websites</p>
<p>PA Standard 2.5.11.B</p> <p>Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.</p>	<p>Teacher will guide students to:</p> <p>Communicate the answer to a problem using the most appropriate method.</p>	<p>Teacher evaluation of:</p> <p>Written board work</p> <p>Independent activities</p> <p>Homework</p> <p>Journal writing</p> <p>Pass to leave</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 2: Problem Solving

MAJOR OBJECTIVE: Decide on a method to solve mathematical problems and communicate results.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.5.11.C Present mathematical procedures and results clearly, systematically, succinctly and correctly.	Teacher will guide students to: Demonstrate the answer and steps to solving the problem to the rest of the class. Evaluate classmates' demonstration of answer and steps to a word problem.	Teacher evaluation of: Oral presentation Written evaluations Teacher observation Group activities Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 3: Statistics and Data Analysis

MAJOR OBJECTIVE: Calculate measures of central tendency, and read and interpret charts and graphs.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.6.11.A Describe the data as an example of a distribution using statistical measures of center and spread.	Teacher will guide students to: Create and use appropriate graphical representation of data to answer questions. (Examples: box –and-whisker plots, stem and leaf plots, and scatter plots.) Use measures of central tendency to describe a set of data. (Examples: mean, median, mode, range, quartiles, interquartile range, and outliers.)	Teacher evaluation of: Student written work on board Homework Journal entry Cooperative group projects Teacher observations Question and answer Test/quiz Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 4: Probability

MAJOR OBJECTIVE: Calculate probability using the fundamental counting principle, permutations, combinations, and independent and mutually exclusive events.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.7.11.D</p> <p>Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.</p>	<p>Teacher will guide students to:</p> <p>Find probabilities for independent, dependent, or compound events and represent as a fraction, decimal, or percent.</p> <p>Find, convert, and compare the probability of a simple event.</p> <p>Determine the number of permutations, combinations, and use the fundamental counting principle to solve problems.</p> <p>Choose the appropriate method (permutations, combinations, or fundamental counting principle) to solve a problem.</p> <p>Make and evaluate predictions using data displays and probability.</p>	<p>Teacher evaluation of:</p> <p>Student written work</p> <p>Group project</p> <p>Station activities</p> <p>Homework</p> <p>Journal writing</p> <p>Group discussions</p> <p>Oral presentations</p> <p>Pass to leave</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.8.11.A</p> <p>Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.</p>	<p>Teacher will guide students to:</p> <p>Decide if a set of data for the existence of a pattern and represent the pattern algebraically or graphically.</p>	<p>Teacher evaluation of:</p> <p>Student written work at board</p> <p>Homework</p> <p>Test/quiz</p> <p>Small group discussion</p> <p>Station activities</p> <p>Pass to leave</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.D Formulate expressions, equations, inequalities, systems of equations, and systems of inequalities model routine and non-routine problem situations.	Teacher will guide students to: Write, solve, and apply a linear equation. Write and solve systems of equations using graphing, substitution, or elimination. Solve quadratic equations using factoring. Solve compound inequalities and graph solution set on a number line.	Teacher evaluation of: Student written work at board Station activities Journal writing Explanation of work –oral presentation Graphing Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.8.11.H</p> <p>Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.</p>	<p>Teacher will guide students to:</p> <p>Choose an appropriate method to solve systems of equations and inequalities.</p>	<p>Teacher evaluation of:</p> <p>Student written work</p> <p>Homework</p> <p>Small group activities</p> <p>Group discussions</p> <p>Teacher observation</p> <p>Journal writing</p> <p>Pass to leave</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Formula sheet</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.L Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.	Teacher will guide students to: Write the equation of a line when given the graph of the line. Write the equation of a line when given two points on the line. Write the equation of a line when given the slope of the line and a point on the line. Compute and use the slope of the line. Determine the appropriate method to writing the equation of a line.	Teacher evaluation of: Student written work Station activities Teacher observation Group discussion on appropriate method Homework Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Formula sheet Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.N Solve linear, quadratic and exponential equations both symbolically and graphically.	Teacher will guide students to: Solve linear equations using algebra and graphing. Solve quadratic equations by factoring.	Teacher evaluation of: Student written work at the board Independent activities Oral questions and answers Journal writing Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Formula sheet Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.O Determine the domain and range of a relation, given a graph or set of ordered pairs.	Teacher will guide students to: Decide if a relation is a function given a set of points or a graph. Identify the domain and range of a relation.	Teacher evaluation of: Group discussions Student written work Journal writing Station activities Oral presentations Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 5: Algebra

MAJOR OBJECTIVE: Review basic algebraic concepts.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.S Analyze properties and relationships of functions.	Teacher will guide students to: Simplify expressions involving polynomials.	Teacher evaluation of: Student written work Teacher observation Station activities Student demonstration to class Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 6: Graphing

MAJOR OBJECTIVE: Graph linear and quadratic equations using a variety of methods.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.K Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, and the use of a graphing calculator.	Teacher will guide students to: Match the graph of a given function to its table or equation. Choose and justify an appropriate method to graph linear equations. Graph a linear function using two variables (slope – intercept, x- and y- intercepts) and using a graphing calculator.	Teacher evaluation of: Student written work Class discussion Station activities Homework Test/quiz Pass to leave Journal writing Teacher observation	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Formula sheet Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 6: Graphing

MAJOR OBJECTIVE: Graph linear and quadratic equations using a variety of methods.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.8.11.Q Represent functional relationships in tables, charts and graphs.	Teacher will guide students to: Show functional relationships in tables, charts, and graphs. Compare and contrast the various methods to represent functions.	Teacher evaluation of: Group discussion Poster/ presentation Test/quiz Homework Journal writing Pass to leave Teacher observation	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 7: Geometry

MAJOR OBJECTIVE: Define terms, identify figures, and solve problems using circles, triangles, and two- dimensional and three- dimensional shapes.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.9.11.C</p> <p>Identify and prove the properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles and diagonals using deductive proofs.</p>	<p>Teacher will guide students to:</p> <p>Identify and use the properties of triangles. (Examples: medians, altitudes, angle bisectors, side/angle relationships, Triangle Inequality theorem)</p> <p>Identify and use the properties of quadrilaterals. (Examples: parallel sides, diagonals, bisectors, congruent sides and angles, and supplementary angles.)</p> <p>Identify and use properties of isosceles and equilateral triangles.</p>	<p>Teacher evaluation of:</p> <p>Teacher observation</p> <p>Station activities</p> <p>Inspiration activity (used to identify different properties between the various shapes)</p> <p>Oral presentation</p> <p>Student written work</p> <p>Homework</p> <p>Test/quiz</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 7: Geometry

MAJOR OBJECTIVE: Define terms, identify figures, and solve problems using circles, triangles, and two- dimensional and three- dimensional shapes.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.9.11.D Identify corresponding parts in congruent triangles to solve problems.	Teacher will guide students to: Identify and use properties of congruent polygons or solids. Identify and use properties of similar polygons or solids.	Teacher evaluation of: Student written work Homework Test/quiz Journal writing Pass to leave	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 7: Geometry

MAJOR OBJECTIVE: Define terms, identify figures, and solve problems using circles, triangles, and two- dimensional and three- dimensional shapes.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.9.11.F</p> <p>Use the properties of angles, arcs, chords, tangents and secants to solve problems involving circles.</p>	<p>Teacher will guide students to:</p> <p>Identify and use the properties of parts of a circle to solve problems. (Example: radius, diameter, tangent, arcs, inscribed angles, and central angles.)</p> <p>Verify the value of pi using circles.</p>	<p>Teacher evaluation of:</p> <p>Student written work</p> <p>Teacher observation</p> <p>Test/quiz</p> <p>Homework</p> <p>Activities with circular objects such as a coffee filter</p> <p>Pi activity</p> <p>Pass to leave</p> <p>Journal entry</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Promethean Board/ laptops</p> <p>Websites</p>

CONTENT: Integrated Math Course III

CORE CONCEPT 7: Geometry

MAJOR OBJECTIVE: Define terms, identify figures, and solve problems using circles, triangles, and two- dimensional and three- dimensional shapes.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.9.11.G Solve problems using analytic geometry.	Teacher will guide students to: Calculate the distance and midpoint between two points on a number line or coordinate plane using the given formulas. Relate slope to perpendicularity and parallelism.	Teacher evaluation of: Student written work Student oral work Teacher observation Station activities Homework Pass to leave Student exploration	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Formula sheet Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 7: Geometry

MAJOR OBJECTIVE: Define terms, identify figures, and solve problems using circles, triangles, and two- dimensional and three- dimensional shapes.

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
PA Standard 2.10.11.B Identify, create and solve practical problems involving right triangles using the Pythagorean Theorem.	Teacher will guide students to: Find the measure of a side of a right triangle using the Pythagorean Theorem.	Teacher evaluation of: Outside activities Student exploration Pass to leave Homework Student written work Test/quiz	Textbook resources Workbook resources Student notebooks Journal Graphing Calculators Manipulatives Formula sheet Promethean Board/ laptops Websites

CONTENT: Integrated Math Course III

CORE CONCEPT 8: Measurement

MAJOR OBJECTIVE: Identify appropriate tools to measure and convert between units.

CURRICULUM STANDARD:

State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p>PA Standard 2.3.11.A</p> <p>Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.</p>	<p>Teacher will guide students to:</p> <p>Describe how a change in the linear dimension of a figure affects its perimeter, circumference, area, or volume.</p> <p>Calculate the surface area and volume of prisms, cylinders, cones, pyramids, and spheres.</p> <p>Estimate area, perimeter, or circumference of an irregular figure.</p> <p>Find the measurement of a missing length given the perimeter, circumference, area, or volume.</p> <p>Measure and compare angles in degrees.</p>	<p>Teacher evaluation of:</p> <p>Outside activities</p> <p>Measuring activities</p> <p>Station activities</p> <p>Teacher observation</p> <p>Homework</p> <p>Test/quiz</p> <p>Pass to leave</p> <p>Journal writing</p>	<p>Textbook resources</p> <p>Workbook resources</p> <p>Student notebooks</p> <p>Journal</p> <p>Graphing Calculators</p> <p>Manipulatives</p> <p>Formula sheet</p> <p>Promethean Board/ laptops</p> <p>Websites</p> <p>Rulers, tape measures, and protractors</p>

V. EXPECTED LEVELS OF ACHIEVEMENT

A. Students are expected to reach the proficient level of achievement, including all of the skills noted in the specific content area of this curriculum.

B. Grading system for Integrated Math Course III classes is as follows:

Grading Scale	
A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	0% - 59%

C. Each student's grade will be determined at the conclusion of each marking. Progress notes will be issued half way through each marking period for those students who are performing below 70%.