

East Penn School District
Secondary Curriculum

A Planned Course Statement
For
Algebra I A

Course # 8303 Grade(s) 8th & 9th Grade

Department: Mathematics

Length of Period (mins.) 41 Total Clock Hours: 123

Periods per Cycle: 6 Length of Course (yrs.) 1

Type of Offering: required elective

Credit: 1

Adopted: _____

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Description of Course

Course Title: Algebra I A

Description:

Goals:

- To introduce students to the fundamental concepts of Algebra necessary to continue further studies in higher mathematics.

Requirements:

- Scientific Calculator
- Prerequisite: Pre-Algebra

Text:

Charles, R. I., Hall, B., Kennedy, & Hall, B. (2011). *Prentice Hall Algebra 1*. Boston, MA: Pearson.

***** A graded project will be completed during each semester in this course.**

Key to Levels of Achievement (Listed with each learning objective)

Awareness (A):	Students are introduced to concepts, forms, and patterns.
Learning (L):	Students are involved in a sequence of steps and practice activities which involved further development and allow evaluation of process.
Understanding (U):	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R):	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication.

Unit	Num	Objective	Level	Content	Evaluation	Standard
I. Algebraic Properties and Real Numbers	1	Students will write and evaluate algebraic expressions using the properties of numbers in algebra. Students will identify number sets. Students will compare, order and evaluate numbers within those sets. Students will identify patterns in sets of real numbers.	R	<ul style="list-style-type: none"> • Substitute and simplify algebraic expressions • Distinguish between rational and irrational numbers • Change repeating decimals to rational numbers • Recognize and define the number sets – real, rational, irrational, integers, and whole numbers • Compare real numbers using $<$, \leq, \geq, $>$ or \neq and graph on a number line • Determine the appropriate order for simplifying an expression and explain why the order works (order of operations) • Use commutative, associative, identity and distributive properties to simplify expressions • Estimate square roots • Evaluate expressions, equations, and formulas using the four basic operations, operations of powers and roots, reciprocals, opposites, and absolute values (including non-perfect square roots $\sqrt{24} = 2\sqrt{6}$) • Translate words into algebraic expressions and equations and estimate answers 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
II. Solving Equations	2	Students will write and solve equations, using the properties of equality.	U	<ul style="list-style-type: none"> • Describe the relationship between an equation and its solution • Use addition, subtraction, multiplication and division equality properties to solve one-step equations • Solve two-step equations using deductive reasoning (justify steps using properties of equality) • Solve multi-step equations using deductive reasoning (justify steps using properties of equality) • Solve equations with variables on both sides of equal sign using deductive reasoning (justify steps using properties of equality) • Translate real world scenarios into algebraic equations and solve • Solve problems using ratios, rates and proportions • Graph and compare proportional relationships • Solving equations with infinite solutions and no solutions 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
III. Inequalities	3	Students will write one-variable inequalities, graph one-variable inequalities and solve one-variable inequalities, using the properties of equality.	U	<ul style="list-style-type: none"> • Describe and graph solutions of inequalities • Use addition, subtraction, multiplication and division properties to solve one-step inequalities ($x + 3 < 5$) • Solve two-step inequalities using deductive reasoning (justify steps using properties of inequality) • Solve multi-step inequalities using deductive reasoning (justify steps using properties of inequality) • Solve inequalities with variables on both sides of inequality signs using deductive reasoning (justify steps using properties of inequality) • Apply inequalities to real world scenarios • Graph Linear Inequalities 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
IV. Graphs of Linear Equations in Two-Variables	4	Students will graph linear equations in two-variables. Students will write the equation of a line.	U	<ul style="list-style-type: none"> • Determine whether a relationship is a function based on its description or graph • Find the domain and range of a function • Determine whether a point is a solution to an equation • Identify points that are solutions to an equation using a graph • Graph a linear equation using a t-chart, slope-intercept form, and standard form • Graph horizontal and vertical lines • Find the slope of a line (given two points, given an equation) • Use similar triangles to find slope • Describe slope (positive, negative, zero, undefined) • Find the slope and y-intercept of a linear equation • Write a linear equation given slope and one point, given a graph, and given two points • Compare a distance/time graph to a distance/time equation • Describe the correlation between variables for graphs (including scatter plots) • Compare properties of two functions expressed in different ways • Find an equation of a line of best fit that models given data; use the model to make estimates • Solve problems using linear models including rate of change • Apply linear equations to real world scenarios 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
V. Systems of Equations	5	Students will solve systems of linear equations using methods of graphing, substitution and elimination.	U	<ul style="list-style-type: none"> • Determine whether an ordered pair is a solution of a system of equations • Write and solve a system of two equations using graphing, substitution, and/or elimination • Determine whether a system of equations has one, many or no solutions (classify as Consistent Dependent, Consistent Independent, or Inconsistent) • Solve real world scenarios using linear system models. • Interpret solutions of systems in the context of the problems 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	
VI. Rules of Exponents	6	Students will use the rules of exponents to simplify expressions.	U	<ul style="list-style-type: none"> • Multiply and divide numbers and variables in exponential form • Simplify negative and zero exponents • Find the power of a power and the power of a product of a product or a quotient • Use scientific notation to solve problems (ex. Find how many times larger one number is than another) • Using square roots and cube roots to solve equations 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
VII. Probability and Statistics	7	Students will calculate measures of central tendency. Students will calculate probabilities for independent, dependent, and compound events.	U	<ul style="list-style-type: none"> • Compute the mean, median, and mode for a set of data • Determine which measure of central tendency is appropriate for authentic data sets • Make predictions using measures of central tendency • Analyze data from scatter plots • Calculate and/or interpret the range, quartiles, and interquartile range of data • Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations) • Calculate probabilities for independent, dependent, and compound events • Design and conduct an experiment using random sampling 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	
VIII. Radical Expressions	8	Students will be able to simplify expressions and equations with radicals.	U	<ul style="list-style-type: none"> • Understand the proof of the Pythagorean Theorem and its converse • Apply the Pythagorean Theorem to find unknown lengths of sides of triangles • Use the Pythagorean Theorem to find the distance between two points on the coordinate plane 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	

Unit	Num	Objective	Level	Content	Evaluation	Standard
IX. Geometry	9		U	<ul style="list-style-type: none"> • Use formulas of cones, cylinder and spheres and use them to solve real-world and mathematical problems. • Verify experimentally the properties of rotations, reflections and translations. • 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. • Describe the effect of dilations, rotations, and reflections on two-dimensional figures using coordinates. • 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. • Establish facts about angle sum, exterior angles of triangles, about the angles created when parallel lines are cut by a transversal and the angle-angle criterion for similarity of triangles. 	•	