

East Penn School District

Secondary Curriculum

A Planned Course Statement For **Algebra I**

Course # 306

Grade(s) 9 - 12

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: 6/28/10

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Revised: 5/27/10 1:05 PM

Description of Course #306

Course Title: Algebra I

Description: The content of this course includes real numbers, solving equations, and inequalities, linear graphs, systems of linear equations, exponents, factoring, rational expressions and equations, relations, functions, probability, quadratic equations and a 2D shape introduction.

Goals:

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

Requirements:

- Scientific Calculator
- Prerequisite: Pre-Algebra B or Pre-Algebra

Text:

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

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. Introduction to Algebra	1	Students will write and evaluate algebraic expressions using the properties of numbers in algebra.	U	<ul style="list-style-type: none"> Identify, describe and explain patterns Substitute and simplify algebraic expressions 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 Evaluate expressions, equations, and formulas Translate words into algebraic expressions and equations 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.B 2.1.11.A 2.2.8.A 2.3.8.B 2.5.11.C 2.8.8.C
II. Real Numbers	2	Students will identify number sets. Students will compare, order and evaluate numbers within those sets. Students will identify patterns in sets of real numbers.	U	<ul style="list-style-type: none"> Identify, describe and explain patterns Distinguish between rational and irrational numbers. Recognize and define the number sets – real, rational, irrational, integers, and whole numbers Compare real numbers using $<$, \leq, \geq, $>$ or \neq Find absolute value, square root, opposites, and reciprocals <i>Optional remediation:</i> perform arithmetic with positive and negative numbers 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.A 2.1.8.B 2.1.8.C 2.1.8.F 2.1.11.A 2.2.8.B 2.2.8.C 2.4.8.A 2.5.11.C 2.8.8.A 2.8.11.A 2.11.8.C

Unit	Num	Objective	Level	Content	Evaluation	Standard
III. Solving Equations	3	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 sentences into algebraic equations and solve 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.G 2.1.11.A 2.2.8.A 2.4.8.C 2.4.11.A 2.5.8.C 2.5.11.A 2.5.11.C 2.8.8.B 2.8.8.C 2.8.8.E 2.8.8.J 2.8.11.A 2.8.11.D 2.8.11.N 2.8.11.O
IV. Inequalities	4	Students will write one-variable inequalities, graph one-variable inequalities and solve one-variable inequalities, using the properties of inequality.	U	<ul style="list-style-type: none"> Describe and graph solutions of an inequalities Use addition, subtraction, multiplication and division properties to solve one-step inequalities Solve two-step inequalities using deductive reasoning (justify steps using properties of inequalities) Solve multi-step inequalities using deductive reasoning (justify steps using properties of inequalities) Solve inequalities with variables on both sides of inequality signs using deductive reasoning (justify steps using properties of inequalities) Translate sentences into algebraic inequalities and solve <i>Optional enrichment:</i> compound inequalities <i>Optional enrichment:</i> absolute value inequalities 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.F 2.1.11.A 2.4.11.A 2.5.8.C 2.5.11.C 2.8.8.C 2.8.8.E 2.8.11.D

Unit	Num	Objective	Level	Content	Evaluation	Standard
V. Graph of Linear Equations in two-variables	5	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, point-slope form, and standard form Graph horizontal and vertical lines Find the slope of a line (given two points, given an equation) 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 Describe the correlation between variables for graphs (including scatter plots) 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 Find the distance between two-points using the distance formula 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.2.11.C 2.4.11.E 2.5.8.C 2.5.11.A 2.5.11.B 2.5.11.C 2.6.8.C 2.8.8.G 2.8.8.H 2.8.11.A 2.8.11.D 2.8.11.J

Unit	Num	Objective	Level	Content	Evaluation	Standard
VI. Graph of Inequalities in Two-Variables	6	Students will graph inequalities with two-variables. Student will generate solutions for a system of linear inequalities using graphing.	U	<ul style="list-style-type: none"> Graph an inequality in slope-intercept form Determine whether an ordered pair is a solution of the inequality Match a given inequality and its graph Graph two inequalities on the coordinate plane and shade the solutions of the graph. <i>Optional enrichment:</i> Write the linear inequality that describes the graph 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.5.8.C 2.5.11.C 2.8.8.C 2.8.11.D 2.8.11.G 2.8.11.J 2.8.11.K 2.8.11.L 2.8.11.M
VII. Systems of Equations	7	Students will solve systems of linear equations.	U	<ul style="list-style-type: none"> Determine whether an ordered pair is a solution of a system of equations Find and interpret the solution of a system of equations using graphing, substitution Determine whether a system of equations has one, many or no solutions (classify as Consistent Dependent, Consistent Independent, or Inconsistent) Solve authentic problems using linear systems models 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.2.8.A 2.2.11.A 2.4.11.E 2.5.8.C 2.5.8.D 2.5.11.A 2.5.11.C 2.8.8.C 2.8.11.D 2.8.11.F 2.8.11.G 2.8.11.N
VIII. Exponents	8	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 Write numbers using scientific notation 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.A 2.1.8.B 2.1.11.A 2.5.8.C 2.5.11.C 2.8.8.B

Unit	Num	Objective	Level	Content	Evaluation	Standard
IX. Polynomials	9	Students will add, subtract, and multiply polynomials.	U	<ul style="list-style-type: none"> Recognize and provide examples of polynomials Determine whether polynomials in different forms are equivalent Write polynomials in descending order Simplify a polynomial by collecting like terms Classify polynomials by terms and degree Add and subtract polynomials (including fractions with LCM for common denominator $\frac{1}{x} + \frac{1}{x^2}$) Multiply polynomials: FOIL, expansion box, distribution, vertical Use patterns to determine rules for special products 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.E 2.1.11.A 2.2.8.A 2.5.8.C 2.5.11.C
X. Factoring	10	Students will use general strategies to factor polynomials. Students will solve polynomial equations by factoring.	U	<ul style="list-style-type: none"> Factor a polynomial by identifying a common factor (GCF) Recognize the pattern for a difference of two squares and factor Factor $ax^2 + bx + c$ where $a = 1$ Factor by grouping Factor $ax^2 + bx + c$ where $a > 1$ Solve equations using zero product property and square roots Application: Pythagorean Theorem 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.8.A 2.1.11.A 2.2.8.A 2.2.11.A 2.4.11.E 2.5.8.C 2.5.11.A 2.5.11.C
XI. Quadratics	11	Students will explore graphs of quadratic equations.	U	<ul style="list-style-type: none"> Graph a quadratic function in the form $y = ax^2$ and $y = ax^2 + c$ Describe the graph of a quadratic function: minimum, maximum, vertex, axis of symmetry <i>Optional enrichment:</i> Graph $y = ax^2 + bx + c$ 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.5.8.C 2.5.11.C 2.8.8.B 2.8.11.E 2.8.11.J 2.8.11.N

Unit	Num	Objective	Level	Content	Evaluation	Standard
XII. Probability	12	Students will be able to compute probabilities. Students will design and conduct an experiment using random sampling. Students will calculate the measure of central tendencies.	U	<ul style="list-style-type: none"> Calculate probabilities for independent, dependent and compound events Design and conduct an experiment using random sampling Draw conclusions from experimental data Calculate range and interquartiles Compute the mean, median, and mode for a set of data Determine which measure of central tendency is appropriate for authentic data sets 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.2.8.A 2.2.11.A 2.2.11.C 2.4.8.F 2.4.11.E 2.5.8.C 2.5.8.D 2.5.11.A 2.5.11.B 2.5.11.C 2.5.11.D 2.6.8.A 2.6.8.C 2.6.8.D 2.6.11.H 2.7.8.B 2.7.8.C 2.7.8.D 2.7.8.E 2.7.11.C 2.7.11.D 2.7.11.E 2.8.11.M 2.8.11.Q 2.8.11.R
XIII. <i>Optional enrichment:</i> 2-D Shapes Intro	13	Students will identify properties of 2D shapes.	A	<ul style="list-style-type: none"> Calculate area and perimeter of 2D figures: square, rectangle, triangle Use coordinate plane to find distance between vertices of 2D figures Calculate geometric probability 	<ul style="list-style-type: none"> Homework Tests Quizzes Independent Work Group Work 	2.1.11.A 2.3.8.A 2.3.8.E 2.5.8.C 2.5.11.C 2.8.8.J 2.10.8.B