## WARREN COUNTY SCHOOL DISTRICT

### PLANNED INSTRUCTION

## COURSE DESCRIPTION

**Course Title:**   Algebra I – College Preparatory

**Course Number:**

**Course Prerequisites:**   This course is designed for the student who has passed Pre-Algebra 8 with a 75% or higher.

**Course Description:**   (Include "no final exam" or "final exam required")
**CP Algebra I** is the first course in a three-year sequence of CP Algebra I, CP Algebra II, and CP Geometry.  This course provides an in-depth look at the foundation of algebraic theory that will be expanded in CP Algebra II, and CP Geometry.  It uses practical problems to apply theory and connect algebra to the real world.  CP Algebra I is intended for students planning on pursuing higher education, particularly those whose primary interests are in the fields that require strong background in math or science.  Students must have earned a grade of 75% or higher in Pre-Algebra 8 or Algebra I Grade 8 (NC or Advanced).  A final exam is required.

**Suggested Grade Level:**            9

**Length of Course:**           One Semester     __X__   Two Semesters          Other

(Describe)

**Units of Credit:**            1        (Insert *NONE* if appropriate.)

**PDE** *Certification and Staffing Policies and Guidelines (CSPG)* **Required Teacher Certification(s)**

(Insert certificate title and CSPG#)   Mathematics CSPG #50

**Certification verified by WCSD Human Resources Department:**

      __X__ Yes           _____ No

**Board Approved Textbooks, Software, Materials:**
**Title:**  Algebra I
**Publisher:**  Prentice Hall
**ISBN #:**  0-13-201577-3
**Copyright Date:**  2007
**Date of WCSD Board Approval:**

|  |  |
|---|---|
| **Date Written:** | Spring 2012 |
| **Date Approved:** | |
| **Implementation Year:** | 2012-2013 |

**Suggested Supplemental Materials:** (List or insert **None**) None

## Course Standards

**PA Academic Standards:** (List by Number and Description)
2.1.11  Numbers, Number Systems, and Number Relationships
2.2.11  Computation and Estimation (Integrated throughout)
2.3.11  Measurement and Estimation
2.4.11  Mathematical Reasoning and Connection (Integrated throughout)
2.5.11  Mathematical Problem Solving and Communication (Integrated throughout)
2.6.11  Statistics and Data Analysis
2.7.11  Probability and Predictions
2.8.11  Algebra and Functions

**WCSD Academic Standards:** (List or **None**)
None

**Industry or Other Standards:** (List, Identify Source or **None**)
**Common Core**
Domains:
    The Real Number System
    Quantities
    Seeing Structure and Expressions
    Arithmetic with Polynomials and Rational Expressions
    Creating Equations
    Reasoning with Equations and Inequalities
    Interpreting Functions
    Building Functions
    Linear, Quadratic, and Exponential Models
    Interpreting Categorical and Quantitative Data
    Making Inferences and Justifying Conclusions
    Conditional Probability and the Rules of Probability
    Using Probability to Make Decisions

## SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

**SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE**

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

PA Standard:  2.1.11  Numbers, Number Systems, and Number Relationships

| | **Performance Indicators** |
|---|---|
| M11.A.1.1.1 | Find the square root of an integer to the nearest tenth using either a calculator or estimation. |
| M11.A.1.1.2 | Express numbers and/or simplify expressions using scientific notation (including numbers less than 1). |
| M11.A.1.3.1 | Locate/identify irrational numbers at the approximate location on a number line. |
| M11.A.2.1.1 | Solve problems using operations with rational numbers including rates and percents (single and multi-step and multiple procedure operations) (e.g., **distance, work and mixture problems,** etc.) |
| M11.A.2.1.2 | Solve problems using direct and inverse proportions. |
| M11.A.2.1.3 | Identify and/or use proportional relationships in problem solving settings. |
| M11.A.3.1.1 | Simplify/evaluate expressions using the order of operations to solve problems (any rational numbers may be used). |

PA Standard:  2.3.11  Measurement and Estimation

| | **Performance Indicators** |
|---|---|
| M11.B.2.2.4 | Find the measurement of a missing length given the perimeter, circumference, area or volume |

PA Standard:  2.8.11  Algebra and Functions

| | **Performance Indicators** |
|---|---|
| A1.1.1.4.1 | Use estimation to solve problems. |
| A1.1.1.1.2 | Simplify square roots (e.g., $\sqrt{24} = 2\sqrt{6}$). |
| A1.1.1.2.1 | Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. |

| A1.1.1.3.1 | Simplify/evaluate expressions involving properties/laws of exponents, roots and/or absolute value to solve problems (exponents should be integers.) |
|---|---|
| A1.1.1.5.1 | Add, subtract and/or multiply polynomial expressions (express answers in simplest form – nothing larger than a binomial multiplied by a trinomial). |
| A1.1.1.5.2 | Factor algebraic expressions, including difference of squares and trinomials (trinomials limited to the form $ax^2+bx+c$ where a is equal to 1 after factoring out all monomial factors). |
| A1.1.1.5.3 | Simplify/reduce a rational algebraic expression. |
| A1.1.2.1.1 | Write, solve and/or apply a linear equation (including problem situations). |
| A1.1.2.1.2 | Use and/or identify an algebraic property to justify any step in an equation solving process (linear equations only). |
| A1.1.2.1.3 | Interpret solutions to problems in the context of the problem situation (linear equations only). |
| A1.1.2.2.1 | Write and/or solve a system of linear equations (including problem situations) using graphing, substitution and/or elimination (limit systems to 2 linear equations). |
| A1.1.2.2.2 | Interpret solutions to problems in the context of the problem situation (systems of 2 linear equations only). |
| A1.1.3.1.1 | Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). |
| A1.1.3.1.2 | Identify or graph the solution set to a linear inequality on a number line. |
| A1.1.3.1.3 | Interpret solutions to problems in the context of the problem situation (limit to linear inequalities). |
| A1.1.3.2.1 | Write and/or solve a system of linear inequalities using graphing (limit systems to 2 linear inequalities). |
| A1.1.3.2.2 | Interpret solutions to problems in the context of the problem situation (systems of 2 linear inequalities only). |
| A1.2.2.1.1 | **(Review)** Identify, describe and/or use constant rates of change. |
| A1.2.2.1.2 | **(Review)** Apply the concept of linear rate of change (slope) to solve problems. |

| | |
|---|---|
| A1.2.2.1.3 | Write or identify a linear equation when given<br>• the graph of the line<br>• 2 points on the line, or<br>• the slope and a point on a line,<br>(Linear equation may be in point-slope, standard and/or slope-intercept form). |
| M11.D.1.1.3 | Identify the domain, range or inverse of a relation (may be presented as ordered pairs or a table). |
| A1.1.1.1.1 | (Review) Compare and/or order any real numbers (rational and irrational may be mixed). |
| A1.2.1.1.1 | Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. |
| A1.2.1.2.2 | Translate from one representation of a linear function to another (graph, table and equation). |
| A1.2.1.1.2 | Determine if a relation is a function given a set of points or a graph. |
| A1.2.1.1.3 | Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). |
| A1.2.1.2.1 | Create, interpret and/or use the equation, graph or table of a linear function. |

PA Standard: 2.6.11  Statistics and Data Analysis
2.7.11  Probability and Predictions

| | Performance Indicators |
|---|---|
| M11.E.3.1.1 | Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent). |
| M11.E.3.1.2 | **(Review)**  Find, convert and/or compare the probability and/or odds of a simple event. |
| M11.E.3.2.1 | **(Review)** Determine the number of permutations and/or combinations or apply the fundamental counting principle. (Formula provided on the reference sheet). |
| M11.E.2.1.1 | Calculate or select the appropriate measure of central tendency (mean, mode or median) of a set of data given or represented on a table, line plot or stem-and-leaf plot. |
| M11.E.4.1.2 | Use probability to predict outcomes. |
| A1.2.3.3.1 | Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal or percent. |

| | |
|---|---|
| M11.E.1.1.1 | Create and/or use appropriate graphical representations of data, including box-and-whisker plots, stem-and-leaf plots or scatter plots. |
| M11.E.2.1.3 | Describe how outliers affect measures of central tendency. |
| A1.2.3.1.1 | Calculate and/or interpret the range, quartiles and interquartile range of data. |
| A1.2.3.2.1 | Estimate or calculate to make predictions based on a circle, line, bar graph, measures of central tendency, or other representations. |
| A1.2.3.2.2 | 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). |
| A1.2.3.2.3 | Make predictions using the equations or graphs of best-fit lines of scatter plots. |

## ASSESSMENTS

**PSSA Assessment Anchors Addressed**:  The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

**Formative and Summative Assessments:**  The teacher will develop and use standards-based assessments throughout the course.

**Suggested Assessments (but not limited to):**

Observations
Evaluate written work
Performance assessment
Tests
Quizzes
Evaluate oral response
Self-evaluation
Cooperative Learning
Homework
Classroom Diagnostic Tool

**Portfolio Assessment:** _____ Yes __X__ No

**District-wide Final Examination Required:** __X__ Yes _____ No

**Course Challenge Assessment** (Describe):
Not applicable


## REQUIRED COURSE SEQUENCE AND TIMELINE
(Content must be tied to objectives)

| | Content Sequence | Dates |
|---|---|---|
| I. | Variables, Functions, Patterns, Graphs | August/September |
| II. | Properties of Real Numbers and Simplify Square Roots | September |
| III. | Solving Linear Equations | October |
| IV. | Solving Linear Inequalities | November |
| V. | Graphs and Functions (direct and inverse) | December |
| VI. | Linear Equations:  Forms and Graphs | January |
| VII. | Systems and Equations and Inequalities | February |
| VIII. | Exponents and Exponential Functions | March |
| IX. | Polynomials and Factoring | April |
| X. | Probability and Statistics | May/June |

**Objectives:**

Students will:

Make sense of problems and persevere in solving them.

Reason abstractly and quantitatively.

Construct viable arguments and critique the reasoning of others.

Model with mathematics.

Use appropriate tools strategically.

Attend to precision.

Look for and make use of structure.

Look for and express regularity in repeated reasoning.


**WRITING TEAM:** WCSD Math teachers


### WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination?                    __X__ Yes    _____ No

2. Does this course issue a mark/grade for the report card?    __X__ Yes    _____ No

3. Does this course issue a Pass/Fail mark?                    _____ Yes    __X__ No

4. Is the course mark/grade part of the GPA calculation?    __X__ Yes    _____ No

5. Is the course eligible for Honor Roll calculation?        __X__ Yes    _____ No

6. What is the academic weight of the course?

    _____ No weight/Non credit        __X__ Standard weight

    _____ Enhanced weight  (Describe)