ALGEBRA I
1 Unit

SPECIFIC COURSE OBJECTIVES

A. At the completion of this course, the student will:

1. be able to organize thoughts to solve mathematical problems that he or she will meet in everyday life.
2. be prepared for continuation of studies in mathematics and science.

II. SPECIFIC OUTLINE OF COURSE CONTENT

A. Basic Concepts standards(8.S.6.2)

1. Numbers in Algebra
2. Describing data
3. Intervals and estimates
4. Order of operations
5. Formulas
6. Sets
7. Probability
8. Relative frequency and the equal fractions property

B. Addition in Algebra standards(8.G.2.1, 8.G.2.2)

1. Putting-together model for addition
2. The slide model for addition
3. Addition of fractions
4. The coordinate plane
5. Two-dimensional slides
6. Solving $x + a = b$
7. Solving $x + a < b$
8. The triangle inequality

C. Subtraction in Algebra standards(8.N.4.2)

1. Subtraction of real numbers
2. Models for subtraction
3. Solving $x - a = b$ and $x - a < b$
4. Intersection of sets
5. Union of sets .,
6. Addition, subtraction, and counting
7. Addition, subtraction, and graphing
8. Addition, subtraction, and geometry

D. Multiplication in Algebra standards(8.M.3.2, 8.A.1.1, 8.S.6.2)

1. Areas, arrays, and volumes

2. Multiplying fractions and rates
3. Special numbers in multiplication
4. Solving ax = b
5. Special numbers in equations
6. Solving ax < b
7. Multiplication counting principle
8. Multiplying probabilities
9. The factorial symbol

E. Division in Algebra standards(8.M.3.1, 8.N.4.1)

1. The definition of division
2. Rates
3. Ratios
4. Solving percent problems using equations
5. Probability without counting
6. Size changes
7. Proportions
8. Similar figures

F. Linear Sentences standards(8.A.1.2)

1. Solving ax + b = c
2. More solving ax + b =c
3. The distributive property
4. Repeated addition and subtraction
5. Solving ax + b = cx + d
6. Solving ax + b < cx + d
7. Why the Distributive Property is so named
8. Subtracting quantities

G. Lines and Distance standards(8.P.5.1, 8.S.6.1)

1. Graphing lines
2. Horizontal and vertical lines
3. Distance and absolute value I
4. Square roots of products
5. Distances in the plane
6. Chunking

I H. Slopes and Lines standards(8.A.1.3, 8.N.4.4)

1. Rates of change
2. Constant rates of change
3. Properties of slope
4. Slope-intercept Equations for lines
5. Equations for lines with a given point and slope

6. Equations for lines through two points
7. Fitting a line to data
8. Equations for all lines
9. Graphing linear inequalities

I. Exponents and Powers standards(8.N.4.2, 8.P.5.2)

1. Compound interest
2. Exponential growth
3. Exponential decay
4. Graphing exponential growth and decay
5. Products of powers
6. Negative exponents
7. Quotients of powers
8. Powers of products and Quotients
9. Remembering the properties

J. Polynomials standards(8.S.6.1)

1. How polynomials arise
2. Adding and subtracting polynomials
3. Multiplying a polynomial by a monomial
4. Common monomial factoring
5. Multiplying polynomials
6. Multiplying binomials
7. Squares of binomials
8. Recognizing perfect squares
9. Difference in squares
10. The zero product property
11. Recognizing factors of polynomials

K. Systems standards(8.N.4.3, 8.S.6.1)

1. An introduction to systems I
2. Solving using substitution I
3. More with substitution
4. Solving systems by addition
5. Multiplying to solve systems
6. Weighted averages and mixtures
7. More with mixtures
8. Parallel lines
9. Situations which always or never happen
10. Systems of inequalities

L. Parabolas and Quadratic Equations standards(8.N.4.1)

1. Graphing ax2 + bx + c
2. Using an automatic grapher
3. Applications of parabolas
4. The quadratic formula

5. Rational and irrational numbers
6. Factoring quadratic trinomials
7. Solving some quadratic equations by factoring
8. The factor theorem

M. Functions standards(8.S.6.1, 8.P.5.2)

1. What are functions?
2. Function notation
3. Absolute value functions
4. Function language
5. Probability functions
6. The tangent of an angle
7. Functions on calculators

III. PLAN FOR STUDENT EVALUATION

A. Grade students' daily assignments.

B. Give one quiz per chapter over the material covered in the first sections of each chapter.

C. Give a test over material in each chapter.

IV. SPECIFIC STANDARDS FOR PASSING

A. The student will accomplish passing work (70% accuracy) in the following areas:

1. Solving numerical and algebraic expressions
2. Applying properties used in solving equations and inequalities
3. Using models of subtraction to form expressions and solve sentences involving subtraction
4. Using addition, subtraction, multiplication, and division to transform equations
5. Applying and recognizing properties associated with linear sentences
6. Using squares and square roots in measurement problems
7. Finding equations for lines and using equations to describe real situations
8. Identifying properties of exponents
9. Factoring, and using factors to solve polynomial expressions
10. Using systems of equations to solve real world problems involving linear combinations
11. Solving quadratic equations using the quadratic formula
12. Communicating mathematical properties and ideas