**Curriculum**

**Pre-Algebra**

**Course Overview**

This is a broad-based course that touches upon various aspects of mathematics and emphasizes day-to-day applications. The primary focus is on developing and refining computational skills while reviewing arithmetic, as well as on extending algebraic and geometric concepts and applications. The development of logical and analytical thought is stressed throughout the course, as are applications to real life mathematics problems. The course reviews basic arithmetic skills to fully equip students with the skills and knowledge they will need for the formal study of algebra and geometry. Topics include graphs and statistical data, computation, positive and negative integers and fractions, ratios, proportion and percent, geometry (including formulas for perimeters, areas, volumes), inequalities, word problem solving, probability, basic trigonometry, and graphing in two variables on a coordinate plane.

**Department Standards**

Students will be able to comprehend mathematical concepts.

Students will apply mathematical procedures accurately, efficiently, and appropriately.

Students will be able to formulate, represent, and solve mathematical problems.

Students will develop logical mathematical thought and precise mathematical communication.

**Benchmarks**:

Students will be able to:

demonstrate mastery of integers and expressions;

demonstrate an understanding of multi-step equations and inequalities;

recognize the rules of exponents;

use ratios, proportions, and percents to solve problems;

demonstrate an understanding of linear equations and functions;

demonstrate an understanding of right triangles and their properties;

demonstrate an understanding of the real number system;

demonstrate an understanding of geometrical figures;

demonstrate an ability to interpret graphs, charts, and plots; and

recognize and simplify polynomials

**Performance Indicators**

First Quarter

Students will be able to:

use powers to describe repeated multiplication;

use order of operations to evaluate expressions;

compare and order integers;

add, subtract, multiply, and divide integers;

find mean, median, mode and range;

identify and plot points in a coordinate plane;

name and use the commutative and associative properties of addition and multiplication;

simplify variable expressions;

solve equations with variables;

solve equations with addition, subtraction, multiplication and division;

solve equations with decimals;

solve two-step equations;

solve equations with variables on both sides;

solve inequalities with addition, subtraction, multiplication and division; and

solve multi-step inequalities.

Second Quarter

Students will be able to:

write the prime factorization of numbers;

find the greatest common factor of two or more whole numbers;

write equivalent fractions;

find the least common multiple of two numbers;

rewrite fractions using positive and negative exponents;

use properties of powers (exponents);

write numbers using scientific notation;

order numbers using scientific notation;

write fractions as decimals and decimals as fractions;

add and subtract like fractions;

add and subtract unlike fractions;

multiply and divide fractions and mixed numbers;

use the multiplicative inverse to solve equations;

use the LCD to solve equations;

find ratios and unit rates;

write and solve proportions;

solve proportions using cross products;

identify similar and congruent figures;

find unknown side lengths of similar figures;

use proportions with scale drawings;

find probabilities; and

find probabilities using the Counting Principle.

Third Quarter

Students will be able to:

use fractions to find percents;

use proportions to solve percent problems;

use decimals to solve percent problems;

use equations to solve percent problems;

find a percent of change in a quantity;

find mark-ups, discounts, sales tax and tips;

calculate simple and compound interest;

use graphs to represent relations and functions;

find solutions of equations in two variables;

use x- and y-intercepts to graph linear equations;

find and interpret slopes of lines;

graph linear equations in slope-intercept form;

write linear equations;

use function notation;

graph and solve systems of linear equations;

graph inequalities in two variables;

find and approximate square roots of numbers;

simplify radical expressions;

use the Pythagorean theorem to solve problems;

compare and order real numbers;

use the distance, midpoint, and slope formulas;

use special right triangles to solve problems; and

use sine, cosine, and tangent to find triangle side lengths.

Fourth Quarter

Students will be able to:

solve problems involving triangles;

classify polygons and quadrilaterals;

find areas of trapezoids and parallelograms;

find circumferences and areas of circles;

find the surface areas of prisms, cylinders, pyramids and cones;

find volumes of prisms, cylinders, pyramids and cones;

construct stem and leaf plots and histograms;

make and interpret box-and-whisker plots;

choose appropriate data displays;

identify populations and sampling methods;

make conclusions about populations using surveys;

use permutations to count possibilities;

use combinations to count possibilities;

find probabilities of disjoint and overlapping events;

find probabilities of independent and dependent events;

classify and write polynomials in standard form;

add and subtract polynomials;

multiply monomials and polynomials;

multiply binomials;

simplify powers of products and quotients;

graph quadratic functions;

graph exponential functions;

identify and formulate sequences;

classify special pairs of angles;

identify angles when a transversal intersects lines;

find measures of interior and exterior angles;

translate figures in a coordinate plane;

reflect figures and identify lines of symmetry; and

rotate figures and identify rotational symmetry.

**Assessments**

First Quarter

Daily homework

Chapter Tests

Quizzes

Second Quarter

Daily Homework

Chapter Tests

Quizzes

Semester One Exam

Third Quarter

Daily Homework

Chapter Tests

Quizzes

Fourth Quarter

Daily Homework

Chapter Tests

Quizzes

Semester Two Exam

**Core Topics**

First Quarter

Review variables, expressions, and integers

Solving equations and properties of real numbers

Solving multi-step equations and inequalities

Second Quarter

Factors, fractions and exponents

Rational numbers and equations

Ratio, probability and proportion

Third Quarter

Percents

Linear functions

Real numbers and right triangles

Fourth Quarter

Measurement, area and volume

Data analysis and probability

Polynomial and nonlinear functions

Angle relationships and transformations

**Specific Content**

First Quarter

Expressions and variables

Powers and exponents

Order of operations

Comparing and ordering integers

Adding integers

Subtracting integers

Mean, median, mode and range

Multiplying and dividing integers

The coordinate plane

Properties and operations

The distributive property

Simplifying variable expressions

Variables and equations

Solving equations with addition, subtraction, multiplication and division

Solving two-step equations

Solving equations having like terms and parentheses

Solving equations with variables on both sides

Solving inequalities with addition and subtraction

Solving inequalities using multiplication and division

Solving multi-step inequalities

Second Quarter

Factors and prime factorization

Greatest common factor

Equivalent fractions

Least common multiple

Rules of exponents

Negative and zero exponents

Scientific notation

Rational numbers

Adding and subtracting like fractions

Adding and subtracting unlike fractions

Multiplying fractions

Dividing fractions

Using multiplicative inverses to solve equations

Equations and inequalities with rational numbers

Ratios and rates

Writing and solving proportions

Solving proportions using cross products

Similar and congruent figures

Similarity and measurement

Scale drawings

Probability and odds

The counting principle

Third Quarter

Percents and fractions

Percents and proportions

Percents and decimals

The percent equation

Percent of change

Percent applications

Simple and compound interest

Relations and functions

Linear equations in two variables

Using intercepts

Slope of a line

Slope-intercept form

Writing linear equations

Function notation

Systems of linear equations

Graphs of linear inequalities

Square roots

Simplifying square roots

The Pythagorean theorem

Real numbers

The distance and midpoint formulas

Special right triangles

The tangent ratio

The sine and cosine ratios

Fourth Quarter

Triangles

Polygons and quadrilaterals

Areas of parallelograms and trapezoids

Circumference and area of a circle

Surface areas of prisms, cylinders, pyramids and cones

Volumes of prisms, cylinders, pyramids and cones

Stem and Leaf plots

Histograms

Box-and-whisker plots

Using Data displays

Collecting Data

Interpreting Data

Permutations

Combinations

Probabilities of disjoint and overlapping events

Independent and dependent events

Polynomials

Adding and subtracting polynomials

Multiplying monomial and polynomials

Multiplying binomials

Other rules of exponents

Quadratic functions

Exponential growth and decay

Sequences

Angle relationships

Angles and parallel lines

Angles and polygons

Translations

Reflections and symmetry

Rotations and symmetry

**Resources**

Textbook: *Pre-Algebra*  by Larson,Boswell, Kanold, and Stiff published by McDougal Littell

*Punchline - Bridge to Algebra* - Steve Marcy and Janis Marcy

*Pizzazz worksheets* – Steve Marcy and Janis Marcy

Resource worksheets

Scientific calculator