

**CANON CITY HIGH SCHOOL
COURSE GUIDE**

Department: Math

Course Title: Proficiency Math

Date: Fall 2003

Grade Level: 12th

Prerequisite/Requirements: 2 math credits
Math teacher recommendation

Costs to Students: Scientific calculator, 3 ring binder, paper, pencils

Course Description:

This course is available to students who need preparation to meet Colorado Math Standards. Topics to be covered in the course will include: problem solving, number sense and computation skills, technology, measurement systems, Geometry, mathematical language and symbolism, Algebraic methods, and statistics.

General Course Outcomes:

Upon completion of this course the proficient student will know and be able to: (core concepts/essential skills).

- 1) Problem Solving – Students will be able to choose an efficient method to solve real world problems using given facts, estimation, and calculation skills.
- 2) Number Sense and Computation Skills – Students will be able to calculate (add, subtract, multiply, divide) with real numbers (positive and negative: integers, fractions, and decimals). Solving ratio, proportion, and percent problems is included.
- 3) Technology – Students will be able to solve problems using ruler, meter/yard stick, protractor, compass, calculator, and computer.
- 4) Measurement Systems – Students will be able to use measurement systems (U.S. customary and metric) to solve problems involving: length, weight, capacity,

- temperature, and time. Techniques of algebra, geometry, and simple trigonometry are included.
- 5) Geometry – Students will be able to solve problems using congruent and similar figures, lines of symmetry, area, perimeter, and volume. Both 2- and 3-dimensional sketches are included. Students will be able to plot points and graph equations on the coordinate plane.
 - 6) Mathematical Language and Symbolism – Students will be able to express mathematical ideas orally and in writing using symbolism, terminology, and math properties. They should be able to interpret, translate, and make valid decisions from written mathematical materials.
 - 7) Algebraic Methods – Students will show competency in fundamental algebra skills: using transformations to solve equations and inequalities, using variables and equations to model real life situations, and applying appropriate formulas.
 - 8) Statistics – Students will be able to demonstrate understanding of statistical methods by: using random sampling in data collection, making and testing predictions, solving application problems using combinations and permutations.

Standards:

List State Standards addressed in this course. (Identify the course outcomes that support those standards.)

Standard 1: Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Demonstrating meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations;
- Developing, testing, and explaining conjectures about properties of number systems and sets of numbers; and
- Using number sense to estimate and justify the reasonableness of solutions to problems involving real numbers.

Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicates the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Modeling real-world phenomena using functions, equations, inequalities, and matrices;
- Representing functional relationships using written explanations, tables, equations, and graphs, and describing the connections among these representations;
- Solving problems involving functional relationships using computers as well as appropriate paper-and-pencil techniques;
- Analyzing and explaining the behaviors, transformations, and general properties of types of equations and functions; and
- Interpreting algebraic equations and inequalities geometrically and describing geometric relationships algebraically.

Standard 3: Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Designing and conducting a statistical experiment to study a problem, and interpreting and communicating the results using the appropriate technology;
- Analyzing statistical claims for erroneous conclusions or distortions;
- Fitting curves to scatter plots, using informal methods or appropriate technology, to determine the strength of the relationship between two data sets and to make predictions;
- Drawing conclusions about distributions of data based on analysis of statistical summaries;
- Using experimental and theoretical probability to represent and solve problems involving uncertainty; and
- Solving real-world problems with informal use of combinations and permutations.

Standard 4: Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Finding and analyzing relationships among geometric figures using transformations in coordinate systems;
- Deriving and using methods to measure perimeter, area, and volume of regular and irregular geometric figures;
- Making and testing conjectures about geometric shapes and their properties, incorporating technology where appropriate; and
- Using trigonometric ratios in problem-solving situations.

Standard 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Measuring quantities indirectly using techniques of algebra, geometry, or trigonometry;
- Selecting and using appropriate techniques and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error of measurements; and
- Determining the degree of accuracy of a measurement.

Standard 6: Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

What the students will know or be able to do includes:

- Using ratios, proportions, and percents in problem-solving situations;
- Selecting and using appropriate methods for computing with real numbers in problem-solving situations from among mental arithmetic, estimation, paper-and-pencil calculator, and computer methods, and determining whether the results are reasonable; and

- Describing the limitations of estimation, and assessing the amount of error resulting from estimation within acceptable limits.

Required Unit of Study:

Themes within the course/Specific concepts being targeted

- Grids and Spreadsheets
- Graphing Data
- Analyzing Data
- Communicating Through Signed Numbers
- Communicating with Expressions
- Identifying Designs
- Transformations
- Finding Patterns
- Using Variables
- Solving Equations
- Spatial Relations
- Nets, Surface Area, and Volume
- Using Ratios to Compare
- Similarity and Scaling
- Intro to Trigonometry
- Probability
- Counting and Probability
- Dependent Relationships
- Linear Functions
- Functions with Curved Graphs

Unit Modifications/Enrichments:

Assistance to students having difficulty and/or special needs

- Provide extra time for assignments/test, as needed
- Assistance with reading comprehension
- Preferential seating
- Teacher – assisted tutoring, before/after school, as requested
- Pass/fail grade

Additional experiences for students capable of advanced work (cooperative learning, adaptive materials, re-teaching, second chance, etc.

- Cooperative/small group learning
- Teacher/student designed, text-based, self-pacing program
- Advanced problems and/or additional assignments

Materials/Resources:

Textbook (CORE and Supplemental) (Publisher, Edition, Year Adopted)

Foundations of Algebra and Geometry, Addison-Wesley, 1999

Media materials used

Technology needs

- Scientific Calculator

Other resource (guest speaker, field trips)

Assessment Program

- **Tests and Quizzes, Homework**
 - daily homework assignments are given: 30-60 minutes in length
 - in class quizzes prepared by instructor
- **Notebooks**
 - students are required to keep an organized notebook with daily notes, assignments and any assigned class projects
- **Authentic production**
- **Proficiency Test Requirement**

Instructional time:

Problem Solving
Number Sense and Computation Skills
Technology
Measurement Systems
Geometry
Mathematical Language and Symbolism
Algebraic
Statistics

One to three weeks per unit