

DARIEN PUBLIC SCHOOLS

CURRICULUM GUIDE

Applied Mathematics 2

APPROVED: October 14, 2003

DARIEN PUBLIC SCHOOLS

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SECTION I - Course Information

STATEMENT OF PHILOSOPHY

H.S. MATHEMATICS DEPARTMENT PHILOSOPHY

We believe in creating learning environments where students practice and acquire the knowledge of mathematics. We believe that students should be able to proficiently apply a range of numerical, algebraic, geometric, and statistical concepts and the skills to formulate, analyze, and solve real world problems. The learning environment will facilitate inquiry, use of technology and the exploration of real world phenomena. It will support continuous development of mathematical skills and the appreciation of mathematics as a discipline. Our mathematics program seeks to graduate students who will possess a sense of numbers, data analysis, spatial relationships, symbolic representations, and the ability to communicate mathematics with others.

DISTRICT MATHEMATICS PHILOSOPHY

Mathematics is a vigorous and growing discipline – a universal language useful for communication and research in other disciplines. We want our students to reason and communicate mathematically, to be mathematical problem-solvers, to value mathematics and to feel confident in their ability to use mathematics. Creating such a foundation necessitates a well-articulated and developmentally appropriate mathematics program for all, developing the mathematical power of each.

Mathematics is more than a collection of concepts and skills to be mastered. It is the exploration of ideas and concepts, the understanding of relationships, the ability to make predictions, to analyze data, to estimate results, to communicate ideas and to solve problems in this ever-changing world. It is no longer limited to the study of complex calculations and formulas. We are moving from a curriculum often dominated by memorization of isolated facts and procedures to one that emphasizes conceptual understandings, multiple representations, deliberate connections and mathematical problem solving. Rather than being a transmitter of knowledge, the teacher becomes a

facilitator of learning, guiding, questioning, listening, clarifying and creating an environment in which the student is an active participant in learning.

The needs of today's society demand that all students become mathematically literate to function effectively. It will be necessary for our students to be able to use mathematics in their personal lives, further studies and future workplaces. As educators, we must recognize that students have differing abilities, performance levels, needs and interests and provide them with the best mathematics education possible so that they may achieve their personal ambitions and career goals.

Too often, students have learned to compute without understanding why the computation procedures make sense or how they apply to their lives. Instruction must focus on the behaviors that contribute to the development of mathematical thinking and number sense – explaining procedures used, justifying reasoning, judging the reasonableness of solutions and reflecting on the application of concepts.

When students gain knowledge from meaningful experiences, they are much more likely to retain and use what they have learned. Sound practice in the teaching of mathematics means that students are guided to use concrete materials and explore ideas with classmates. In this way, knowledge evolves from personal experience.

The fundamental objective of education has always been to prepare students to be contributing members of the society in which they live. The objectives of this mathematics curriculum support and affirm this tradition.

PROGRAM GOALS

- Extend skills in the fundamentals of whole number arithmetic
- Develop strategies for problem solving
- Refine skills in computation with fractions and decimals
- Attain proficiency in solving basic algebraic equations
- Identify when the use of mathematical computations is appropriate in real world applications
- Extract relevant information from graphs and charts
- Analyze and draw conclusions from data, surveys, and simulations
- Understand basic algebraic concepts
- Develop familiarity with calculator functions and specific computer programs
- Develop map reading skills

OVERVIEW

Applied Math 2 is designed to reinforce and build upon the concepts taught in Applied Math 1. Topics taught in Applied Math 1 are reviewed, and re-taught when necessary, as well studied in greater depth. Students are encouraged to use prior knowledge to assist in solving problems. A strong emphasis is put on working together in groups and participation plays an important role in the assessment of students. As in Applied Math I, students are shown the correlation between the course work and the real world. Students are encouraged to provide examples of when and where certain mathematical processes are needed. A major goal of the course is to increase the students' proficiency as well as their confidence in their math skills. Technology plays a large role in the course as students are trained on the calculator and appropriate computer software.

A prerequisite of this course is a passing grade in Applied Math 1. Students who successfully complete this course generally take Applied Math 3, though a student who excels in the course may be eligible to take Algebra I – 200. The course will help prepare students for the rigors of traditional math courses with an emphasis on note taking, group work, homework, and test taking.

ESSENTIAL QUESTIONS

- 1) Can the students compute, both alone and within the context of an algebraic equation, with whole numbers and numbers in fractional or decimal form?
- 2) Can students develop and implement a strategy for solving a given problem?
- 3) Given a set of data, graph or chart, can the students interpret and withdraw relevant information, as well as draw or create a graph or table to represent data?
- 4) Can students take, understand, and compare measurements in different areas using different units?
- 5) Do the students understand how mathematical processes relate to their lives outside of the classroom?

K-12 Essential Questions

- How does math help us to make sense of our world?
- How does math help us to understand real-world phenomena, make decisions and meet challenges?
- What are the natural and cultural patterns around us?
- How does math, as a universal language, empower us and help us to communicate?

PROCESS SKILLS

- Reading (Comprehending)
- Reading (Analyzing)
- Reading (Appreciating)
- Writing mathematical equations
- Listening
- Viewing
- Studying
- Reasoning and Reflecting
- Using Learning Resources, manipulatives, Technology
- Working Independently and Collaboratively
- Designing
- Creating
- Quantifying
- Understanding Number Operations
- Compute
- Problem Solving
- Graphing
- Applying Probability and Statistics
- Applying Scientific Method

STUDENT PERFORMANCE SUMMARY

- Calculator competency assessment
- Cooperative learning
- Computer based lab work
- Practical and Theoretical Applications
- Preparation for Standardized Tests
- Projects linked to real-life data
- Property design project
- Tests and Quizzes
- Homework
- Class Participation

GRADING GUIDELINES

	<u>Expectations of Students</u>	<u>% of Report Card Grade</u>
Homework	100% of all assignments	0 -10%
Notebook	All notes maintained	
Tests	All tests taken/made up	25 - 50%
Quizzes	All quizzes taken/made up	30 – 40%
Mid-Year Exam		20% of semester grade
Final Exam		20% of semester grade
Projects		0 – 20%
Class Participation		10 – 15%

SECTION II – Units of Study

SUMMARY OF UNITS

Unit Title	Duration (weeks)
UNIT 1: ADDITION, SUBTRACTION, MULTIPLICATION, & DIVISION	1-2
UNIT 2: OPERATIONS WITH DECIMALS	2-3
UNIT 3: NUMBER THEORY	3-4
UNIT 4: OPERATIONS WITH FRACTIONS	2-3
UNIT 5: INTEGERS	2-3
UNIT 6: ORDERED PAIRS AND GRAPHING	3-4
UNIT 7: RATIONAL NUMBERS, PROPORTIONS, AND PERCENTS	3-4
UNIT 8: GEOMETRY	3-4
UNIT 9: SQUARES & SQUARE ROOTS	3-4

UNIT 1: ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION

- 1) Can the student perform all operations in the context of an algebraic equation?
- 2) Can the student apply all properties of addition, subtraction, multiplication & division?
- 3) Can the student use the order of operations to successfully simplify an expression?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content:

1. Properties of addition, subtraction, multiplication & division
2. Evaluating expressions
3. Order of operations
4. Distributive property
5. Formulas
6. Problem solving

Skills:

1. Replace a variable in an open sentence so that a true sentence results
2. Demonstrate an understanding of the properties of addition
3. Demonstrate an understanding of the relationship between addition and subtraction
4. Understand and apply the properties of equality
5. Demonstrate an understanding of the properties of multiplication
6. Simplify an expression using the order of operations
7. Understand and apply the distributive property

VOCABULARY

Open sentence, commutative property, associative property, additive identity, substitution property, reflexive property, symmetric property, transitive property, multiplicative identity, order of operations, distributive property

ACTIVITIES

- Computer program to perform order of operations
- Calculator uses project

PERFORMANCE ASSESSMENT

Tests, Quizzes, Homework, Notebook review

CAREER AWARENESS (where appropriate)

Computer programmer

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Computer programming

UNIT 2: COMPUTATION AND ESTIMATION

1. Can the student add, subtract, multiply and divide whole numbers and/or decimals with whole numbers and/or decimals?
 2. Can the student develop, analyze, and explain procedures for estimation?
 3. Can the student solve an algebraic equation involving decimals?
 4. Can the student round decimals to an appropriate place?
 5. Can the student solve word problems including decimals?
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1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content:

1. Place value and metric prefixes
2. Comparing decimals
3. Rounding
4. Multiplying and dividing by 10, 100, 1000, etc.
5. Estimation
6. Problem solving

Skills:

1. Understand value of each place value in decimal
2. Round numbers to an indicated place value
3. Determine reasonableness of place value for given answer
4. Multiply and divide by multiples of 10 by moving decimal place
5. Add and subtract decimals by aligning decimal points
6. Multiplying divisor and dividend in a division problem to convert to whole numbers

VOCABULARY

Place value, expanded notation, metric prefixes, rounding numbers, estimation

ACTIVITIES

Heat cost project

PERFORMANCE ASSESSMENT

Tests, quizzes, homework, special projects
See page 10 for additional performance assessments

CAREER AWARENESS (where appropriate)

Researcher

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Calculator exercises

UNIT 3: NUMBER THEORY

1. Can the student identify a number as factorable or prime and, if possible, identify the factors?
2. Can the student use divisibility tests to help identify a number as factorable?
3. Can the student simplify an expression involving a base with an exponent?
4. Can the student identify the greatest common factor between two or more numbers?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Factors
2. Divisibility tests
3. Prime and composite numbers
4. Powers and exponents
5. Multiples

Skills

1. Factor all numbers
2. Conduct the divisibility tests on a given number
3. Identify a number as prime or composite
4. Simplify powers
5. Find the prime factorization of a number
6. Solve problems that require factoring of numbers
7. Identify the greatest common factor among two or more numbers
8. Identify the least common multiple among two or more numbers

VOCABULARY

Factor, prime number, composite number, powers, base, exponent, prime factorization, greatest common factor, multiples, least common multiple

ACTIVITIES

Construction inventory project

PERFORMANCE ASSESSMENT

Tests, Quizzes, Homework, Special projects
See page 10 for additional performance assessments

CAREER AWARENESS (where appropriate)

Operations research

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

TI-83
Computer Lab

UNIT 4: OPERATIONS WITH FRACTIONS

1. Can the student perform indicated operations involving fractions?
2. Can the student transform a fraction to simplest form, and or change the denominator of the fraction?
3. Can the student use fractions in the context of real world problems?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content:

1. Fractions and mixed numerals
2. Addition and subtraction with like and unlike denominators
3. Multiplication and division of fractions
4. Converting with decimals

Skills:

1. Simplify fractions
2. Change from improper fraction to mixed numeral and vice-versa
3. Adding and subtracting fractions and mixed numerals, obtaining a common denominator when necessary
4. Multiply and divide fractions
5. Solving problems involving decimals
6. Converting decimals into fractions and fractions into decimals

VOCABULARY

Numerator, denominator, simplest form, mixed numeral, equivalent fractions, multiplicative inverses, terminating decimals, repeating decimals

ACTIVITIES

Recipe conversion project
Comparing fractions computer program

PERFORMANCE ASSESSMENT

Tests, Quizzes, homework, special projects
See page 10 for additional performance assessments

CAREER AWARENESS (where appropriate)

Chef

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

TI-83 calculator
Computer lab

UNIT 5: INTEGERS

1. Can the student understand the concept of negative numbers?
2. Can the student convert subtraction problems to those using addition?
3. Can the student perform all operations involving negative numbers?
4. Can the student solve an equation containing variables on both sides of the equal sign?
5. Can the student solve inequalities?

STANDARDS

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

8. Patterns Students will discover, analyze, describe, extend and create patterns, and use patterns to describe mathematical and other real-world phenomena.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content:

1. Addition and subtraction of positive and negative integers
2. Multiplication and division with integers
3. Solving equations using a variety of operations
4. Inequalities
5. Solving problems with rational numbers
6. Solving problems with inequalities

Skills:

1. Add, subtract, multiply and divide with positive and negative numbers
2. Evaluating expressions involving positive and negative integers
3. Solve a linear equation using algebraic methods
4. Solve an inequality using more than one operation

VOCABULARY

Integer, opposite, absolute value, additive inverses, inequality

ACTIVITIES

Ocean salt content project

PERFORMANCE ASSESSMENT

Tests, Quizzes, homework, special projects
See page 10 for additional performance assessments

CAREER AWARENESS (where appropriate)

Commercial underwriter

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Computer lab
TI-83 Temperature probe
Graphing software

UNIT 6: ORDERED PAIRS AND GRAPHING

1. Can the student identify, and use the properties of a coordinate plane?
2. Can the student describe the properties of points, lines, and planes?
3. Can the student identify the slope of a line and describe its effect on the line?
4. Can the student use a linear equation to graph a straight line?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

5. Measurement Students will make and use measurements in both customary and metric units to approximate, measure and compute length, area, volume, mass, temperature, angle and time.

6. Spatial Relationships and Geometry Students will analyze and use spatial relationships and basic concepts of geometry to construct, draw, describe and compare geometric models and their transformations, and use geometric relationships and patterns to solve problems.

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Number lines and inequalities
2. Ordered pairs
3. The coordinate system
4. Linear equations
5. Graphing
6. Slope and intercepts

Skills

1. Solve equations and inequalities and graph solutions on the number line
2. Plot points or identify the coordinates of points on the coordinate plane
3. Put an equation into slope-intercept form and graph the result
4. Identify the slope of an equation from two points, the equation or the graph
5. Identify the slope of horizontal and vertical lines

VOCABULARY

Point line plane, coordinate, ordered pair, quadrants, coordinate system, x-axis, y-axis, origin, slope, y-intercept, x-intercept

ACTIVITIES

Distance project
Map building project

PERFORMANCE ASSESSMENT

Tests, Quizzes, Homework, Special projects
See page 10 for additional performance assessments

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Geometer's Sketchpad
TI-83 graphing calculator

UNIT 7: RATIONAL NUMBERS, PROPORTIONS, & PERCENTS

1. Can the student use the properties of rational numbers to solve equations?
2. Can the student understand the properties of proportions?
3. Can the student manipulate percents, and rewrite percents to fit a particular problem?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

4. Ratios, Proportions and Percents Students will use ratios, proportions and percents to represent relationships between quantities and measures and solve problems involving ratios, proportions and percents.

CONTENT KNOWLEDGE OBJECTIVES

Content:

1. Solving problems involving rational numbers
2. Ratios
3. Proportions
4. Percents
5. Problem solving with percents

Skills:

1. Solve equations with all types of rational numbers
2. Change fractions to ratios and vice-versa
3. Identify ratios as equal
4. Finding percentages of numbers
5. Solving word problems involving percents

VOCABULARY

Rational number, ratio, proportion, percent, base, rate

ACTIVITIES

Camera-lens group project
Gear ratios project

PERFORMANCE ASSESSMENT

Tests, Quizzes, homework, special projects
See page 10 for additional performance assessments

CAREER AWARENESS (where appropriate)

Tax Accountant

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

TI-83 calculator

UNIT 8: GEOMETRY

1. Can the student identify the characteristics of simple polygons?
2. Can the student identify the relationship of angles when two parallel lines are intersected by a third?
3. Can the student use different units of measurement to compare different figures and values?
4. Can the student obtain the area and volume of different geometric figures?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

5. Measurement Students will make and use measurements in both customary and metric units to approximate, measure and compute length, area, volume, mass, temperature, angle and time.

6. Spatial Relationships and Geometry Students will analyze and use spatial relationships and basic concepts of geometry to construct, draw, describe and compare geometric models and their transformations, and use geometric relationships and patterns to solve problems.

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Introduction to geometry
2. Parallel and perpendicular lines
3. Polygons
4. Congruent triangles
5. Similar triangles
6. Perimeter of polygons
7. Circles and circumference
8. Area
9. Volume

Skills

1. Solve for missing angles and the intersection of a transversal with parallel lines

2. Identify and apply the characteristics of triangles and quadrilaterals
3. Identify whether or not triangles are congruent
4. Identify similar triangles and solve for missing pieces
5. Find the perimeter of a polygon or circle
6. Calculate the area of rectangles, triangles, parallelograms, trapezoids and circles
7. Find the volume of prisms, cylinders, pyramids and cones

VOCABULARY

Ray, angle, vertex, degree, acute, right, obtuse, congruent, parallel, vertical angles, perpendicular, polygon, quadrilateral, equilateral, isosceles, scalene, similar, perimeter, radius, diameter, semicircle, area, base, prism, cylinder, cone

ACTIVITIES

Constructing geometric figures using compass, ruler, and protractor

PERFORMANCE ASSESSMENT

Tests, Quizzes, Homework, Special projects
See page 10 for additional performance assessments

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Geometers sketchpad
Interactive whiteboard

UNIT 9: SQUARES & SQUARE ROOTS

1. Can the student solve an equation involving the squaring or square root of a variable?
2. Can the student simplify a radical and identify an irrational number?
3. Can the student manipulate formulas involving square roots to solve for particular parts of a triangle?
4. Can the student identify when a square root is or is not a real number?

STANDARDS

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Square Roots
2. The Pythagorean Theorem
3. Heron's Formula
4. Graphing Irrational Numbers
5. Problem Solving with Square Roots

Skills

1. Solving equations where variable is squared
2. Writing in simplest radical form
3. Using the Pythagorean theorem to find the hypotenuse or leg of a right triangle
4. Using Heron's formula to find the area of a triangle
5. Graphing irrational numbers on the number line

VOCABULARY

Square, square root, irrational number, semiperimeter, real number

ACTIVITIES

Pythagorean Theorem to find pieces of right triangles within school

PERFORMANCE ASSESSMENT

Tests, Quizzes, Homework, Special projects
See page 10 for additional performance assessments

CORE TEXT FOR STUDENTS

N/A

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Geometers sketchpad
Interactive whiteboard

SECTION III - Goals and Standards

RELATED GOALS and STANDARDS

Connecticut Content Standards

1. Number Sense Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information.

2. Operations Students will add, subtract, multiply and divide with whole numbers, fractions, decimals and integers, and develop strategies for selecting the appropriate computational and operational methods for solving problems.

3. Estimation and Approximation Students will make estimates and approximations, and judge the reasonableness of results.

4. Ratios, Proportions and Percents Students will use ratios, proportions and percents to represent relationships between quantities and measures and solve problems involving ratios, proportions and percents.

5. Measurement Students will make and use measurements in both customary and metric units to approximate, measure and compute length, area, volume, mass, temperature, angle and time.

6. Spatial Relationships and Geometry Students will analyze and use spatial relationships and basic concepts of geometry to construct, draw, describe and compare geometric models and their transformations, and use geometric relationships and patterns to solve problems.

7. Probability and Statistics Students will use basic concepts of probability and statistics to collect, organize, display and analyze data, simulate events and test hypotheses.

8. Patterns Students will discover, analyze, describe, extend and create patterns, and use patterns to describe mathematical and other real-world phenomena.

9. Algebra and Functions Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

10. Discrete Mathematics Students will use the concepts and processes of discrete mathematics to analyze and model a variety of real-world situations that involve recurring relationships, sequences, networks, combinations and permutations.

NCTM Standards

1. Number & Operations

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
- Understand meanings of operations and how they relate to one another
- Compute fluently and make reasonable estimates

2. Algebra

- Understand patterns, relations, and functions
- Represent and analyze mathematical situations and structures using algebraic symbols
- Use mathematical models to represent and understand quantitative relationships
- Analyze change in various contexts

3. Geometry

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships
- Specify locations and describe spatial relationships using coordinate geometry and other representational systems
- Apply transformations and use symmetry to analyze mathematical situations
- Use visualization, spatial reasoning, and geometric modeling to solve problems

4. Measurement

- Understand measurable attributes of objects and the units, systems, and processes of measurement
- Apply appropriate techniques, tools, and formulas to determine measurements

5. Data Analysis & Probability

- Understand and apply basic concepts of probability

6. Problem Solving

- build new mathematical knowledge through problem solving;

- solve problems that arise in mathematics and in other contexts;
- apply and adapt a variety of appropriate strategies to solve problems;
- monitor and reflect on the process of mathematical problem solving

7. Reasoning & Proof

- recognize reasoning and proof as fundamental aspects of mathematics;
- make and investigate mathematical conjectures;
- develop and evaluate mathematical arguments and proofs;
- select and use various types of reasoning and methods of proof

8. Communication

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely

9. Connections

- recognize and use connections among mathematical ideas;
- understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
- recognize and apply mathematics in contexts outside of mathematics.

10. Representation

- create and use representations to organize, record, and communicate mathematical ideas;
- select, apply, and translate among mathematical representations to solve problems;
- use representations to model and interpret physical, social, and mathematical phenomena

SECTION IV – Learning Resources

SUPPLEMENTAL RESOURCES (Most located in math department closet)

Text books

- Pre-Algebra, Phares G. O’Daffer, Addison-Wesley
- Pre-Algebra, Price, Rath, Leschensky, Merrill
- Math Competencies for Everyday Living, Powell & Hartley Scott, South-Western

Websites

- www.nctm.org
- www.learner.org/exhibits/dailymath
- www.math.temple.edu/~paulos
- www.mathforum.org
- www.maa.org
- www.mathematicallycorrect.com
- www.personal.cfw.com/~clayford
- www.math.com
- www.math.uah.edu/psol
- www.nilesonline.com/stats
- www.mathmistakes.com
- www.innumeracy.com
- www.techlar.com/fractals
- www.superstringtheory.com

Other Resources

- TTL/C-5 Computer Lab
- Microsoft Excel
- TI-83 graphing calculator
- World Almanac
- Media center
- Winplot
- LiveMath
- Access
- Interactive Whiteboard
- Geometers Sketchpad

- Internet
- Probability Manipulatives (Playing cards, dice, etc.)