

# **DARIEN PUBLIC SCHOOLS**

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## **CURRICULUM GUIDE**

### **Applied Mathematics 1**

APPROVED: October 14, 2003

# **DARIEN PUBLIC SCHOOLS**

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## **CURRICULUM GUIDE AUTHORS**

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Michael Sullivan\*, Dan Haron, Shirley Taylor, Ann Hannon, Susan Wood, Tom Jockers, Mike O'Brien, Marcia Kasony, Patrick Dooley, Felicia Bellows, Bonita Messman, Kathy Kenny, Steven Brooks

\* Main author

## **DATES**

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Board of Education Approval: October 14, 2003

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# **SECTION I - Course Information**

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## **STATEMENT OF PHILOSOPHY**

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### **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

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- Extend skills in the fundamentals of whole number arithmetic
- Introduce and develop strategies for problem solving
- Develop skills in computation with fractions and decimals
- Convert fractions to decimals and decimals to fractions
- Identify when the use of mathematical computations is appropriate in real world applications
- Extract relevant information from graphs and charts
- Understand basic algebraic concepts
- Develop familiarity with calculator functions and specific computer programs
- Develop map reading skills

## **OVERVIEW**

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This course is designed to offer a foundation in computational skills and an understanding for when to apply those skills in a real-world context. The course will give the students a sense of confidence in their abilities where it may have been previously lacking. The course will review the process for computing with numbers, both whole and fractional, and provide examples of when such skills will be necessary outside of the classroom. Students will then be introduced to idea of identifying patterns in groups of data and establishing an equation to represent such data. This will provide students with an introduction to basic algebraic concepts. Finally students will be shown the correlation of some simple topics in geometry and their lives outside of the classroom.

This class is designed for the student who enters high school without the basic mathematical skills necessary to begin the study of algebra. This course and the subsequent courses, Applied Math II and Applied Math III, will provide the student with those skills. This course will also prepare students for the rigor of a traditional math course with an emphasis on organized note taking, group work, and homework and projects done outside of the classroom. This course is a 200 level course closed to any student who has successfully completed Algebra I.

## **ESSENTIAL QUESTIONS**

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- 1) Can the students compute 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?
- 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**

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- 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**

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- 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**

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	<b><u>Expectations of Students</u></b>	<b><u>% of Report Card Grade</u></b>
Homework	100% of all assignments	0 -10%
Notebook	All notes maintained	
Tests	All tests taken/made up	45 – 60%
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		0 – 5%

## **SECTION II – Units of Study**

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### **SUMMARY OF UNITS**

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Unit Title	Duration (weeks)
UNIT 1: NUMBER SENSE AND RELATIONSHIPS	3-4
UNIT 2: COMPUTATION AND ESTIMATION	3-4
UNIT 3: NUMBER THEORY	3-4
UNIT 4: PATTERNS AND FUNCTIONS	3-4
UNIT 5: INTRODUCTION TO ALGEBRA	3-4
UNIT 6: INTRODUCTION TO GEOMETRY	3-4
UNIT 7: MEASUREMENT	3-4
UNIT 8: PROBABILITY	3-4

## UNIT 1: NUMBER SENSE AND RELATIONSHIPS

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- 1) Can the student understand, represent, and use equivalent forms of numbers?
- 2) Can the student understand and apply ratios proportions and percents?
- 3) Can the student investigate and describe the relationship among fractions decimals and percents?

### STANDARDS

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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.

**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

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#### Content:

1. Place values
2. Fractional, decimal, and percent equivalencies
3. Number sentences
4. Ratio and proportion
5. Inequalities
6. Negative numbers

#### Skills:

1. Identify and use place values through billions
  2. Demonstrate an understanding of positive exponents
  3. Identify, describe and apply fractional, decimal and percent equivalencies
  4. Understand and apply negative numbers
  5. Understand and apply ratio and proportion to solve problems
  6. Compare integers, decimals, and fractions using number sentences with  $>$ ,  $<$ ,  $=$
  7. Use a calculator to compare integers, fractions and decimals
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## **VOCABULARY**

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Integer, Whole number, Decimal, Decimal place, Fraction, Equivalent, Exponent, Place value, Equation, Inequality, Ratio, Proportion, Percent, Less-than, Greater-than, Rational number

## **ACTIVITIES**

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- Survey
- Calculator uses project

## **PERFORMANCE ASSESSMENT**

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Tests, Quizzes, Homework, Notebook review

## **CAREER AWARENESS (where appropriate)**

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Accountant, Bookkeeper

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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Introduction to calculator and its functions

## **UNIT 2: COMPUTATION AND ESTIMATION**

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1. Can the student compute with whole numbers, fractions, and decimals?
  2. Can the student develop, analyze, and explain procedures for estimation?
  3. Can the student develop, analyze, and explain procedures for solving proportions?
  4. Can the student select and use the appropriate method for computing?
  5. Can the student estimate and check the reasonableness of results?
- 
- 

**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.

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## **CONTENT KNOWLEDGE OBJECTIVES**

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### **Content:**

1. Computation
2. Estimation
3. Rounding
4. Comparison of results
5. Solve problems
6. Check reasonableness of answers

### **Skills:**

1. Use different processes of computation (mental, oral, written, calculator, etc)
2. Describe multiple strategies for estimating quantities
3. Round whole numbers, decimals, and fractions to the nearest pre-assigned value
4. Use estimation to solve whole number operations & compare with actual results
5. Use ratio and proportion to solve problems
6. Apply number sense and estimation skills to check the reasonableness of computations

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## **VOCABULARY**

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Estimation, algorithm

## **ACTIVITIES**

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1. Fahrenheit / Celsius Test
2. Census project

## **PERFORMANCE ASSESSMENT**

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

## **CAREER AWARENESS (where appropriate)**

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Researcher

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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TI-83 and temperature probes

## UNIT 3: NUMBER THEORY

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1. Can the student understand and explain the need for numbers other than whole numbers?
2. Does the student know and use whole numbers, fractions and decimals?
3. Can the student use operations involving fractions decimals and whole numbers?
4. Can the student create and apply number theory concepts, including prime numbers and multiples?

## STANDARDS

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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.

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

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## CONTENT KNOWLEDGE OBJECTIVES

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### Content

1. Order relation of numbers
2. Order of operations
3. Multiples and factors
4. Prime numbers
5. Periodicity

### Skills

1. Create and solve problems involving fractions and decimals
2. Understand order of equivalence within decimals
3. Write a number between two given numbers
4. Use order of operations including those with parenthesis

5. Use operations involving fractions decimals and whole numbers
6. Understand common multiples, factors, prime and composite numbers
7. Find least common multiple and greatest common factor of whole numbers
8. Understand periodicity of numbers

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## **VOCABULARY**

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PEMDAS, prime number, factor, multiple, periodicity, composite number, base

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## **ACTIVITIES**

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Calculator exploration

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## **PERFORMANCE ASSESSMENT**

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

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## **CAREER AWARENESS (where appropriate)**

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## **CORE TEXT FOR STUDENTS**

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N/A

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## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

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## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

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## **INTEGRATED TECHNOLOGY**

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TI-83  
Computer Lab

## UNIT 4: PATTERNS AND FUNCTIONS

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1. Can the student describe, extend, analyze, and create patterns?
2. Can the student describe and represent relationships with models, tables, graphs, and rules?
3. Can the student use patterns and functions to represent and solve problems?

### STANDARDS

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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.

**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

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#### Content:

1. Patterns of data
2. Models, tables and graphs
3. The number line and coordinate plane
4. Analyzing functional relationships
5. Comparing rates of change

#### Skills:

1. Manipulate various types of graphs, tables and models representing data
2. Plot points on a number line or coordinate plane
3. Obtain, describe, represent, and compare rates of change using graphs and tables
4. Describe the effect of a change in one number on another in a given function

5. Use patterns involving integers and positive rational numbers to solve problems

## **VOCABULARY**

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Function, bar graph, line graph, pie chart, histogram, coordinate plane, number line

## **ACTIVITIES**

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Interest rate comparison project  
Graphing calculator introduction

## **PERFORMANCE ASSESSMENT**

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

## **CAREER AWARENESS (where appropriate)**

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Actuary

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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TI-83 Ranger  
Graphing software

## UNIT 5: INTRODUCTION TO ALGEBRA

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1. Can the student understand the concepts the concept of a variable?
2. Can the student solve linear equations?
3. Can the student construct expressions and equations?

### STANDARDS

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**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

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**Content:**

1. Expressions with variables
2. Algebraic notation
3. Properties of functions
4. Linear equations
5. Inequalities
6. Equations to model problems
7. Methods of solving equations

**Skills:**

1. Use and analyze tables and graphs to identify algebraic relationships
2. Write an algebraic expression to represent a real world scenario
3. Solve a linear equation using algebraic methods
4. Solve a linear equation by trial and error
5. Understand and solve simple inequalities

## **VOCABULARY**

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Inequality, variable, equation, linear function

## **ACTIVITIES**

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Bake sale project  
Computer project

## **PERFORMANCE ASSESSMENT**

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

## **CAREER AWARENESS (where appropriate)**

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Analyst, Weather forecaster

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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Computer lab  
TI-83 Ranger  
Graphing software

## UNIT 6: INTRODUCTION TO GEOMETRY

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1. Can the student identify, describe, compare, and classify geometric figures?
2. Can the student describe the properties of points, lines, and planes?
3. Can the student construct a variety of geometric figures?
4. Can the student compare and create similar figures?

### STANDARDS

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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.

**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.

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### CONTENT KNOWLEDGE OBJECTIVES

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#### Content

1. Basic definitions in geometry
2. Graphing on the coordinate plane
3. Characteristics of triangles
4. Quadrilaterals
5. Other polygons
6. Circles
7. Perimeter and area

## **Skills**

1. Plot points and graph lines on the coordinate plane
2. Classifying triangle based on angles and sides
3. Understanding the characteristics of different quadrilaterals
4. Naming various polygons
5. Determining missing angles
6. Calculate the perimeter and area of a given polygon or circle
7. Understand the relationship of similar polygons

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## **VOCABULARY**

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Plane, parallel, skew, obtuse, acute, right angle, scalene, isosceles, equilateral, diagonal, congruent, radius, diameter, circumference,  $\pi$ , proportion

## **ACTIVITIES**

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Height project with similar triangles  
House/landscape design project

## **PERFORMANCE ASSESSMENT**

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

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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Geometer's Sketchpad

## UNIT 7: MEASUREMENT

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1. Can the student select the appropriate units and tools to measure to the degree of accuracy required in a particular situation?
2. Can the student describe the meaning of and use capacity, density, weight and mass as forms of measurement?
3. Can the student develop and apply formulas and procedures for determining measure to solve problems?

### STANDARDS

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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.

**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

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#### Content:

1. Tools of measurement
2. Units of measurement
3. Rates of measure
4. Measurement in association with area/perimeter

#### Skills:

1. Be familiar with and comfortable with using tools to measure length, weight, temperature, and time
2. Change units of measure to coincide
3. Understand and use maps and scale drawings
4. Use different combinations of units of measure (i.e. mph)

## **VOCABULARY**

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Mass, capacity, meter, gram, liter, Celsius, Fahrenheit, density

## **ACTIVITIES**

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Conversions of measurements  
Weigh-station experiment

## **PERFORMANCE ASSESSMENT**

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

## **CAREER AWARENESS (where appropriate)**

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Surveyor

## **CORE TEXT FOR STUDENTS**

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N/A

## **ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

## **MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

## **INTEGRATED TECHNOLOGY**

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TI-83 temperature probe  
Graphing software  
Interactive blackboard

## UNIT 8: PROBABILITY

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1. Can the student model situations by devising and carrying out experiments or simulations to determine probabilities?
2. Can the student make predictions that are based on experimental or theoretical probabilities?

### STANDARDS

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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.

**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.

### CONTENT KNOWLEDGE OBJECTIVES

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#### Content

1. Experiments
2. Constructing sample spaces
3. Experimental results vs. mathematical expectations
4. Reasonableness of predictions

#### Skills

1. Carry out and discuss results of probability experiment
2. Determine probabilities of real-world situations
3. Determine experimental probability and establish theoretical probability
4. Cite real-world situations and explain how probability is used

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**VOCABULARY**

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Experiment, odds, ratio, simulation, reasonableness, prediction

**ACTIVITIES**

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Categorization of school population

**PERFORMANCE ASSESSMENT**

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

**CORE TEXT FOR STUDENTS**

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N/A

**ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS**

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See Section IV, Learning Resources

**MATERIALS AND SUPPLIES**

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See Section IV, Learning Resources

**INTEGRATED TECHNOLOGY**

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Computer generated simulated experiments

## SECTION III - Goals and Standards

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### RELATED GOALS and STANDARDS

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## 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**

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### **SUPPLEMENTAL RESOURCES (Most located in math department closet)**

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#### **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](http://www.nctm.org)
- [www.learner.org/exhibits/dailymath](http://www.learner.org/exhibits/dailymath)
- [www.math.temple.edu/~paulos](http://www.math.temple.edu/~paulos)
- [www.mathforum.org](http://www.mathforum.org)
- [www.maa.org](http://www.maa.org)
- [www.mathematicallycorrect.com](http://www.mathematicallycorrect.com)
- [www.personal.cfw.com/~clayford](http://www.personal.cfw.com/~clayford)
- [www.math.com](http://www.math.com)
- [www.math.uah.edu/psol](http://www.math.uah.edu/psol)
- [www.nilesonline.com/stats](http://www.nilesonline.com/stats)
- [www.mathmistakes.com](http://www.mathmistakes.com)
- [www.innumeracy.com](http://www.innumeracy.com)
- [www.techlar.com/fractals](http://www.techlar.com/fractals)
- [www.superstringtheory.com](http://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.)