

# **DARIEN PUBLIC SCHOOLS**

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## **CURRICULUM GUIDE**

### **Applied Mathematics 3**

APPROVEC: October 14, 2003

# **DARIEN PUBLIC SCHOOLS**

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## **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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- Continue to improve functional math skills
- Develop strategies for problem solving
- Develop system for solving real world problems
- Create educated and confident consumers
- Identify when the use of mathematical computations is appropriate in real world applications
- Introduce and familiarize students with personal finance
- Analyze and draw conclusions from data, surveys, and simulations
- Understand basic algebraic and geometric concepts
- Develop familiarity with calculator functions and specific computer programs

## **OVERVIEW**

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A continuation of the Applied Math series, Applied Math 3 creates a strong tie between the classroom and the everyday world. Students are taught how to use the calculator to perform a large amount of calculations, develop problem solving skills, the mathematics of personal finance, and comparison-shopping. They are introduced to areas that are typically foreign to them such as the stock market and other investment avenues, commissions, depreciation and income tax returns. A continued emphasis is put on algebraic and geometric topics learned in previous courses.

Applied Math 3 is a 200 level course typically taken by students completing the applied math sequence, though it is open to students who have taken and passed Algebra 1-200 and Geometry-200. The series completes the 3 years of mathematics necessary for graduation, though students typically continue on to take Algebra 1 or Principles of Mathematics.

## **ESSENTIAL QUESTIONS**

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- 1) Can the student compute and solve problems with confidence outside of the classroom?
- 2) Are students comfortable calculating sale prices, interest rates, percentage gains or losses, etc.?
- 3) Can students measure and compare different quantities and use those measurements to draw conclusions?
- 4) Are students informed of different investment and money borrowing opportunities?
- 5) Given a set of data, graph or chart, can the students interpret and withdraw relevant information?

### **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
- 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: THE CALCULATOR AND A REVIEW OF THE BASICS	4-5
UNIT 2: WORD PROBLEMS AND PROBLEM SOLVING	4-5
UNIT 3: COMPARISON SHOPPING	3-4
UNIT 4: TABLES GRAPHS AND AVERAGES	3-4
UNIT 5: MEASUREMENT	3-4
UNIT 6: BANKING	3-4
UNIT 7: GEOMETRIC SHAPES AND CALCULATIONS	2-3
UNIT 8: TIME	3-4

## UNIT 1: THE CALCULATOR AND A REVIEW OF THE BASICS

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- 1) Can the student comfortably use the TI-83 graphing calculator and its functions?
- 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. Basic functions of the calculator
2. Advanced functions of the calculator
3. Rounding
4. Ratio and proportion
5. Percent
6. Negative numbers

#### Skills:

1. Perform all basic functions of the calculator
  2. Store multiple values in calculator memory for future use
  3. Use trig functions to solve problems
  4. Graph functions
  5. Raise powers using math function
  6. Write simple programs to perform various functions
  7. Understand and apply ratio and proportion to solve problems
  8. Apply percent values to numbers
  9. Use a calculator to compare integers, fractions and decimals
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## **VOCABULARY**

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Sine, cosine, tangent, logarithm, function, window, range, domain, intercepts

## **ACTIVITIES**

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- Calculator programming project

## **PERFORMANCE ASSESSMENT**

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Tests, Quizzes, Homework, Notebook review

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

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Accountant

## **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  
Programming

## **UNIT 2: WORD PROBLEMS AND PROBLEM SOLVING**

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1. Can the student read, interpret and solve a word problem?
  2. Can the student develop, analyze, and explain procedures for solving problems?
  3. Can the student substitute a value into a problem to check for accuracy?
  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.

**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.

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## **CONTENT KNOWLEDGE OBJECTIVES**

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### **Content:**

1. Directions and key words
2. Estimation
3. Simplifying the problem
4. Patterns
5. Guess and check
6. Real world word problems

### **Skills:**

1. Use different processes of computation (mental, oral, written, calculator, etc)
2. Describe multiple strategies for estimating quantities
3. Read directions and understand what problem is asking for
4. Use estimation to solve whole number operations & compare with actual results

5. Substitute easier values into problem to solve
6. Apply number sense and estimation skills to check the reasonableness of computations
7. Draw a picture or diagram to help in solving problems

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## **VOCABULARY**

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Key words, substitution, guess and check method, estimation, algorithm

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## **ACTIVITIES**

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CAPT practice exam

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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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Project manager

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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

## UNIT 3: COMPARISON SHOPPING

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1. Can the student obtain an accurate comparison of similar products?
2. Can the student understand secondary costs of larger purchases?
3. Can the student calculate the different costs of buying goods with credit?

### 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. Shopping for groceries
2. Miscellaneous purchases
3. Expenses
4. Buying on credit
5. Depreciation

#### Skills

1. Calculate the unit price of an item
2. Change units of measure for accurate comparison
3. Calculate the cost of convenience products
4. Calculate the cost per serving
5. Read advertisements to ascertain better deal
6. Understand underlying costs of any purchase
7. Calculate the cost of borrowing money to make a purchase

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## **VOCABULARY**

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Unit price, total price, rate of exchange, convenience product, cost per serving, appreciation, depreciation, deductible, escrow, interest rate, principle, balance,

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## **ACTIVITIES**

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Comparison-shopping workbook

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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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Loan officer

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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: TABLES, GRAPHS, AND AVERAGES

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1. Can the student read and interpret tables and graphs?
2. Can the student describe and represent relationships with models, tables, graphs, and rules?
3. Can the student calculate and interpret the mean, median, mode, and range of a set of data?

### 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. Reading tables and graphs
2. Schedules and timetables
3. Making graphs from given information
4. Surveys, tests, and experiments
5. Mean, median, mode, and range

#### Skills:

1. Manipulate various types of graphs, tables and models representing data
2. Compile and organize data into graphs and tables
3. Draw conclusions from results
4. Present data in an accurate and convincing manner

## **VOCABULARY**

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Function, bar graph, line graph, pie graph, histogram, mean, median, mode, range, average, line of best fit

## **ACTIVITIES**

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Student survey  
Graphing calculator 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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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  
Graphing software

## UNIT 5: Measurement

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1. Can the student understand when a variety of different measurements are appropriate?
2. Can the student compare and convert between different units of measure?
3. Can the student physically take measurements of different types?

### 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.

### CONTENT KNOWLEDGE OBJECTIVES

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#### Content:

1. Linear measurement
2. Metric measurement
3. Conversions
4. Other measurements
5. Cooking measurements
6. Temperature
7. Maps & scale drawings

#### Skills:

1. Measure and compare linearly using different tools
2. Convert between metric and standard units of measure
3. Calculate other measurements for objects such as weight, density, etc.
4. Accurately read and convert temperature in Fahrenheit and Celsius scales
5. Understand and use cooking measurements

## **VOCABULARY**

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Mass, density, dry measurement, wet measurement, metric prefixes

## **ACTIVITIES**

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Conversion 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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Cartographer

## **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  
TI-83 Temperature probe

## UNIT 6: BANKING

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1. Can the student identify the advantages and disadvantages of different bank accounts?
2. Can the student calculate interest of a variety of forms?
3. Can the student maintain a checkbook?
4. Can the student understand the difference between a stock and a bond and read listings of a major stock market?

### 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.

**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. Bank accounts
2. Balancing an account
3. Other investment opportunities
4. Reading a statement
5. The stock and bond markets

#### Skills

1. Choose and open an appropriate bank account
2. Maintain and balance a checking account
3. Understand and be familiar with CDs, money market funds, and other investment opportunities
4. Read and understand financial documents

5. Understand the difference, advantages, and disadvantages of stocks, bonds, and mutual funds

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## **VOCABULARY**

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Certificate of deposit, money market fund, reconcile, endorse, stock, bond, mutual fund, dividend, IPO, stock split, interest rate

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## **ACTIVITIES**

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Stock market game  
Checkbook balancing project

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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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## **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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Online stock market game

## UNIT 7: GEOMETRIC SHAPES & CALCULATIONS

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1. Can the student identify the properties and characteristics of common geometric figures?
2. Can the student identify triangles as congruent or similar?
3. Can the student find the perimeter and area of polygons?
4. Can the student find the volume and surface area of prisms, cones, cylinders, etc.?

### 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. Lines, rays, angles, angle measurements
2. Characteristics of polygons and circles
3. Perimeter & Area
4. Volume and surface area

#### Skills:

1. Understand the relationship of complimentary, supplementary, and vertical angles
2. Identify polygons on sight and when given characteristics
3. Determine the area and perimeter of any polygons or circles
4. Find the volume, lateral surface area and total surface area of 3-D shapes

## **VOCABULARY**

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Line, ray, vertex, complimentary, supplementary, vertical, alternate interior, alternate exterior, corresponding, polygon, concave, convex,

## **ACTIVITIES**

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Landscape design 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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Architect

## **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  
Graphing software  
Interactive blackboard

## UNIT 8: TIME

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1. Can the student read, interpret, and create work and transportation schedules?
2. Can the student compute values for work schedules such as hours worked, overtime, etc.?

### 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.

**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. Time intervals
2. Time at a Job
3. Overtime
4. Transportation schedules
5. Time zones

#### Skills

1. Determine the time interval between two distinct events
2. Setup a functional work schedule
3. Calculate pay based upon various work schedules
4. Coordinate travel using different transportation schedules

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**VOCABULARY**

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Interval, conversion, overtime, tie-and-a-half

**ACTIVITIES**

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Transportation coordinator project  
Work schedule managing 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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Microsoft Excel  
Winplot

## 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.)