

DARIEN PUBLIC SCHOOLS

Math 7

Approved by the Board of Education

May 24, 2005

DARIEN PUBLIC SCHOOLS

BOARD OF EDUCATION

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SECTION I - Course Information

STATEMENT OF PHILOSOPHY

MMS MATHEMATICS DEPARTMENT PHILOSOPHY

Middlesex Middle School believes that all students can be successful in mathematics. We believe in providing an environment where mathematics can be learned and appreciated by all students. The mathematics curriculum serves to accommodate developmental differences among students. The learning environment will provide a bridge from simple to more complex math concepts in such a way that is accessible to all students. The curriculum aims to provide stimulating new material while embedding review throughout the program. All courses provide real-world applications, which seek to prepare students for all of their future endeavors.

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.

OVERVIEW

This is a traditional elementary-middle school transition program geared for the needs of most of our students. This course includes a careful study of arithmetic with attention to both the structures of mathematics and computational skills. Among topics studied are the four basic operations with whole numbers, fractions and decimals with applications to percentage, and other type word problems. The other various branches of math (i.e. statistics, probability, and geometry) are also explored.

ESSENTIAL QUESTIONS

For This Course:

- How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?
- How are the base ten number system and fractions, decimals, percents and ratios related?
- How do geometric relationships and measurements help us to solve problems and make sense of our world?
- How can collecting, organizing and displaying data help us analyze information and make reasonable predictions and informed decisions?

K-12 Math Curriculum 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?

Discussion Ideas:

Understand patterns in the world around us
To be able to function in society (ex. understand paychecks)
Deductive reasoning
Intelligent citizenship
Problem-solving skills
Abstract/concrete
Opening the mind to possibilities
Effective communication
Mental math
Understanding practical uses
Technology and math

PROCESS SKILLS

- Reading (Comprehending)
- Reading (Analyzing)
- Reading (Appreciating)
- Writing mathematical equations
- Speaking the language of algebra
- Listening
- Viewing
- Using graphs and tables
- Studying
- Reasoning and Reflecting
- Using Learning Resources and Technology
- Working Independently and Collaboratively
- Performing
- Quantifying
- Understanding Number Operations
- Using and Creating Formulas
- Problem Solving

STUDENT PERFORMANCE SUMMARY

- Demonstration
- Model with Written Explanation and/or Visuals
- Cooperative Learning
- Computer based lab work
- Tests and quizzes
- Preparation for standardized tests
- Homework and class participation
- Practical and theoretical applications

GRADING GUIDELINES

	<u>Expectations of Students</u>	<u>% of Report Card Grade</u>
Homework	100% of all assignments	0 – 15%
Notebook	All notes maintained	0 – 10%
Tests	All tests taken/made up	45 – 60%
Quizzes	All quizzes taken/made up	30 – 40%
Projects		0 – 20%
Class Participation		0 – 5%

SECTION II – Units of Study

SUMMARY OF UNITS

<u>Unit Title</u>	<u>Duration (Weeks)</u>
Unit 1: Problem Solving	Taught as small sections throughout year
Unit 2: Number Relationships and Fractions	3 weeks
Unit 3: Fractions	3 weeks
Unit 4: Integers	3 weeks
Unit 5: Statistics	3 weeks
Unit 6: Ratios and Proportions	3 weeks
Unit 7: Percents and Decimals	3 weeks
Unit 8: Two-Dimensional Geometry	3 weeks
Unit 9: Three-Dimensional Geometry	3 weeks
Unit 10: Algebra with Integers	3 weeks
Unit 11: Probability and Discrete Mathematics	3 weeks
Unit 12: Equations and Functions	2 weeks

UNIT 1: Problem Solving

1. How do patterns and functions help us describe data and solve a variety of real-life problems?
2. Can the student utilize appropriate problem solving strategies when solving real-life problems?

RELATED DARIEN AND CT STANDARDS

Algebraic Reasoning: Patterns and Functions

- Algebraic equations may be used as problem solving tools.

Geometry and Measurement

- Problems involving measurement can be solved through the use of appropriate tools, techniques and strategies.

Working with Data: Probability and Statistics

- Selecting the appropriate visual representation of data is based on the kind of data collected and the purpose for its use.

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Problem solving plan
2. Patterns
3. Drawing a diagram
4. Experiments and simulations
5. Guess, check and revise
6. Writing an equation
7. Logical reasoning

Skills

1. Solve word problems by using a problem solving plan
2. Solve word problems by analyzing patterns
3. Make predictions using mathematical experiments
4. Solve word problems by using guess, check and revise
5. Write equations to represent a problem
6. Use a Venn Diagram to solve a problem
7. Be able to interpret graphs

VOCABULARY

similar, perimeter, area, equation, variable, Venn diagram

ACTIVITIES

Mind Challenge Problem-Solver Days
Problem Solving in the Real World

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Sales, Store displays, Floor tiling, Advertising

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Microsoft Excel

UNIT 2: Number Relationships and Fractions

1. Can the student use the order of operations to simplify number expressions as well as evaluate algebraic expressions?
2. Can the student use basic number theory principles to understand relationships about whole numbers?
3. Can the student locate on a number line and have an understanding of rational numbers?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Computation with positive and negative numbers may be modeled in the context of increasing and decreasing value or changes in measurements

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Order of operations
2. Powers and exponents
3. Divisibility tests
4. Prime factorization
5. Greatest common factor
6. Simplifying fractions
7. Ordering numbers

Skills

1. Evaluate an expression using order of operations
2. Use exponents to write powers
3. Decide whether a number is divisible by 2, 3, 4, 5, 6, 9, 10
4. Write a whole number as a product of prime numbers
5. Find the greatest common factor between two whole numbers
6. Write fractions in simplest form
7. Represent and recognize a fraction as a division problem
8. Use a number line to order numbers

VOCABULARY

Expression, numerical expression, variable expression, evaluating an expression, factor, exponent, base, power, prime number, composite number, prime factorization, tree diagram, common factor, greatest common factor, equivalent fractions, simplest form, number line

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Banking, Archeology

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 3 Fractions

1. Can the student perform the basic operations with fractions as well as understand why the algorithm works?
2. Can students integrate fraction concepts with the distributive property?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Models and pictures may be used to demonstrate the answers to problems involving division with fractions
- Fractions, decimals and percents are equivalent ways to represent real-world situations and the choice of which symbolic form to use may make it easier to describe a relationship or solve a problem

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Least common multiples
2. Mixed numbers and improper fractions
3. Adding and subtracting fractions
4. Adding and subtracting mixed numbers
5. Multiplying fractions and mixed numbers
6. The Distributive Property
7. Dividing fractions and mixed numbers

Skills

1. Find the least common multiple between up to three whole numbers
2. Write mixed numbers as improper fractions
3. Write improper fractions as decimals
4. Find the sum or difference between fractions
5. Use regrouping to subtract mixed numbers
6. Find the product between fractions
7. Use the Distributive Property to rewrite expressions

VOCABULARY

Multiple, least common multiple, proper fraction, improper fraction, mixed number, regrouping, Distributive Property, reciprocal

ACTIVITIES

Drawing fraction diagrams, Tangrams

ASSESSMENT

Tests

Quizzes

Homework

Special Assignments

Class participation

Oral Presentations

Group Projects

Performance Assessment

CAREER AWARENESS

Landscaping, Food Service

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Using a calculator to manipulate fractions

UNIT 4 Integers

1. Can the students, using manipulative add and subtract integers, \mathbb{Z} ?
2. Can students solve one step addition and subtraction equations?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Computation with positive and negative numbers may be modeled in the context of increasing and decreasing value or changes in measurements

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Patterns, tables and expressions
2. Decimals
3. Integers
4. Adding integers
5. Subtracting integers
6. Addition equations
7. Subtraction equations

Skills

1. Make a table for an expression
2. Write an expression that represents a table
3. Add, subtract, multiply and divide decimals
4. Graph and order integers
5. Add negative integers
6. Subtract negative integers
7. Solve addition and subtraction equations

VOCABULARY

Decimals, integers, negative integers, positive integers, negative sign, opposites, verbal model

ACTIVITIES

Analyzing stock market prices

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Manufacturing, Geography

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

Lab top Labs, Internet

UNIT 5: Statistics

1. Can students take real world data and organize it and display it in appropriate graphs?

RELATED DARIEN AND CT STANDARDS

Working with Data: Probability and Statistics

- Selecting the appropriate visual representation of data is based on the kind of data collected and the purpose for its use
- Experimental probabilities are determined by actual sampling and use of statistics. Theoretical probabilities are determined through identifying all possible outcomes under stated conditions

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Measures of central tendency
2. Histograms
3. Box-and-whisker plots
4. Scatter plots
5. Appropriate graphs
6. Probability

Skills

1. Find mean, median and mode
2. Create a frequency table to draw histograms
3. Organize data with box-and-whisker plots
4. Plot points in a coordinate plane
5. Draw scatter plots to represent real-life data
6. Understand the difference between line graphs and scatter plots
7. Recognize when to use a particular graph for a set of data
8. Recognize misleading graphs
9. Find the probability of a single event

VOCABULARY

Measures of central tendency, mean, median, mode, frequency table, frequency, range, histogram, quartiles, box and whisker plot, quadrant, pictograph, probability of an event

ACTIVITIES

Geo-Project, Lab top lab

PERFORMANCE ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects

CAREER AWARENESS

Advertising

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

INTEGRATED TECHNOLOGY

The students will use Microsoft Excel to calculate the measures of central tendency.

UNIT 6: Ratios and Proportions

1. Can the student recognize the difference between a ratio and rate?
2. Can the student relate real life situations involving proportions and solve the proportion using the three methods introduced in the chapter?

RELATED DARIEN AND CT STANDARDS

Geometry and Measurement

- Explore the relationships among angles, sides, perimeters and areas of congruent and similar polygons using models and diagrams on the rectangular coordinate plane

Numerical and Proportional Reasoning

- Fractions, decimals and percents are equivalent ways to represent real-world situations and the choice of which symbolic form to use may make it easier to describe a relationship or solve a problem

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Ratios
2. Rates
3. Proportions
4. Similar polygons
5. Scale drawings

Skills

1. Find ratios and decide whether two ratios are equivalent
2. Use ratios to solve real-life problems
3. Use rates to solve real-life problems
4. Solve proportions using the Cross Product Property
5. Use proportions to solve real-life problems
6. Decide whether two polygons are similar
7. Use similar polygons to solve real-life problems
8. Read a scale drawing
9. Use similarity to find distances on a map

VOCABULARY

Ratio, rate, unit rate, proportion, cross products, corresponding sides and angles, proportional, similar polygons, scale drawing, scale factor

ACTIVITIES

Planet Project

ASSESSMENT

Tests

Quizzes

Homework

Special Assignments

Class participation

Oral Presentations

Group Projects

Performance Assessment

CAREER AWARENESS

Photography, Event Planning, Architecture

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 7: Percents and Decimals

1. Can the students use decimals and proportions to solve percent problems?
2. Can the students utilize percents in diverse real life situations?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Percents can be used to make comparisons between groups of unequal size because each group is based on a ratio of parts per hundred
- Fractions, decimals and percents are equivalent ways to represent real-world situations and the choice of which symbolic form to use may make it easier to describe a relationship or solve a problem

Working with Data: Probability and Statistics

- Selecting the appropriate visual representation of data is based on the kind of data collected and the purpose for its use

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Percents
2. Fractions
3. Decimals
4. Percent of a number
5. Percent equations
6. Circle graphs
7. Simple interest
8. Percent of increase/decrease

Skills

1. Use percents, fractions, and decimals in real-life
2. Be able to convert between percents, fractions and decimals
3. Find percent of a number
4. Use large and small percents to estimate percent of a number
5. Find the angle measures for parts of a circle graph
6. Create a circle graph
7. Use the formula for simple interest to calculate interest
8. Find the percent of increase/decrease

VOCABULARY

Percent, percent equation, circle graph, principal, annual interest rate, simple interest, percent increase, percent decrease

ACTIVITIES

Costco Project

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Banking, Marketing, Sales

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 8 Two-Dimensional Geometry

1. Can the students relate the area of a rectangle to the area of: triangles
parallelograms trapezoids circles

RELATED DARIEN AND CT STANDARDS

Geometry and Measurement

- Subdividing polygons and solids into simpler shapes and prisms can be used to solve geometric and measurement problems
- The properties of polygons influence the number of flips and turns needed to return a shape to its original orientation

Numerical and Proportional Reasoning

- Use models and number lines to solve problems that involve integers, powers and roots

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Circumference
2. Area of a parallelogram
3. Area of a trapezoid
4. Area of a circle
5. Square roots
6. The Pythagorean Theorem

Skills

1. Find the circumference of a circle
2. Find the perimeter of polygons.
3. Find the area of a parallelogram
4. Find and use the formula for the area of a trapezoid
5. Find the area of a circle
6. Find and estimate square roots
7. Identify types of triangles
8. Use the Pythagorean Theorem to find the lengths of the sides of a right triangle

VOCABULARY

Radius, diameter, circumference, parallelogram, base and height of a parallelogram, trapezoid, base and height of a trapezoid, square root, radical sign, perfect square, acute triangle, right triangle, obtuse triangle, hypotenuse, legs, Pythagorean Theorem

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Carpentry, Animation

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 9: Three-Dimensional Geometry

1. Can the students identify prisms, pyramids and cylinders?
2. Can the students find the surface area and volume of prisms and cylinders?

RELATED DARIEN AND CT STANDARDS

Geometry and Measurement

- Subdividing polygons and solids into simpler shapes and prisms can be used to solve geometric and measurement problems
- Base plans (footprints), orthogonal views (from the front, side and top) and isometric drawings (on a triangle-based grid) are ways to represent three-dimensional objects in two-dimensional diagrams
- Problems involving measurement can be solved through the use of appropriate tools, techniques and strategies

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Polyhedrons
2. Surface Area
3. Spatial visualization
4. Volume
5. Similar prisms

Skills

1. Identify polyhedrons
2. Identify parts of polyhedrons
3. Find the surface area of a prism
4. Find the surface area of a cylinder
5. Draw and analyze different views of a solid
6. Find the volume of a prism
7. Find the volume of a cylinder
8. Identify similar prisms

VOCABULARY

Polyhedron, face, edge, vertex, cylinder, base, lateral surface, surface area of polyhedron and cylinder

ACTIVITIES

Create nets to represent solids

PERFORMANCE ASSESSMENT

Tests

Quizzes

Homework

Special Assignments

Class participation

Oral Presentations

Group Projects

CAREER AWARENESS

Engineering, Manufacturing, Architecture

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 10: Algebra with Integers

1. Can the students multiply and divide integers?
2. Can the students manipulate large and small numbers in scientific notation?
3. Can the students master the concept of absolute value?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Computation with positive and negative numbers may be modeled in the context of increasing and decreasing value or changes in measurement
- Very large and very small numbers may be written using scientific notation, which is based on powers of ten

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Absolute value of a number
2. Addition of integers
3. Subtraction of integers
4. Patterns in a coordinate plane
5. Multiplication of integers
6. Division of integers
7. Integers and exponents
8. Scientific notation

Skills

1. Find the absolute value of a number
2. Find the sum, difference, product and quotient of negative numbers
3. Find patterns in a scatter plot of an equation, including absolute value equations
4. Raise an integer to a power
5. Recognize the pattern of exponent equations in the coordinate plane
6. Evaluate powers of ten
7. Convert numbers into scientific notation

VOCABULARY

Absolute value, absolute value signs, scientific notation

ASSESSMENT

Tests

Quizzes

Homework

Special Assignments

Class participation

Oral Presentations

Group Projects

Performance Assessment

CAREER AWARENESS

Astronomy

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 11: Probability and Discrete Mathematics

1. Can students relate lists, tree diagrams and the counting principle to find the total possible outcomes of an experiment?

RELATED DARIEN AND CT STANDARDS

Numerical and Proportional Reasoning

- Fractions, decimals and percents are equivalent ways to represent real-world situations and the choice of which symbolic form to use may make it easier to describe a relationship or solve a problem

Working with Data: Probability and Statistics

- Recognizing whether order matters may be important when determining possible outcomes
- Experimental probabilities are determined by actual sampling and use of statistics. Theoretical probabilities are determined through identifying all possible outcomes under stated conditions

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Grouping equally likely outcomes
2. Counting techniques
3. Permutations
4. Combinations
5. Expected value
6. Predictions
7. Venn Diagrams

Skills

1. Use probability and outcomes to solve real-life problems
2. Use tree diagrams to count the number of ways an event can happen
3. Apply the Counting Principle to find the number of ways an event can happen
4. Find the number of permutations of a select number of objects
5. Use permutations to solve probability problems
6. Use list to count combinations to solve probability problems
7. Find expected value to decide whether a game is fair
8. Predict the number of times an event will occur
9. Use Venn Diagrams to represent sets
10. Use Venn Diagrams and compound events to solve probability problems

VOCABULARY

Experimental probabilities, theoretical probabilities, tree diagram, Counting Principle, permutation, factorial, combination, expected value, fair game, dependent events, independent events

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Genetics, Insurance

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

Cite books, journals, web sites, etc.

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

UNIT 12: Equations and Functions

1. Can the student solve a two step equation with one variable?

RELATED DARIEN AND CT STANDARDS

Algebraic Reasoning: Patterns and Functions

- Algebraic equations may be used as problem solving tools
- Some relationships are continuous, others are not continuous (discrete) and the graphs of data points should reflect this

CONTENT KNOWLEDGE OBJECTIVES

Content

1. Inverse operations
2. Addition and subtraction equations
3. Multiplication equations
4. Division equations
5. Two-step equations
6. Functions

Skills

1. Use inverse operations to solve additions equations
2. Use inverse operations to solve subtraction equations
3. Use inverse operations to solve multiplication equations
4. Use inverse operations to solve division equations
5. Use inverse operations to solve two-step equations
6. Evaluate functions
7. Write a rule for a function

VOCABULARY

Inverse operation, isolating the variable, function, input, output

ASSESSMENT

Tests
Quizzes
Homework
Special Assignments
Class participation
Oral Presentations
Group Projects
Performance Assessment

CAREER AWARENESS

Business

CORE TEXT FOR STUDENTS

Passport to Mathematics Book 2, McDougal Littell

ADDITIONAL TEXTS/ RESOURCES FOR USE BY STUDENTS

See Section IV, Learning Resources

MATERIALS AND SUPPLIES

See Section IV, Learning Resources

SECTION III - Goals and Standards

RELATED GOALS and STANDARDS

Connecticut Content Standards

Algebraic Reasoning: Patterns and Functions

- Algebraic equations may be used as a problem solving tool.
- A constant rate of change between two variables (slope) will yield a straight line (linear) graph, but if the change varies, then the graph is not a line (nonlinear)
- Some relationships are continuous, others are not continuous (discrete) and the graphs of data points should reflect this.
- The values of slope and of the points where a graph intersects each axis (intercepts) facilitate writing equations and graphing linear relationships.

Numerical and Proportional Reasoning

- Computation with positive and negative numbers may be modeled in the context of increasing and decreasing value or changes in measurements.
- Very large and very small numbers may be written using scientific notation, which is based on powers of ten
- Models and pictures may be used to demonstrate the answers to problems involving division with fractions.
- Percents can be used to make comparisons between groups of unequal size because each group is based on a ratio of parts per hundred
- Fractions, decimals and percents are equivalent ways to represent real-world situations and the choice of which symbolic form to use may make it easier to describe a relationship or solve a problem

Geometry and Measurement

- Subdividing polygons and solids into simpler shapes and prisms can be used to solve geometric and measurement problems.
- The properties of polygons influence the number of flips and turns needed to return a shape to its original orientation.
- Base plans (footprints), orthogonal views (from the front, side and top) and isometric drawings (on a triangle-based grid) are ways to represent three-dimensional objects in two-dimensional diagrams.
- Problems involving measurement can be solved through the use of appropriate tools, techniques and strategies.

Working with Data: Probability and Statistics

- Selecting the appropriate visual representation of data is based on the kind of data collected and purpose for its use
- Recognizing whether order matters may be important when determining possible outcomes.
- Experimental probabilities are determined through actual sampling and use of statistics. Theoretical probabilities are determined through identifying all possible outcomes under stated conditions.

NCTM Standards

Numbers and Operations

- Work flexibly with fractions, decimals, and percents to solve problems
- Compare and order fractions, decimals, and percents efficiently and find their approximate locations on a number line
- Develop meaning for percents greater than 100 and less than 1
- Understand and use ratios and proportions to represent quantitative relationships
- Develop an understanding of large numbers and recognize and appropriately use exponential, scientific, and calculator notation
- Use factors, multiples, prime factorization, and relatively prime numbers to solve problems
- Develop meaning for integers and represent and compare quantities with them

Algebra

- Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules
- Relate and compare different forms of representation for a relationship
- Identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations

Geometry

- Precisely describe, classify, and understand relationships among types of two- and three-dimensional objects using their defining properties
- Understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects
- Create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship

Measurement

- Understand both metric and customary systems of measurement
- Understand relationships among units and convert from one unit to another within the same system
- Understand select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume

Data Analysis and Probability

- Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population
- Select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatter plots

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

Reasoning and 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

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

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

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

PRIMARY RESOURCES

Textbook

- Passport to Mathematics Book 2, McDougal Littell

TECHNOLOGY RESOURCES

Websites

- www.algebra.com
- www.aplusmath.com
- www.funbrain.com
- www.math.com
- www.mathforum.org
- www.nctm.com
- www.state.ct.us/sde
- www.themathpage.com

Other Resources

- Computer lab
- Access
- Microsoft Excel
- Mobile lab top lab
- TI-83 graphing calculator