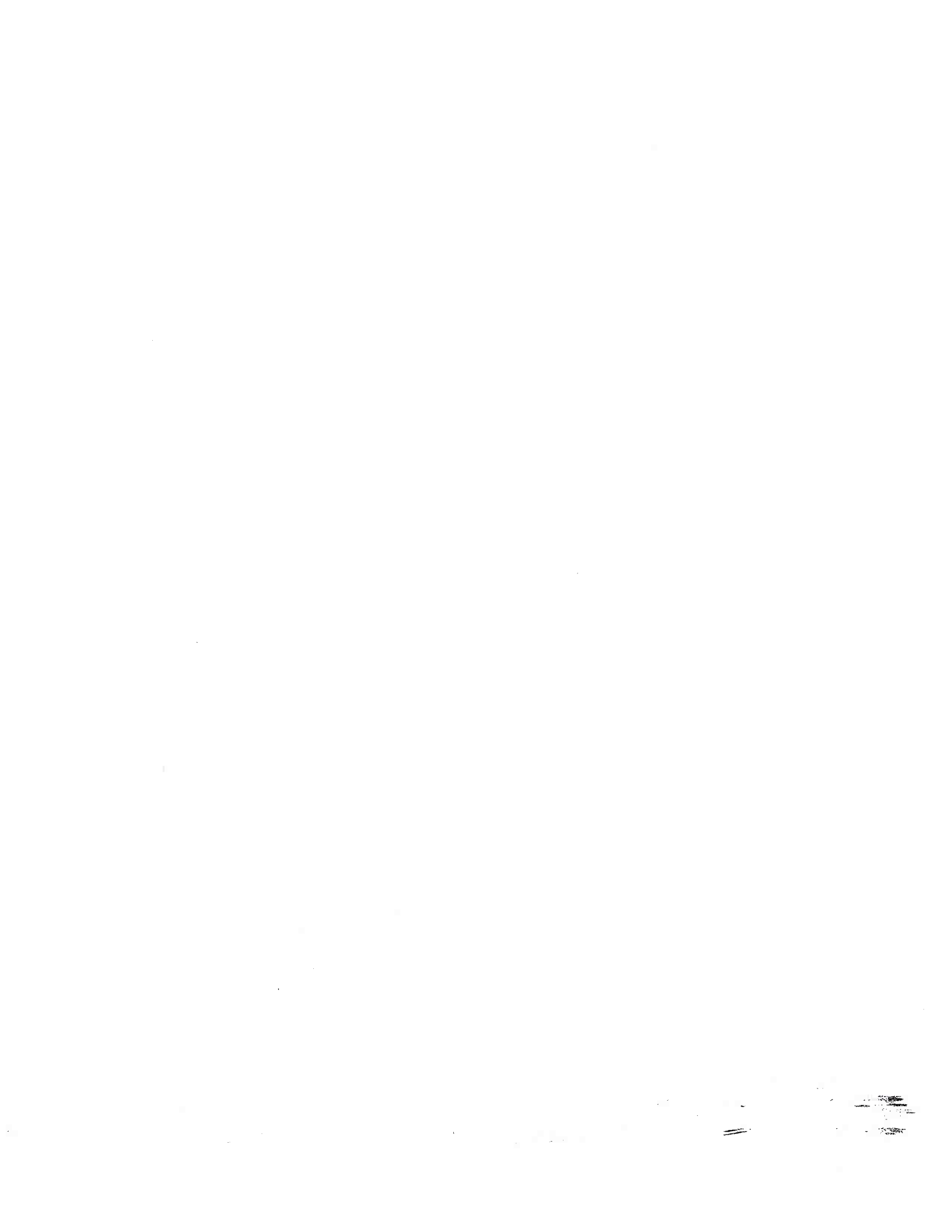


# **HOPATCONG SCHOOLS**

**COURSE OF STUDY**

## **Mathematics – Grade 4**

**July, 2001**



# GRADE 4 MATH CURRICULUM

## SECTION I MEASUREMENT AND GEOMETRY

### Instructional Activities

#### Measurement

The students will:

- estimate then measure and compare standard, non-standard, and metric measurement length.
- develop a metric collage
- estimate then weigh various objects using a balance
- problem solve using measurement.
- compare the scale of Fahrenheit/Celsius thermometer during Science Weather Unit
- use an analog and digital clock to tell time to the nearest minute
- utilize an analog clock to measure heart beats per minute
- read and create a schedule for school day

### Evaluation

1. Formal
  - standardized tests
  - teacher made tests
  - quizzes
2. Informal
  - projects
  - portfolios
  - co-operative activities
  - packets
  - oral presentations
  - discussion
  - student work
  - rubric evaluation

### Materials

rulers, standard/metric  
dot paper  
geoboards  
rubber bands  
measuring containers  
protractors  
compasses  
clocks  
connecting blocks  
graph paper  
tessellation blocks  
tangrams

## GRADE 4 MATH CURRICULUM

### SECTION I MEASUREMENT AND GEOMETRY

**Goal Statement:** In fourth grade the math curriculum should develop and expand students understanding of two and three dimensional geometry; measurements of perimeter area, and volume; the skills of measuring which includes length, mass, weight, capacity, time and temperature; and the exploration of line segments. Students should be able to make and use estimates and use units of measure in problem and everyday life situations.

#### Instructional Objectives

#### Subject Matter Content

Students should be able to:

- measure and compare length, mass, weight and capacity using standard, nonstandard metric measurement 4.9 #1,2,3,4\*
- estimate and choose appropriate measurement using customary or metric 4.9 #1,6 and 4.10 #2,3
- apply measurement skills to nearest quarter inch 4.5 #1
- find elapsed time in hours and minutes 4.9 #1
- change larger units to smaller ones 4.9 #13
- tell time to nearest minute using analog and digital clocks 4.9 #1
- measure temperature in degrees Fahrenheit and degrees Celsius 4.9 #1,7
- apply measurement skills when problem solving 4.9 #5
- solve problems by reading and interpreting a schedule 4.9 #1

#### I. Measurement

- A. Units of measurement customary-metric
- B. Time
- C. Temperature
- D. Problem Solving

**\*Denotes the NJ Core Curriculum Content Standard(s) Addressed**

## GRADE 4 MATH CURRICULUM

### SECTION I MEASUREMENT AND GEOMETRY

#### Instructional Activities

##### Geometry

The students will:

- estimate then measure the perimeter and calculate the area of various boxes (cereal, soap, pasta and soup)
- demonstrate the difference between plane and solid figures by making a triangle from clay balls and straws then transforming it to a triangular pyramid
- create designs using different kinds of polygons
- search for Search of the Day throughout the school day. Record, graph the number of times the shape is seen and its location
- design line drawings by connecting one set of points to another using line segments, lines and rays
- explore angles and lines using magazine drawings. Outline obtuse, right and acute angles and parallel, perpendicular, and intersecting lines in objects of the picture
- study a simple floor plan of a home. Figure its perimeter and area
- make a simple origami object. Predict the figures you will see as it is unfolded. (Parallel lines, angles, etc.)
- collect real natural shapes (leaves, shells etc.). Describe the symmetry, similarity, and/or congruence
- use connecting cubes to construct rectangular prisms. Give groups a set amount (36); record the many prisms that can be made
- create designs by sliding, flipping, turning and tessellating two geometric templates onto a sheet of paper. Trace the outcome.

#### Evaluation

1. Formal
  - standardized tests
  - teacher made tests
  - quizzes
2. Informal
  - projects
  - portfolios
  - co-operative activities
  - packets
  - oral presentations
  - discussion
  - student work
  - rubric evaluation

#### Materials

rulers, standard/metric  
dot paper  
geoboards  
rubber bands  
measuring containers  
protractors  
compasses  
clocks  
connecting blocks  
graph paper  
tessellation blocks  
tangrams

# GRADE 4 MATH CURRICULUM

## SECTION I MEASUREMENT AND GEOMETRY

### Instructional Objectives

Students should be able to:

- find the area and perimeter of a shape using customary/metric units 4.7 #5,9
- problem solve using geometric skills 4.1 #2
- distinguish between plane and solid figures and polygons. Recognize their properties 4.7 #3,4
- identify lines, line segments, rays, parallel, perpendicular, and intersecting lines 4.7 #1
- determine the center, radius and diameter of a circle
- identify symmetry, congruency, or similarity in objects 4.7 #2
- transform figures by sliding, flipping, or turning 4.7 #7
- recognize geometry in everyday life experiences 4.7 #10
- explore ways to measure geometric shapes (angles, circles, and volume) 4.7 #9
- recognize whether figure will or will not tessellate 4.7 #6

### Subject Matter Content

#### II. Geometry

- A. Perimeter-Area
- B. Plane and Solid Figures
- C. Line Segments, Lines and Rays
- D. Perpendicular, Parallel and Intersecting Lines
- E. Angles
- F. Circles
- G. Geometric Transformations

LITERATURE CONNECTION

The Greedy Triangle, Marilyn Burns

Ann's Math Games III Mitsumasa Anno

The Tangram Magician, Lisa Campbell and Lee Ernst

Eight Hands Round: A Patchwork Alphabet, Ann Whitford Paul

# GRADE 4 MATH CURRICULUM

## SECTION II NUMBER SENSE, OPERATIONS AND PROPERTIES

**Goal Statement:** In grade four the math curriculum would include whole number concepts and skills so the students can demonstrate their proficiency in the use of numerical operations (+,-,x: ), estimation, place value, and number sense. Further, this knowledge should be applied to real world experiences through the use of physical materials and problem solving situations.

### Instructional Objectives

Students should be able to:

- write, compare and order numbers through one hundred million 4.6 #2, 4.10 #1
- compare and order commonly used fractions and decimals 4.10 #1
- round numbers to nearest ten, hundred, thousand and dollar 4.10 #5
- become proficient with and know basic number facts 4. #2
- calculate sums and differences through ten-thousand with multiple regrouping 4.8 #1,3
- subtract four digit numbers across zeros
- calculate products with multiples of thousands 4.8 #1, 3
- calculate products, multiplying two digits by three digits 4.8 #1, 3
- compute quotients with zeros in the dividend 4.8 #1,3
- perform computation using money 4.6 #6
- use a variety of methods to develop mental computation and estimation techniques 4.8 #5, 4.10 #3,5,6,7
- use concepts of range, mean, median, and mode 4.12 #4
- recognize the equivalent value of fraction on a number line 4.8 #4
- add and subtract fractions with like and unlike denominators 4.8 #8
- add and subtract mixed numbers 4.8 #8
- select from among multiple strategies in problem solving 4.3 #4, 4.4 #1,2,4

### Subject Matter Content

- I. Number Sense
  - A. Write, compare and order numbers
  - B. Estimation and rounding
- II. Numerical Operations
  - A. Addition
  - B. Subtraction
  - C. Multiplication
  - D. Division
  - E. Money
  - F. Range, median, mode, and mean
  - G. Fractions
  - H. Decimals
  - I. Problem solving

## GRADE 4 MATH CURRICULUM

### SECTION II Number Sense, Operations and Properties

#### Instructional Activities

The students will:

- use a road atlas to name a city ten miles away, list five towns one hundred miles away and three states one thousand miles away to explore place value
- participate in the game, "Match a Million" to understand hundred millions
- play "Word Worth" to practice adding three or more numbers
- make Palindromes to practice addition and patterns
- use a catalog and order form to practice addition, subtraction, and multiplication skills to simulate life situations
- develop number sense and practice divisibility by playing "jacks"
- add and subtract money by using enrichment activities 2.12, 2.13 writing checks and balancing a checkbook
- visit the cafeteria and interview the food materials service manager to determine how quantities of food are selected to feed large groups
- use geoboards to represent equivalent fractions
- make instant pudding to show mastery of fractions

#### Evaluation

1. Formal
  - standardized tests
  - teacher made tests
  - quizzes
2. Informal
  - projects
  - portfolios
  - co-operative activities
  - packets
  - oral presentations
  - discussion
  - student work
  - rubric evaluation

#### Materials

- base ten blocks
- graph paper
- money (coins, bills)
- calculators
- fraction bars
- jacks
- flash cards
- spinners, dice

## GRADE 4 MATH CURRICULUM

### SECTION III - DATA ANALYSIS, PROBABILITY AND DISCRETE MATH

**Goal Statement:** In grade four math students will collect, organize and describe data; construct, read and interpret displays of data; explore concepts of probability and develop an understanding of the applications of discrete mathematics

#### Instructional Objectives

Students should be able to:

- analyze data from tables and graphs 4.12 #1,5
- display data using appropriate tables and graphs 4.12 #3
- explore theoretical and experimental probability 4.1 #9, 4.12 #6,7,8
- make an educated guess based upon persuasive data 4.12 #2
- express probability as a fraction using chance devices 4.12 #2
- arrange a given set of elements in a logical order 4.14 #4
- explore and model a practical decision based upon an every day life occurrence 4.14 #2
- interpret information using coordinates 4.7 #8

#### Subject Matter Content

##### I. Data

###### A. Graphs

1. Line
2. Bar
3. Pictograph
4. Circle

###### B. Tables

1. Frequency
2. Tally

###### C. Grid

##### II. Probability

###### A. Explore concepts

- B. Make appropriate inferences
- C. Show results as fractions

##### III. Discrete Mathematics

###### A. Networking and classifying

###### B. Devising

## GRADE 4 MATH CURRICULUM

### SECTION III - Data Analysis, Probability and Discrete Math

#### Instructional Activities

#### Evaluation

The students will:

- collect, organize and present data with his/her group
- survey peers and chart information using tally, frequency tables and graphs
- collect and use information from a calendar and compare to calendars of other countries
- using weather information each day, place it on a daily weather map and chart our expected weather
- create mystery grid pictures
- make a spinner or use a die. Predict how many times each number 1-6 will appear after ten rolls or spins. Write your prediction at the top of the tally table. Complete the task keeping a tally then make a bar graph to show the results
- complete the Vending Machine Game
- using a map, find the most convenient route from one city to another
- locate information on a map using the grid box
- construct "Tree Diagrams" from a series of information given.
- use the computer to construct graphs from given information

1. Formal
  - standardized tests
  - teacher made tests
  - quizzes
2. Informal
  - projects
  - portfolios
  - co-operative activities
  - packets
  - oral presentations
  - discussion
  - student work
  - rubric evaluation

#### Materials

dice  
spinners  
collection of maps  
graph paper  
alphabet pasta  
computer

## GRADE 4 MATH CURRICULUM

### SECTION IV - PATTERNS, FUNCTION AND ALGEBRA

**Goal Statement:** Fourth grade students will be able to identify, describe, analyze, create and extend a wide variety of numerical and non-numerical patterns. Further, the curriculum should emphasize reasoning so that students can explore use of open sentences to express relationships and use as well as recognize the associative and distributive properties of multiplication.

#### Instructional Objectives

Students should be able to:

- recognize and extend patterns in a pictorial sample 4.11 #3
- identify and create numerical patterns 4.11 #5
- investigate the occurrence of patterns in nature, art, and other areas 4.7 #10
- verify the rule for a pattern or table 4.11 #6
- problem solve by finding the pattern 4.11 #1,3,5
- identify the associative and distributive properties of multiplication 4.13 #1,3
- write an algebraic equation 4.13 #4

#### Subject Matter Content

- I. Patterns
  - A. Non-numerical
  - B. Numerical
- II. Functions
  - A. Rules
- III. Algebra
  - A. Associative Property
  - B. Distributive Property

## GRADE 4 MATH CURRICULUM

### SECTION IV Patterns, Functions and Algebra

#### Instructional Activities

The students will:

- construct a multiplication or division fact table and compare to another students'
- find the multiples of a number by using a hundreds chart and shading the answer; i.e 3's to 51
- see above, choose another number and shade its multiples using another color on the same chart. Find their common multiples
- complete a given table by writing the rule to find several select missing numbers
- write a number sentence from a pictorial display ( $3 \times 2 = 2 \times 3$ )
- build a "Palindrome" to practice patterning
- practice patterning using a calculator
- predict a pattern
- write an original word problem in everyday life (i.e. plan a trip and find out how many miles it is and how long it will take)
- review patterns on the calender

#### Evaluation

1. Formal  
standardized tests  
teacher made tests  
quizzes
2. Informal  
projects  
portfolios  
co-operative activities  
packets  
oral presentations  
student work

#### Materials

counters  
graph paper  
calculators  
tangrams  
pattern blocks  
calendar

**Addendum:** In each unit of study the student should be able to write about his/her mathematical experience. There are many recommended examples throughout the Fourth Grade Text (i.e., keeping journals, writing an original word problem).

This is aligned with the New Jersey Core Curriculum Content Standards

## LITERATURE CONNECTION

How Much is Million David Schwartz

Pumpkins, Mary Lyn Ray

Where the Sidewalk Ends “Eighteen Flavors”, Shel Silverstein

The Three Little Pigs First Cookbook, Cameron N. Watson

