

# Elementary Math Content Standards

## Kindergarten Content Standards

### Estimation

- Compare the number of objects in different sets; tell which set has more and which has less.
- Acquire the skill of estimation. In early stages this involves a comparison with familiar objects within the range of the child's early development.

### Number Sense

- Develop number sense for numerals up to 100.
- Develop a familiarity with numbers 1 - 100.
- Count by multiples of 2, 5, 10 to 100.
- Read and write numerals for the numbers 1 - 50.
- Physically show halves and fourths.
- Explore the concepts of money.

### Concepts of Number Operation

- Develop a concrete understanding of addition and subtraction for the numbers 0 - 10.

### Geometry

- Sort sets on the basis of one attribute.
- Relate physical world examples to the ideas and concepts of geometry.
- Explore familiar two- and three- dimensional objects.
- Identify properties such as inside, outside, straight, round, square, large, and small should be included.

### Measurement

- Explore the concepts of time, length, volume (conservation)

### Statistics

- Construct simple bar graphs and pictographs. State impressions obtained from these graphs. The data for these visual displays should come from realistic problem situations that occur in the classroom.

## **Probability**

- Explore the concepts of chance based on repeated observations of real world events such as weather, games, or contests.

## **Patterns**

- Develop pattern recognition. This would be carried out primarily by working with simple sequences that are determined by numerical or geometric properties, or by other attributes such as color or orientation. Construct an ABC pattern and repeat it at least 6 times.

## **First Grade Content Standards**

### **Estimation**

- Identify the number of objects in a set by counting or estimating.
- Decide whether estimation or counting is appropriate.

### **Number Sense**

- Read and write numerals 1 - 100.
- Read and write number words to ten.
- Recognize numbers 1 - 100.
- Count by multiples of 2, 5, 10, to 100.
- Fractions:  $\frac{1}{2}$ ,  $\frac{1}{4}$ .
- Understand that fractions are parts of a whole.
- Read and write numerals for simple fractions.
- Understand basic place value concepts for whole numbers (ones, tens, hundreds).
- Become familiar with attributes of monetary value.

### **Concept of Number Operations**

- Use objects, pictures, and problem situations to model and interpret different definitions of addition and subtraction of whole numbers.

### **Computation**

- Accurately and with minimal hesitation, provide response for basic addition and subtraction facts, 0 - 10.

## **Geometry**

- Relate physical world examples to the ideas and concepts of geometry.
- Identify and classify the following figures through visual observations and properties: triangles, squares, rectangles, hexagons, trapezoids, rhombus, cubes, pyramids, spheres, circles, and ovals.
- Explore simple patterns of symmetry in the environment and the natural world.

## **Measurement**

- Explore the process of measurement. This includes choosing an appropriate unit of measure and selecting the proper measuring instrument.
- Become familiar with attributes of length, weight, area, liquid capacity, time, and temperature.
- Measure objects using non-standard units (i. e. beads, Unifix cubes, etc.)

## **Statistics**

- Construct graphs. State impressions obtained from these graphs. The data for these visual displays should come from realistic problem situations that occur in the classroom.
- Use simple charts for reference, comparisons, and record keeping.

## **Probability**

- Explore the concepts of chance based on repeated observations of real world events such as weather, games, or contests.

## **Patterns**

- Develop pattern recognition. This would be carried out primarily by working with simple sequences that are determined by numerical or geometric properties, or by other attributes such as color or orientation. The pattern may be represented physically, pictorially, or symbolically. The child should be able to describe the rule or relation that determines the sequence and continue the sequence.

## **Algebra**

- Write number sentences to represent problems involving different addition and subtraction situations and solve the sentences.

## Second Grade Content Standards

### Estimation

- Identify the number of objects in a set by counting or estimating.
- Decide whether estimation or counting is appropriate.

### Number Sense

- Count by multiples of 2, 5, 10, 100.
- Understand basic place value concepts for whole numbers (ones, tens, hundreds).
- Fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{3}$ . Understand that fractions are parts of a whole. Be able to demonstrate an understanding of fractions physically or pictorially. Relate fractions to real world examples.
- Read and write numerals for simple fractions.
- Become familiar with the use of numbers in newspapers, magazines, television, and other sources within society.
- Acquire skills associated with values of coins and bills. This includes all appropriate vocabulary, the recognition of coins and bills up to \$5, the knowledge of their value (coins in cents, bills in dollars), and the following equivalencies: one dime = 2 nickels; one quarter = 5 nickels; one half-dollar = 2 quarters; one dollar = 2 half-dollars, 4 quarters, or 10 dimes

### Concepts of Number Operations

- Use objects, pictures, and problem situations to model and interpret different definitions of addition, subtraction, and multiplication of whole numbers.
- Write word problems representing different addition and subtraction situations and solve them.

### Computation

- Accurately and with minimal hesitation provide response for basic addition and subtraction facts.
- Carry out a series of computations using a calculator involving addition and/or subtraction and involving up to four steps.

### Geometry

- Relate physical world examples to the ideas and concepts of geometry.
- Identify and classify the following figures through visual observations and identified properties: triangles, squares, rectangles, cubes, spheres, circles, and ovals.

- Explore simple patterns of symmetry in the environment and the natural world.

### **Measurement**

- Become familiar with attributes of length, weight, area, liquid capacity, time, and temperature.
- Acquire length and weight measurement skills: inch, foot, yard, meter, centimeter, ounce, pound, gram, kilogram; relative size of one unit to another.
- Use a ruler to draw a segment of a given length to nearest inch or centimeter.
- Acquire time measurement skills: calendar (days, weeks, months, years), equivalencies (one week = 7 days, one year = 12 months), clock (hours, minutes, fractional parts of hours), tell time to the nearest quarter-hour.

### **Statistics**

- Construct graphs. State impressions obtained from these graphs. The data for these visual displays should come from realistic problem situations that occur in the classroom.
- Use simple charts for reference, comparisons, and record keeping.
- Become familiar with use of graphs in newspapers, magazines, television, and other sources within society.

### **Probability**

- Explore the concepts of chance based on repeated observations of real world events such as weather, games, or contests.

### **Patterns**

- Develop pattern recognition. This would be carried out primarily by working with simple sequences that are determined by numerical or geometric properties, or by other attributes such as color or orientation. The pattern may be represented physically, pictorially, or symbolically. The child should be able to describe the rule or relation that determines the sequence and continue the sequence.

### **Algebra**

- Write number sentences to represent problems involving different addition and subtraction situations and solve the sentences.
- Use numbers to replace a box representing an unknown quantity in a number sentence (for example  $9 + \_ = 14$ ) and determine if the replacement makes the sentence true.

## Third Grade Content Standards

### Estimation

- Estimate measurement.
- Estimate time.
- Estimate and find volume, capacity, length, and weight using metric and standard units

### Number Sense

- Skip count by whole numbers.
- Understand, represent and find real world applications for fractions and *decimals* using models, pictures, and symbols.
- Explore bases other than ten to develop understanding of place value concepts.
- Find change by counting up from amount of purchase.
- Understand and use decimal notation for monetary values.
- Using models, pictures, symbols, and words, identify, represent, and explain place value concepts.
- Round whole numbers.
- Read, write, compare and order whole numbers.
- Explore whole number relationships.
- Using models, pictures, and symbols, find and identify multiples of whole numbers

### Concepts and Numbers of Operations

- Use concrete objects to invent and model different procedures for finding sums, differences, products, and quotients of whole numbers.
- Use concrete objects to model and interpret different problem situations for addition, subtraction, and multiplication of whole numbers.
- Choose appropriate operations to solve problems.
- Recognize the relationships between addition, subtraction, multiplication, and division.
- Write, experience, and explain processes in problem solving situations.

### Computation

- Demonstrate reasonable proficiency with basic multiplication and division facts.
- Demonstrate reasonable proficiency with addition and subtraction of multi-digit numbers.
- Develop concept of error analysis.
- Use mental math when appropriate.

- Use a calculator when appropriate.

## **Geometry**

- Identify angles.
- Recognize, identify, and describe 2- and 3-dimensional geometric shapes.
- Recognize, identify, and describe properties of congruent shapes.
- Relate symmetry concepts to geometric shapes.
- Recognize, identify, and describe characteristics of lines and angles.
- Develop spatial sense using manipulatives.

## **Measurement**

- Find perimeters using concrete objects, student diagrams, and various units of measurement.
- Find elapsed time.
- Explore map scales.
- Measure temperature (Celsius and Fahrenheit).
- Tell time.
- Find areas of squares and rectangles.
- Explore volume, capacity, length, and weight using metric and standard units

## **Statistics**

- Collect, organize, and describe data.
- Construct charts, tables, and graphs.
- Interpret, explain, and describe data from charts, tables, and graphs.
- Make predictions from data.
- Investigate concepts of averages, median and mode.

## **Probability**

- Use spinners, dice, and coins to explore probability.
- Assess fairness of a probability experiment.
- Begin generalizing events of likely, unlikely, certain, and luck using everyday experiences.
- Create probability story problems

## **Patterns**

- Develop an awareness of patterns in relationship to mathematics and the natural world.
- Find, recognize, describe, and extend patterns.
- Discover and demonstrate patterns using manipulatives.

- Discover, demonstrate, describe, and recognize number operation patterns.
- Formulate rules to describe patterns and apply the rules to extend the patterns.

## **Algebra**

- Use shapes or letters to represent numbers in number sentences.
- Use manipulatives to represent equations containing an unknown.
- Write and solve story problems using equations containing a variable for an unknown.

## **Fourth Grade Content Standards**

### **Estimation**

- Use appropriate estimation strategies.
- Understand relationship between computation and estimation.
- Apply appropriate estimation strategies when solving problems.

### **Number Sense**

- Identify, represent, and explain place value concepts using models, money, pictures, symbols, and words.
- Read and write numbers.
- Understand place value concepts.
- Use equivalent names for numbers.
- Read and write Roman numerals.
- Build rectangular arrays for the whole numbers.
- Identify, represent, and explain factors using models, pictures, symbols, and words.
- Identify real world applications for fractions.
- Compare and order fractions using models and pictures.
- Explore ancient numeration systems (relate to social studies).

### **Concepts of Number Operations**

- Write, experience, and explain processes in problem solving situations.
- Use manipulatives to invent, model, and describe different procedures for finding sums, differences, products, and quotients.
- Model, interpret, and describe different problem situations for addition, subtraction, multiplication and division.

### **Computation**

- Demonstrate reasonable proficiency with multiplication and division.

- Demonstrate reasonable proficiency with addition , subtraction, multiplication, and division involving money values.
- Use mental math when appropriate.
- Select appropriate method for computation (pencil and paper, mental math, calculator, computer).
- Expand use of error analysis to include all operations.

## **Geometry**

- Explore the various characteristics of 2- and 3-dimensional geometric shapes.
- Apply symmetry concepts to geometric shapes.
- Recognize, identify, and describe properties of congruent shapes.
- Explore properties of 2-dimensional shapes through drawing, modeling, comparing, measuring, and classifying.
- Develop spatial sense by exploring different perspectives (views) of 3-dimensional shapes.
- Explore properties of rectangles; find area and perimeter.
- Locate points on the coordinate plane.

## **Measurement**

- Solve real life problems involving elapsed time.
- Find perimeters of regular and irregular shapes.
- Find areas of regular shapes.
- Estimate areas of irregular shapes.
- Develop and use formulas for finding perimeters of geometric shapes.
- Solve real life problems involving map scales.
- Solve real life problems involving temperature.
- Solve real life problems involving metric and standard units of volume, capacity, weight, and length.

## **Statistics**

- Collect, organize, and describe data.
- Construct charts, tables, and graphs.
- Interpret, explain, and describe data from charts, tables, and graphs.
- Predict trends using charts, graphs, and tables.
- Find mean, median and mode.

## **Probability**

- Make predictions based on own experience and experiments.
- Explore a variety of probability experiments.

- Generalize events of likely, unlikely, certain, and luck based on experiments, experience, and data.
- Analyze and present probability data using simple fractions.
- Create probability story problems.

### **Patterns**

- Develop an awareness of patterns in relationship to mathematics and the natural world.
- Discover, demonstrate, and extend patterns using manipulatives.
- Formulate rules to describe patterns and apply the rules to extend the patterns.
- Formulate descriptions of patterns and their relationship to number operations.
- Explore patterns represented in tables, graphs, rules, and problem solving situations.
- Explore how change in one quantity results in change in another.

### **Algebra**

- Use shapes or letters to represent numbers in number sentences.
- Find solutions for open sentences.
- Use manipulatives to describe and solve equations with an unknown.
- Write and solve story problems using equations containing a variable for an unknown.

## **Fifth Grade Content Standards**

### **Estimation**

- Use appropriate estimation strategies.
- Understand relationship between computation and estimation.
- Apply appropriate estimation strategies when solving problems.

### **Number Sense**

- Identify, represent, compare, and order fractions, mixed numbers, decimals, and percentages using models, pictures, symbols, and words.
- Compare and order positive and negative numbers.
- Simplify fractions.
- Recognize the relationship between fractions, decimals, and percents.
- Explore bases other than ten to develop understanding of base ten system.
- Identify, represent, and explain prime number concepts using models, pictures, symbols, and words.

## Concepts of Number Operations

- Use manipulatives to model, invent, interpret, and describe different problem situations for addition and subtraction of fractions and decimals.
- Write, experience, solve, and explain processes in problem solving situations.

## Computation

- Demonstrate reasonable proficiency with multiplication and division involving whole numbers or money values.
- Demonstrate reasonable proficiency with addition and subtraction of decimals and fractions.
- Expand use of error analysis to decimal and fraction computation.
- Select appropriate method for computation (pencil and paper, mental math, calculator, computer).

## Geometry

- Explore, identify, and describe characteristics of 2-and 3-dimensional geometric shapes.
- Perform translations and rotations of 2-dimensional shapes.
- Explore the characteristics of triangles and parallelograms; find the area and perimeter.
- Identify geometric shapes properties in architecture and natural structures.
- Draw line segments determined by locating points on a coordinate plane.

## Measurement

- Develop and use formulas for finding areas of polygons.
- Find circumferences of circles.
- Measure angles with a protractor.
- Draw to scale.
- Solve real life problems involving area and perimeter.
- Find surface areas of cubes and prisms.
- Solve real life problems involving measurement.
- Become familiar with rate concepts.
- Estimate areas of circles.

## Statistics

- Collect, organize, and describe data.
- Construct charts, tables, and graphs.
- Interpret, explain, and describe data from charts, tables, and graphs.
- Predict trends using charts, graphs, and tables.

- Evaluate data to determine validity, propaganda, and prejudice.

### **Probability**

- Analyze and present probability data.
- Identify probability in real life situations.
- Conduct probability experiments where data is gathered in a variety of ways such as surveys, science experiments, newspapers, and spinners.
- Create probability story problems.

### **Patterns**

- Develop an awareness of patterns in relationship to mathematics and the natural world.
- Conduct and analyze experiments that demonstrate how change in one quantity results in change in another.
- Extend and describe patterns represented in tables, graphs, rules, formulas, and problem solving.

### **Algebra**

- Use symbols to represent variables in number sentences; find solutions for number sentences containing variables.
- Write and solve story problems using equations containing a variable for an unknown.
- Graph number sentences.
- Analyze graphs and tables; make predictions from graphs and tables.
- Find relationships using patterns involving multiple variables.

## **Sixth Grade Content Standards**

### **Estimation**

- Use appropriate estimation strategies.
- Understand relationship between computation and estimation.
- Apply appropriate estimation strategies when solving problems.

### **Number Sense**

- Extend their understanding of number concepts to include fractions, decimals, integers, i.e., rational numbers.
- Apply decimals and fractions to real world situations.
- Understand ratio and proportion concepts.
- Explore whole number, fraction, decimal, and percent relationships.

## **Concept of Number Operations**

- Use manipulatives to model, invent, interpret and describe problem situations for decimal and fraction operations.
- Identify real world applications for decimal and fraction operations.
- Write, experience, solve, and explain thought processes in problem solving situations involving multiple operations.

## **Computation**

- Demonstrate reasonable proficiency with addition, subtraction, multiplication, and division of decimals and fractions.
- Add and subtract integers with like and unlike signs.
- Find percent of a number, i.e. simple interest.
- Use mental math when appropriate.
- Expand use of error analysis to include fraction and decimal computation.
- Compare various technological tools for computation.

## **Geometry**

- Apply characteristics of 2- and 3-dimensional geometric shapes to everyday life.
- Apply characteristics of congruency to person-made and natural structures.
- Explore the characteristics of trapezoids and circles; find area, perimeter, and circumference.
- Apply geometric concepts to practical situations.

## **Measurement**

- Use a protractor to measure and draw angles.
- Find surface areas of cubes, prisms, and pyramids.
- Find volumes of cubes and rectangular prisms.
- Develop an understanding of the formulas for finding circumferences and areas of circles.
- Solve real life problems involving measurement concepts.
- Apply measurement concepts to real life situations.
- Solve real life problems involving rate.

## **Statistics**

- Find Median, mode, and range
- Solve average problems.
- Collect, organize, and describe data.
- Construct charts, tables, and graphs.
- Interpret, explain, and describe data from charts, tables, and graphs.

- Predict trends using charts, graphs, and tables.
- Evaluate data to determine validity, propaganda, and prejudice.
- Make inferences and convincing arguments based on data.
- Understand the use of statistics in the real world.

### **Probability**

- Analyze and present probability data using percents and ratios.
- Apply probability to real life situations.
- Design and conduct experiments and simulations using probability.
- Continue to use probability as a logical approach to problem solving.
- Create probability story problems.
- Predict probabilities of simple events.
- Compute probabilities of simple events.
- Compare predicted and computed probabilities with experimental probabilities.

### **Patterns**

- Develop an awareness of patterns in relationship to mathematics and the natural world.
- Conduct, and analyze real world experiments that demonstrate how change in one quantity results in change in another.
- Demonstrate how patterns in mathematics result in algorithms and formulas.
- Develop an awareness of how patterns influence decision making in their lives.

### **Algebra**

- Use concrete examples and manipulatives to solve algebraic problems from everyday life experiences that involve identity properties, order of operations, exponents, inverse operations, and inequalities.
- Use a variety of methods to solve one-step equations.
- Informally investigate inequalities and nonlinear equations.
- Write and solve story problems using equations containing a variable for an unknown.
- Graph number sentences.
- Analyze graphs and tables; make predictions from graphs and tables.