

## **Mathematics Curriculum Overview**

### **Fourth Grade**

#### **A. Number Sense**

Students will understand the place value of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions.

The students will:

- Count, read, write, compare, and plot whole numbers using words, models, number lines and expanded form.
- Read and write whole numbers up to 1,000,000, given a place-value model.
- Read and write roman numbers through 39.
- Name the place value of a particular digit in a given whole or decimal number from thousandths to millions.
- Given a word name for a numeral, identify the numeral, from millions to thousandths, and conversely.
- Identify and classify a list of whole numbers, zero to one hundred, as prime or composite.
- Round whole numbers up to 10,000 to the nearest ten, hundred, and thousand.
- Order and compare whole numbers using symbols for “less than” ( $<$ ), “equals” ( $=$ ), and “greater than” ( $>$ ).
- Rename and rewrite whole numbers as fractions and reduce them to lowest terms.
- Compare and order fractions and mixed numbers with like or unlike denominators to the whole number one.
- Name and write mixed numbers as improper fractions, using objects or pictures.
- Write tenths and hundredths in decimal and fraction notation. Know the fraction and decimal equivalents for halves and fourths.
- Round two-place decimals to tenths or to the nearest whole number.
- Identify square numbers and roots.
- Master mathematical vocabulary including sum, difference, product, addend, and factor.

#### **B. Computation**

Students will solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among these operations. They will extend their use and understanding of whole numbers to the addition and subtraction of simple fractions and decimals.

The students will:

- Understand and use standard algorithms for addition and subtraction.
- Add any three or more numbers having up to four digits.
- Add and subtract any two numbers up to five digits.
- Develop and use algorithms to add and subtract decimals.
- Represent any situation involving repeated addition as multiplication.
- Represent as division any situation involving the sharing of objects or the number of groups of shared objects.

- Demonstrate mastery of the multiplication tables for numbers between 0-12 and the corresponding division facts.
- Multiply two or three-digit numbers by one or two digit numbers with or without regrouping.
- Check answers using inverse properties (addition/subtraction, multiplication/division)
- Multiply numbers by multiples of ten, hundred, and thousand.
- Use a standard algorithm to multiply and divide numbers up to 100 by numbers up to 10 without regrouping or remainders, using relevant properties of the number system.
- Divide two-digit numbers by one or two digit numbers with or without remainders.
- Use a division algorithm to find a three-digit quotient with a zero in the tens' or ones' place of a three-digit dividend and a one-digit divisor.
- Use a division algorithm to find a one- to two digit quotient of a two to three digit dividend and a two digit divisor.
- Understand the special properties of 0 and 1 in multiplication and division.
- Write multiples of a number.
- Find the missing factor in multiplication problems.
- Add and subtract simple fractions with different denominators, using objects or pictures.
- Use a standard algorithm to add and subtract decimals (to hundredths), using objects and pictures.
- Know and use strategies for estimating results of any whole-number computations.
- Use mental arithmetic to add or subtract numbers rounded to hundreds or thousands.

### C. Algebra and Functions

Students will use and interpret variables, mathematical symbols, and properties to write and simplify numerical expressions and sentences. They will understand relationships among the operations of addition, subtraction, multiplication, and division.

The students will:

- Use letters, boxes, or other symbols to represent any number in simple expressions, equations, or inequalities.
- Use and interpret formulas to answer questions about quantities and their relationships.
- Understanding that multiplication and division are performed before addition and subtraction in expressions without parentheses.
- Understand that an equation such as  $y = 3x + 5$  is a rule for finding a second number when a first number is given 46.
- Continue number patterns using multiplication and division.
- Recognize and apply the relationships between addition and multiplication, between subtraction and division, and the inverse relationship between multiplication and division to solve problems.

- Relate problem situations to number sentences involving multiplication and division.
- Plot and label whole numbers on a number line up to 100. Estimate positions on the number line.

#### D. Geometry

Students will show an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

The students will:

- Identify, describe, and draw right angles, acute angles, obtuse angles, straight angles and rays using appropriate mathematical tools and technology.
- Identify, describe and draw parallel, perpendicular, and nonperpendicular lines using appropriate mathematical tools and technology.
- Identify, describe and draw parallelograms, rhombuses, and trapezoids, using appropriate mathematical tools and technology.
- Identify center, radius, and diameter of a circle.
- Identify congruent quadrilaterals and give reasons for congruence using sides, angles, parallels and perpendiculars.
- Draw lines of symmetry in polygons and identify shapes with reflectional and rotational symmetry
- Identify, describe, and construct three-dimensional solids including cubes and prisms.

#### E. Measurement

Students will understand perimeter and area, as well as measuring volume, capacity, time and money.

The students will:

- Measure length to the nearest quarter-inch, eighth-inch, and millimeter.
- Subtract units of length that may require renaming of feet to inches or meters to centimeters.
- Develop and use formulas for finding the perimeter and area of rectangles, including squares, using appropriate strategies, tools and units of measure.
- Estimate and calculate the area of rectangular shapes by using appropriate units, such as square centimeter (cm<sup>2</sup>), square meter (m<sup>2</sup>), inch (in<sup>2</sup>), or square yard (yd<sup>2</sup>).
- Understand that rectangles with the same area can have different perimeters and that rectangles with the same perimeter can have different areas.
- Find areas of shapes by dividing them into basic shapes such as rectangles and triangles.
- Use volume and capacity as different ways of measuring the space inside a shape.
- Add time intervals involving hours and minutes.
- Determine time shown, time before, and time after a given time, using analog and digital clocks.

- Determine the amount of change from a purchase.
- Multiply amounts of money less than ten dollars.

#### F. Data Analysis and Probability

Students will organize, represent, and interpret numerical and categorical data and clearly communicate their findings. They will show outcomes for simple probability situations.

The students will:

- Represent data on a number line and in tables, including frequency tables.
- Interpret data graphs to answer questions about a situation.
- Summarize and display the results of probability experiments in a clear and organized way.

#### G. Problem Solving

Students will make decisions about how to approach problems and communicate their ideas.

The students will:

- Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing, and prioritizing information, and observing patterns.
- Decide when and how to break a problem into simpler parts to solve more complex problems.
- Use a variety of methods, such as word, numbers, symbols, charts, graphs, tables, diagrams, tools, and models to solve problems, justify an argument, and make conjectures.
- Express solutions clearly and logically by using the appropriate mathematical terms and notation to support solutions with evidence in both verbal and symbolic work.
- Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.
- Know and use appropriate methods for estimating results of whole-number computations.
- Make precise calculations and check the validity of the results in the context of the problem.
- Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.