

Math

GRADE 4

STANDARD 1

The student understands and applies the concepts and procedures of number sense and numeration.

To meet this standard, the student will:

Benchmark 4.1.1: Represent and explore the relationships among whole numbers, decimals, mixed numbers, and fractions using concrete materials and drawings

Indicators:

- 4.1.1.1 Recognize and read numbers from 0.001 to 1,000,000
- 4.1.1.2 Read and write whole numbers to millions in standard, expanded, and written forms (e.g., $9367 = 9000 + 300 + 60 + 7 =$ nine thousand three hundred sixty-seven)
- 4.1.1.3 Represent the place value of whole numbers and decimals from 0.001 to 1,000,000 using concrete materials, drawings, and symbols
- 4.1.1.4 Read and write decimal numbers to thousandths
- 4.1.1.5 Recognize whole number factors and multiples
- 4.1.1.6 Recognize whole numbers as prime or composite
- 4.1.1.7 Read and write fractions and mixed numbers
- 4.1.1.8 Connect proper fractions and mixed numbers with decimals (tenths and hundredths) using concrete materials, drawings, and symbols
- 4.1.1.9 Explore the relationships between fractions and decimals using a calculator, concrete materials, and drawings (e.g., $1/4$ on a calculator is entered as $1 \div 4$)

Benchmark 4.1.2: Compare and order whole numbers and decimals using concrete materials and drawings

Indicators:

- 4.1.2.1 Compare and order whole numbers and decimals from 0.001 to 1,000,000 using concrete materials drawings, and symbols
- 4.1.2.2 Compare and order decimals

Benchmark 4.1.3: Compare and order mixed numbers and proper and improper fractions with like denominators using concrete materials and drawings

Indicators:

- 4.1.3.1 Model equivalent fractions
- 4.1.3.2 Compare, and order mixed numbers and proper and improper fractions with like denominators (e.g., $1/5$ and $3/5$ or $1/8$ and $4/8$) using concrete materials and drawings

Benchmark 4.1.4: Understand and use basic operations (addition, subtraction, multiplication, and division)

Indicators:

- 4.1.4.1 Add with 2 or 3 numbers over 1, 000
- 4.1.4.2 Subtract with 2 or 3 numbers over 1, 000
- 4.1.4.3 Multiply up to 4-digit numbers by 2-digit numbers using a variety of techniques
- 4.1.4.4 Multiply numbers with zeros by 1-digit numbers
- 4.1.4.5 Divide up to 3-digit by 2-digit numbers with and without remainders

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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- 4.1.4.6 Demonstrate an understanding of the addition and subtraction of decimal numbers to hundredths
- 4.1.4.7 Interpret multiplication and division problems using concrete materials, drawings, and symbols

Benchmark 4.1.5: Understand the significance and use operations with fractions, using concrete materials, drawings, and rules

Indicators:

- 4.1.5.1 Add and subtract fractions with common denominators
- 4.1.5.2 Add and subtract mixed numbers with common denominators

Benchmark 4.1.6: Justify in verbal expression the method chosen for calculations, estimation, mental computation, concrete materials, algorithms (rules for calculations)

Indicators:

- 4.1.6.1 Pose problems involving whole numbers and solve them using the appropriate calculation method: pencil and paper, or calculator (e.g., what 2 items whose total cost is less than \$20 can I buy from this catalog?)
- 4.1.6.2 Explain their thinking and method used when solving problems involving whole numbers
- 4.1.6.3 Recognize situations in problem solving that call for multiplication and division and interpret the answer correctly (e.g., recognize that multiplication is required in problems involving area and that the solution is in units squared)
- 4.1.6.4 Decide when to use mental math versus computation
- 4.1.6.5 Use a variety of strategies for problem solving
- 4.1.6.6 Select the appropriate operation and solve one-step problems involving whole numbers and decimals without a calculator (e.g., how much change will you receive when you purchase an \$8.95 item with \$10?)
- 4.1.6.7 Round numbers to the nearest place value from .01 to 100,000
- 4.1.6.8 Estimate answers to operations using rounding and other methods

Benchmark 4.1.7: Be proficient at mental calculations for the following operations

Indicators:

- 4.1.7.1 Count by 3's, 4's, 6's, 7's, 8's, 9's, and 10's to 100
- 4.1.7.2 Multiply and divide whole numbers mentally by 10, 100, and 1000
- 4.1.7.3 Demonstrate addition and subtraction facts to 20
- 4.1.7.4 Recall multiplication and division facts to 144

Benchmark 4.1.8: Understand the significance of numbers within the surrounding environment

Indicators

- 4.1.8.1 Identify and appreciate the use of numbers in the media
- 4.1.8.2 Identify the use of numbers in various careers
- 4.1.8.3 Add and subtract with decimals for making change and counting money
- 4.1.8.4 Discuss the use of numbers in the Bible

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STANDARD 2

The student understands and applies the concepts and procedures of algebra and patterns.

To meet this standard, the student will:

Benchmark 4.2.1: Demonstrate an understanding of mathematical relationships in patterns using concrete materials, drawings, and symbols

Indicators:

- 4.2.1.1 Recognize mathematical relationships in patterns (e.g., the second term is two more than the first, the second shape is the first shape turned through 90°)
- 4.2.1.2 Demonstrate equivalence in simple numerical equations using concrete materials, drawings, and symbols (e.g., $13 + 7 = 19 + 1$)
- 4.2.1.3 Relate addition, subtraction, multiplication and division to each other
- 4.2.1.4 Determine the value of a missing term in equations involving addition and subtraction, with and without the use of concrete materials and calculators
- 4.2.1.5 Recognize the addition and multiplication properties (commutative, associative, identity and zero)

Benchmark 4.2.2: Identify, extend, and create patterns (linear and non-linear geometric patterns, number and measurement patterns, and patterns in their environment)

Indicators:

- 4.2.2.1 Identify, extend, and create patterns for number relationships (functions)
- 4.2.2.2 Describe patterns encountered in any context (e.g., quilt patterns, money), make models of the patterns, and create charts to display the patterns
- 4.2.2.3 Identify, extend, and create patterns by changing two or more attributes (e.g., color, size, orientation) (geometric)
- 4.2.2.4 Given a rule expressed in informal language, extend a pattern
- 4.2.2.5 Identify examples of patterns in God's creation

Benchmark 4.2.3: Analyze and discuss patterning rules

Indicators:

- 4.2.3.1 Analyze number patterns and state the rule for any relationships
- 4.2.3.2 Discuss and defend the choice of a pattern rule
- 4.2.3.3 Translate between verbal and algebraic expressions and equations

Benchmark 4.2.4: Apply patterning strategies to problem-solving situations

Indicators:

- 4.2.4.1 Pose and solve problems by applying a patterning strategy (e.g., solve an area problem by extending a geometric grid pattern)
- 4.2.4.2 Pose and solve problems by translating between written and algebraic expression

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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STANDARD 3

The student understands and applies the concepts and procedures of geometry.

To meet this standard, the student will:

Benchmark 4.3.1: Identify, describe, compare, and classify geometric angles and polygons

Indicators:

- 4.3.1.1 Identify basic geometric figures in a plane (such as line segment, endpoint, ray, plane)
- 4.3.1.2 Measure with a protractor and classify angles (acute, right, and obtuse)
- 4.3.1.3 Classify lines as intersecting, perpendicular or parallel
- 4.3.1.4 Classify polygons by number of sides and angles
- 4.3.1.5 Classify triangles and quadrilaterals
- 4.3.1.6 Identify parts of a circle
- 4.3.1.7 Discover geometric patterns and solve geometric puzzles

Benchmark 4.3.2: Identify congruent and similar figures using transformations

Indicators:

- 4.3.2.1 Identify similar and congruent figures
- 4.3.2.2 Explore congruency through transformations
- 4.3.2.3 Identify rotational symmetry on two-dimensional shapes
- 4.3.2.4 Construct congruent figures in a variety of ways (e.g., cutting and matching, using a geoboard)
- 4.3.2.5 Demonstrate an understanding of translations, reflections, and rotations (e.g., on a geoboard or dot paper)
- 4.3.2.6 Apply translations, reflections, and rotations using concrete materials and drawings to pose and solve problems

Benchmark 4.3.3: Investigate the attributes, draw and build three-dimensional objects and models

Indicators:

- 4.3.3.1 Identify the types and parts of three dimensional shapes
- 4.3.3.2 Draw plane and solid figures
- 4.3.3.3 Design and make skeletons and nets (e.g., with straws or toothpicks and marshmallows) for three-dimensional figures

Benchmark 4.3.4: Describe location and movements on a grid

Indicator:

- 4.3.4.1 Demonstrate an understanding of coordinate systems and an ability to use them in simple games (e.g., battleship, bingo).

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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Benchmark 4.3.5: Use language effectively to describe geometric concepts, reasoning, and investigations, and coordinate systems

Indicators:

- 4.3.5.1 Use mathematical language to describe geometric ideas (e.g., line, angle)
- 4.3.5.2 Recognize and describe the occurrence and application of geometric properties and principles in the everyday world
- 4.3.5.3 Discuss geometric concepts with peers and explain their understanding of the concepts
- 4.3.5.4 Discuss ideas, make connections, and articulate hypotheses about geometric properties and relationships

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STANDARD 4

The student understands and applies the concepts and procedures of measurement.

To meet this standard, the student will:

Benchmark 4.4.1: Demonstrate an understanding of and ability to apply appropriate metric and customary prefixes in measurement and estimation activities

Indicators:

- 4.4.1.1 Draw items given specific lengths (e.g., a pencil 5 cm long) in metric and American systems
- 4.4.1.2 Estimate lengths in metric and American systems
- 4.4.1.3 Estimate weight in metric and American systems
- 4.4.1.4 Estimate capacity in metric and American units
- 4.4.1.5 Distinguish between estimated and precise measurements and know when each kind is required

Benchmark 4.4.2: Identify relationships among measurement concepts (e.g., linear, mass capacity)

Indicators:

- 4.4.2.1 Describe the relationship and convert between millimeters, centimeters, decimeters, meters, and kilometers
- 4.4.2.2 Describe the relationship and convert between inches, feet, yards, and miles
- 4.4.2.3 Describe the relationship and convert between grams and kilograms and milliliters and liters
- 4.4.2.4 Describe the relationship and convert between ounces, pounds, and tons; and cups, pints, quarts, and gallons
- 4.4.2.5 Describe the relationship and convert between teaspoon, tablespoon, cups, pints, quarts, and gallons

Benchmark 4.4.3: Estimate, measure, and record the perimeter and the area of two-dimensional shapes, and compare the perimeters and areas

Indicators:

- 4.4.3.1 Select the most appropriate standard unit (millimeter, centimeter, decimeter, meter, kilometer, or inches, feet, yards or miles) to measure linear dimensions and the perimeter of regular polygons
- 4.4.3.2 Select the most appropriate standard unit (square centimeter, square meter, square inch, square foot) to measure the area of polygons of different sizes
- 4.4.3.3 Use linear dimensions and perimeter and area measures with precision to measure length, perimeter, and area
- 4.4.3.4 Estimate the area of regular polygons and measure the area in square centimeters using grid paper
- 4.4.3.5 Understand that different two-dimensional shapes can have the same perimeter or the same area
- 4.4.3.6 Explain the meaning of linear dimension, perimeter, and area
- 4.4.3.7 Relate measures of area and perimeter to the linear dimensions of parts of rectangles or squares
- 4.4.3.8 Explain the difference between perimeter and area and indicate when each measure should be used
- 4.4.3.9 Use a variety of techniques (ruler, geoboard, formula, etc.) to find perimeter
- 4.4.3.10 Use a variety of techniques (arrays, geoboard, formula, etc.) to find area

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Benchmark 4.4.4: Solve problems related to their day-to-day environment using measurement and estimation

Indicators:

- 4.4.4.1 Estimate and measure time intervals to the nearest second
- 4.4.4.2 Determine elapsed time
- 4.4.4.3 Convert among units of time (seconds, minutes, days, years, etc.)
- 4.4.4.4 Estimate, read, and record temperature to the nearest degree Fahrenheit and Celsius
- 4.4.4.5 Make purchases of and change for items up to \$50
- 4.4.4.6 Estimate the amount of money in collections of coins and bills to \$50 and count to determine the total value

Benchmark 4.4.5: Estimate, measure, and record the capacity of containers and the mass of familiar objects, compare the measures, and model the volume of three-dimensional figures

Indicators:

- 4.4.5.1 Select the most appropriate standard metric unit (e.g., milliliter, liter) to measure the capacity of containers
- 4.4.5.2 Select the most appropriate standard customary unit (e.g. pints, quarts, gallons) to measure capacity of containers
- 4.4.5.3 Estimate, measure, and record the mass of objects using metric units (gram, kilogram), compare the measures, and order objects by mass
- 4.4.5.4 Estimate measure and record the mass of objects using customary units (ounces, pounds), compare the measures, and order objects by mass
- 4.4.5.5 Select the most appropriate unit to measure mass (e.g., milligram or gram, ounces, pound, or ton)

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STANDARD 5

The student understands and applies the concepts and procedures of data analysis and probability.

To meet this standard, the student will:

Benchmark 4.5.1: Collect and organize data

Indicators:

- 4.5.1.1 Conduct surveys and record data on tally charts
- 4.5.1.2 Display data on horizontal and vertical bar graphs and on pictographs using many-to-one correspondence (e.g., if a picture of 1 car represents 4 cars, then a picture of 1.5 cars represents 6 actual cars)
- 4.5.1.3 Use conventional symbols, titles, and labels when displaying data
- 4.5.1.4 Recognize the purposes of different parts of a graph: title, labels, axes
- 4.5.1.5 Construct labeled graphs (e.g., labeled with titles, horizontal and vertical axes, intervals, and data points)
- 4.5.1.6 Create intervals suited to the range and distribution of the data gathered (e.g., a graph with a range of 100 years is better divided into intervals of 10 years than 1 year)
- 4.5.1.7 Decide which type of graph is appropriate in given situations
- 4.5.1.8 Identify examples of the use of data in the world around them

Benchmark 4.5.2: Interpret displays of data and present the information using mathematical terms

Indicators:

- 4.5.2.1 Explain how data were collected and describe the results of a survey
- 4.5.2.2 Find the range mean, median, mode for a set of data
- 4.5.2.3 Read and interpret data presented on tables, charts, and graphs (e.g., line plots, bar graphs, line graphs, circle graphs) and discuss the important features

Benchmark 4.5.3: Evaluate and use data from graphic organizers

Indicator:

- 4.5.3.1 Explain and compare sets of data

Benchmark 4.5.4: Demonstrate an understanding of probability concepts

Indicators:

- 4.5.4.1 List all possible outcomes for an experiment
- 4.5.4.2 Compare experimental results with predicted results
- 4.5.4.3 Conduct simple probability experiments and use the results to make decisions
- 4.5.4.4 Use tree diagrams to organize data according to several criteria
- 4.5.4.5 Describe likelihood and fairness of an experiment

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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