

Grade 4 - Mathematics

Standards I: Mathematical Processes.

- A. *Use a variety of tools and strategies in problem solving. I-A*
- B. *Apply mathematical knowledge and skills routinely in other content areas and practical situations. I-B*
- C. *Recognize and use connections between equivalent representations and related procedures. I-C*
- D. *Evaluate the reasonableness of predictions, estimations and solutions. I-D*
- E. *Use a variety of mathematical representations to organize, record, and communicate mathematical ideas. I-E*
- F. *Use mathematical language and symbols to explain, analyze, and justify mathematical ideas, strategies, and solutions. I-F*
- G. *Write clearly and coherently about mathematical thinking and ideas. I-G*

Benchmarks for Standard I:

- **Use reasoning skills to determine and explain the reasonableness of a solution with respect to the problem situation.**
- **Represent problem situations in a variety of forms (physical model, diagram, in words or symbols), and recognize when some ways of representing a problem may be more helpful than others.**
- **Read, interpret, discuss and write about mathematical ideas and concepts using both everyday and mathematical language.**
- **Begin to use mathematical language to explain and justify mathematical ideas, strategies and solutions.**

Standards II: Number, Number Sense and Operations.

- A. Identify and generate equivalent forms of fractions and decimals. For example: II-C

1. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., $\frac{1}{2}$, $\frac{5}{10}$, "five tenths," 0.5, shaded rectangles with half, and five tenths.
2. Understand and explain that $\frac{10}{10}$ is the same as one whole in both fraction and decimal form.
- B. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers through millions and decimals through thousandth. II-C
- C. Round whole numbers to a given place value. II-D
- D. Use models and points of reference to compare commonly used fractions. II-C, I-E
- E. Use associative and distributive properties to simplify and perform computations; e.g., use left to right multiplication and the distributive property to find an exact answer without paper and pencil, such as $5 \times 47 = 5 \times 40 + 5 \times 7 = 200 + 35 = 235$. II-B,D
- F. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders; e.g., situations involving measurement, money. II-B,D
- G. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies. II-D
- H. Use physical models, visual representations, and paper and pencil to add and subtract decimals and commonly used fractions with like denominators. II-A,B,D, I-E
- I. Develop and explain strategies for performing computations mentally. II-D
- J. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an organized approach, and verify and interpret results with respect to the original problem. II-D
- K. Demonstrate fluency in adding and subtracting whole numbers and develop skills in multiplying and dividing whole numbers by one and two digit numbers and multiples of ten. II-B,D

Benchmarks for Standard II:

- **Estimate the results of whole number computations using a variety of strategies, and judge reasonableness.**
- **Represent commonly used fractions and mixed numbers using words and physical models.**
- **Analyze and solve multi-step problems involving addition, subtraction, multiplication and division of whole numbers.**
- **Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil.**

Standard III: Measurement.

- A. Solve problems involving counting money and making change, using both coins and paper bills. III-A
- B. Relate the number of units to the size of the units used to measure an object; e.g., compare the number of cups to fill a pitcher to the number of quarts to fill the same pitcher. III-D
- C. Demonstrate and describe perimeter as "distance around" and area as covering a two-dimensional shape, and volume as filling a three-dimensional object. III-C
- D. Identify and select appropriate units to measure: III-A,B
 1. perimeter – string or links (inches or centimeters).
 2. area – tiles (square inches or square centimeters).
 3. volume – cubes (cubic inches or cubic centimeters).
- E. Develop and use strategies to find perimeter using string or links, area using tiles or a grid, and volume using cubes; e.g., count squares to find area of regular or irregular shapes on a grid, layer cubes in a box to find its volume. III-D
- F. Make simple unit conversions within a measurement system; e.g., inches to feet, kilograms to grams, quarts to gallons. III-D

Benchmarks for Standard III:

- **Select appropriate units for perimeter, area, weight, volume, time and temperature, using: objects of uniform size; U.S. customary units, e.g. mile, square inch, cubic inch, second, degree Fahrenheit, and other units as appropriate; metric units; e.g., millimeter, kilometer, square centimeter, kilogram, cubic centimeter, degree Celsius, and other units as appropriate.**
- **Know that the number of units is inversely related to the size of the unit for any item being measured.**
- **Develop common referents for units of measure for length, weight, volume and time to make comparisons and estimates.**
- **Identify appropriate tools and apply counting techniques for measuring side lengths, perimeter and area of squares, rectangles, and simple irregular two-dimensional shapes, volume of rectangular prisms, and time and temperature.**

Standard IV: Geometry and Spatial Sense.

- Identify, describe and model intersecting, parallel and perpendicular lines and line segments; e.g., use straws or other material to model lines. IV-A,G
- Describe, classify, compare and model two- and three-dimensional objects using their attributes. IV-A
- Identify similarities and differences of quadrilaterals; e.g., squares, rectangles, parallelograms and trapezoids. IV-A,G
- Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles). IV-D,G
- Describe points, lines and planes, and identify models in the environment. IV-C,G
- Specify locations and plot ordered pairs on a coordinate plane, using first quadrant points. IV-B
- Identify and describe line symmetry in 2-dimensional shapes and designs. IV-F

- Use geometric models to solve problems in other areas of mathematics, such as number (multiplication/division) and measurement (area, perimeter, border). IV-I, I-E

Benchmarks for Standard IV:

- **Describe and identify points, lines and planes in the environment.**
- **Describe and identify intersecting, parallel and perpendicular lines or segments in the environment.**
- **Identify and classify right, obtuse, acute and straight angles.**
- **Develop definitions of classes of shapes.**
- **Identify and describe line symmetry in two-dimensional shapes and designs.**

Standard V: Patterns, Functions and Algebra.

- Use models and words to describe, extend and make generalizations of patterns and relationships occurring in computation, numerical patterns, geometry, graphs and other applications. V-B, I-E
- Represent and analyze patterns and functions using words, tables and graphs. V-D
- Use rules and variables to describe patterns and other relationships. V-G
- Represent mathematical relationships with equations or inequalities. V-D,J

Benchmarks for Standard V:

- **Write and solve open sentences and explain strategies.**
- **Represent an unknown quantity as a variable using a symbol, including letters.**
- **Use variables to create and solve equations representing problem situations.**

Standard VI: Data Analysis and Probability.

- Create a plan for collecting data for a specific purpose. VI-A
- Represent and interpret data using tables, bar graphs, line plots and line graphs. VI-B
- Interpret and construct Venn diagrams to sort and describe data. VI-B,C

- Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data. VI-B,C
- Propose and explain interpretations and predictions based on data displayed in tables, charts and graphs. VI-C,F
- Identify the range, median and mode in a set of data. VI-C
- Conduct simple probability experiments and draw conclusions from the results; e.g., rolling number cubes or drawing marbles from a bag. VI-G
- Represent the likelihood of possible outcomes for chance situations; e.g., probability of selecting a red marble from a bag containing 3 red and 5 white marbles. VI-F
- List and count all possible combinations using one member from each of several sets, each containing 2 or 3 members; e.g., the number of possible outfits from 3 shirts, 2 shorts and 2 pairs of shoes. VI-H

Benchmarks for Standard VI:

- **Construct charts, tables and graphs to represent data, including line graphs, line plots and Venn diagrams.**
- **Read, interpret and construct graphs in which icons represent more than a single unit or intervals greater than one; e.g., each Δ = 10 bikes or the intervals on an axis are multiples of ten.**
- **Conduct a simple probability experiment and draw conclusions about the likelihood of possible outcomes.**
- **Identify and represent possible outcomes, such as arrangements of a set of up to four members and possible combinations from several sets, each containing 2 or 3 members.**
- **Use the set of possible outcomes to describe and predict events.**

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