

# Math

## GRADE 5

### STANDARD 1

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

To meet this standard, the student will:

**Benchmark 5.1.1: Represent and explore relationships among whole numbers, decimals, mixed numbers, and fractions using concrete materials and drawings**

**Indicators:**

- 5.1.1.1 Recognize and read numbers from 0.001 to 1,000,000,000
- 5.1.1.2 Read and write whole numbers to 1,000,000 in standard, expanded, and written forms (e.g., 82,011 = 80,000 + 2000 + 10 + 1 = eighty-two thousand eleven)
- 5.1.1.3 Explore place value relationships
- 5.1.1.4 Represent whole number multiples and factors (LCM and GCF)
- 5.1.1.5 Represent whole numbers as prime factorization
- 5.1.1.6 Explore relationship of fractions as parts of a whole

**Benchmark 5.1.2: Compare and order, whole numbers, decimals, fractions, and percents using concrete materials and drawings along with rules**

**Indicators:**

- 5.1.2.1 Compare, order, and represent the place value of whole numbers and decimals from 0.001 to 1,000,000,000 using concrete materials, drawings, and symbols.
- 5.1.2.2 Compare, order and represent decimals as part of a whole (based on concrete material. drawings, number lines, decimals, etc.
- 5.1.2.3 Compare, order and represent fractions as part of a whole (based on concrete material. drawings, number lines, fractions, etc.
- 5.1.2.4 Convert among fractions, decimals, and percents

**Benchmark 5.1.3: Understand and use basic operations (addition, subtraction, multiplication and division) without a calculator**

**Indicators:**

- 5.1.3.1 Add with 2 or 3 numbers over 1,000
- 5.1.3.2 Subtract 2 numbers over 1,000
- 5.1.3.3 Add and subtract decimals (down to .001) using concrete materials, drawings and symbols (like money, etc.)
- 5.1.3.4 Multiply up to 2 multi-digit numbers (including decimals)
- 5.1.3.5 Divide up to a 4-digit number and two-digit number with and without remainders (including decimals)
- 5.1.3.6 Add and subtract money amounts to 1¢ using concrete materials, drawings, and symbols
- 5.1.3.7 Use order of operations to evaluate multi-step operations

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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**Benchmark 5.1.4: Develop proficiency in adding/multiplying/subtracting/dividing by multiples of 10**

**Indicators:**

- 5.1.4.1 Mentally multiply and divide whole numbers by multiples of 10
- 5.1.4.2 Mentally multiply and divide decimals by multiples of 10
- 5.1.4.3 Model numbers grouped in 10's and 1's and use zero as a place holder

**Benchmark 5.1.5: Understand the significance and use operations with fractions, using concrete materials, drawings, and rules**

**Indicators:**

- 5.1.5.1 Convert among equivalent fractions
- 5.1.5.2 Convert between a mixed number and improper fraction
- 5.1.5.3 Relate fractions to division (e.g. 16 divided by 3 is  $5\frac{1}{3}$ )
- 5.1.5.4 Add and subtract fractions with and without common denominator
- 5.1.5.5 Multiply and divide fractions
- 5.1.5.6 Estimate operations with fractions, especially for reasonableness of solution

**Benchmark 5.1.6: Justify in verbal expression the method chosen for calculations: estimation, mental computation, concrete materials, algorithms, or calculators**

**Indicators:**

- 5.1.6.1 Pose and solve number problems involving more than one operation
- 5.1.6.2 Describe their thinking and method used as they solve problems
- 5.1.6.3 Decide when to use mental math versus computation
- 5.1.6.4 Explain processes and solutions with whole numbers and decimals using mathematical language
- 5.1.6.5 Use a variety of strategies for problem solving
- 5.1.6.6 Estimate answers to operations using rounding and other methods
- 5.1.6.7 Round whole numbers and decimals to a given place value

**Benchmark 5.1.7: For the following operations, students will be proficient at mental calculations.**

**Indicators:**

- 5.1.7.1 Identify the effect of zero in addition, subtraction, multiplication, and division
- 5.1.7.2 Demonstrate addition and subtraction facts to 20 using concrete materials
- 5.1.7.3 Mentally multiply up to  $12 \times 12$
- 5.1.7.4 Mentally divide up to the 12's
- 5.1.7.5 Identify the halves, fourth, and tenths as fractions, decimals and percents

**Benchmark 5.1.8: Understand the significance of numbers within the surrounding environment**

**Indicators:**

- 5.1.8.1 Discuss the use of number and arrangement in real-life situations (e.g., there are 21 children in my class, 11 girls and 10 boys)
- 5.1.8.2 Use a seriation line to display relationships of order (e.g., order of events in a story)
- 5.1.8.3 Estimate the number of objects and check the reasonableness of an estimate by counting
- 5.1.8.4 Discuss the use of numbers in the Bible

*Addition:* 3 four-digit numbers

*Subtraction:* 2 four-digit numbers

*Multiplication:* a two-digit number by a two-digit number

*Division:* a four-digit number by a two-digit number with and without remainders

*Key:* 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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# Math

## GRADE 5

### STANDARD 2

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

To meet this standard, the student will:

**Benchmark 5.2.1: Recognize and discuss the mathematical relationships between and among patterns**

**Indicators:**

- 5.2.1.1 Recognize the relationship between the position of a number and its value (e.g., the first term is 1, the second term is 4, the third term is 7, and so on)
- 5.2.1.2 Recognize the addition and multiplication properties (commutative, associative, identity and zero)

**Benchmark 5.2.2: Identify, extend, and create patterns in a variety of contexts**

**Indicators:**

- 5.2.2.1 Identify, extend, and create patterns that identify changes in terms of two variables (e.g., 1, 2, 4, 5, 7, 8, 10, 11, 13 . . . goes up by one, then up by two)
- 5.2.2.2 Identify and extend patterns to solve problems in meaningful contexts (e.g., leaves on trees, spirals on pineapples)
- 5.2.2.3 Identify examples of patterns from the Bible

**Benchmark 5.2.3: Analyze and discuss patterning rules**

**Indicators:**

- 5.2.3.1 Describe patterns encountered in any context (e.g., computer games, television show times), make models of the patterns, and create charts to display the patterns
- 5.2.3.2 Analyze number patterns and state the rule for any relationships
- 5.2.3.3 Discuss and defend the choice of a pattern rule
- 5.2.3.4 Given a rule expressed in informal mathematical language, extend a pattern
- 5.2.3.5 Translate between verbal and algebraic expressions and equations

**Benchmark 5.2.4: Create tables to display patterns**

**Indicators:**

- 5.2.4.1 Create input and output tables (functions)
- 5.2.4.2 Use function tables to write rules (equations)

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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**Benchmark 5.2.5: Apply patterning strategies to problem-solving situations**

**Indicators:**

- 5.2.5.1 Pose and solve problems by applying a patterning strategy (e.g., what effect will doubling the first number have on the pattern?)
- 5.2.5.2 Determine the value of a missing factor in equations involving addition, subtraction, multiplication, and division.
- 5.2.5.3 Determine solutions using patterning strategies to problems solving situations

# Math

## GRADE 5

### STANDARD 3

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

To meet this standard, the student will:

**Benchmark 5.3.1: Identify, describe, compare, and classify geometric angles and polygons**

**Indicators:**

- 5.3.1.1 Identify basic geometric figures in a plane (such as point, line, ray, segment, and plane)
- 5.3.1.2 Identify basic relationships of rays and lines (angles, parallel, intersecting, and perpendicular)
- 5.3.1.3 Sort polygons (triangles and quadrilaterals) according to the number of sides, angles, and vertices
- 5.3.1.4 Classify two-dimensional shapes according to angle and side properties (e.g., obtuse, scalene)
- 5.3.1.5 Name vertex and endpoints of lines
- 5.3.1.6 Identify parts of a circle
- 5.3.1.7 Measure and construct angles using a protractor
- 5.3.1.8 Construct triangles given specific measures of angles and sides, using a variety of tools

**Benchmark 5.3.2: Identify congruent and similar figures using transformations**

**Indicators:**

- 5.3.2.1 Demonstrate an understanding of congruent and similar figures
- 5.3.2.2 Demonstrate congruence of figures using paper folding, reflections in a transparent mirror (Mira), and various computer applications

**Benchmark 5.3.3: Explore transformations of geometric figures**

**Indicators:**

- 5.3.3.1 Describe the effect of a translation, reflection, and rotation
- 5.3.3.2 Explore tiling patterns that cover a plane
- 5.3.3.3 Construct two-dimensional shapes with one line of symmetry (tessellation)
- 5.3.3.4 Apply translations, reflections, and rotations (e.g., using concrete materials and grid paper or isometric dot paper) to pose and solve problems

**Benchmark 5.3.4: Investigate the attributes, draw and build three-dimensional objects and models**

**Indicators:**

- 5.3.4.1 Classify 3-dimensional figures (based on base)
- 5.3.4.2 Identify nets for a variety of polyhedra from drawings while holding three-dimensional figures in their hands
- 5.3.4.3 Construct nets of cubes and pyramids using a variety of materials
- 5.3.4.4 Sketch the faces that make up a three-dimensional figure by looking at a three-dimensional figure

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

**Benchmark 5.3.5: Use mathematical language effectively to describe geometric concepts, reasoning, and investigations, and coordinate systems**

**Indicators:**

- 5.3.5.1 Use mathematical language to describe geometric ideas (e.g., quadrilateral, scalene triangle)
- 5.3.5.2 Recognize and explain the occurrence and application of geometric properties and principles in the everyday world
- 5.3.5.3 Discuss geometric concepts with peers and use mathematical language to explain their understanding of the concepts
- 5.3.5.4 Discuss ideas, make conjectures, and articulate hypotheses about geometric properties and relationships

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## GRADE 5

### STANDARD 4

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

To meet this standard, the student will:

**Benchmark 5.4.1:** Demonstrate an understanding of and ability to apply appropriate metric prefixes in measurement and estimation activities

**Indicators:**

- 5.4.1.1 Use prefixes in the metric system correctly
- 5.4.1.2 Select the most appropriate standard unit (millimeter, centimeter, decimeter, meter, feet, yards, miles, or kilometer) to measure linear dimensions and the perimeter of irregular polygons

**Benchmark 5.4.2:** Identify relationships between and among measurement concepts (linear, temporal, monetary)

**Indicators:**

- 5.4.2.1 Determine the relationship between linear units (e.g., centimeter to meter, feet to yards and miles)
- 5.4.2.2 Convert among the linear units (metric and American)
- 5.4.2.3 Determine the relationship between capacity units
- 5.4.2.4 Convert among the capacity units (metric and American)
- 5.4.2.5 Determine the relationship between weight units
- 5.4.2.6 Convert among the weight/mass units (metric and American)

**Benchmark 5.4.3:** Solve problems related to the calculation of the perimeter and the area of regular and irregular two-dimensional shapes

**Indicators:**

- 5.4.3.1 Investigate measures of circumference using concrete materials (e.g., use string to measure the circumference of cans or bottles)
- 5.4.3.2 Develop rules for calculating the perimeter and area of rectangles, generalize rules, and develop formulas
- 5.4.3.3 Estimate and calculate the perimeter and area of rectangles and squares
- 5.4.3.4 Explain the rules used in calculating the perimeter and area of rectangles and squares
- 5.4.3.5 Estimate the area of irregular polygons and measure the area by dividing the polygons into parts, using grid paper
- 5.4.3.6 Develop methods of using grid paper to track and measure the perimeter and area of polygons and irregular two-dimensional shapes

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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# Math

## GRADE 5

### STANDARD 5

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

To meet this standard, the student will:

**Benchmark 5.5.1: Collect and organize data**

**Indicators:**

- 5.5.1.1 Design surveys, collect data, and record the results on given spreadsheets or tally charts
- 5.5.1.2 Display data on graphs (e.g., bar graphs, pictographs, histograms, stem and leaf plots, and line graphs) by hand
- 5.5.1.3 Construct labeled bar graphs, frequency tables, line plots, and stem and leaf plots by hand
- 5.5.1.4 Explain the choice of intervals used to construct a bar graph or the choice of symbols on a pictograph

**Benchmark 5.5.2: Interpret displays of data and present the information using mathematical terms**

**Indicators:**

- 5.5.2.1 Read and interpret data from a variety of types of graphs.
- 5.5.2.2 Find range, mode, mean, and median for a set of data, and determine which best fits the data
- 5.5.2.3 Evaluate data presented on tables, charts, and graphs and use the information in discussion (e.g., discuss patterns in the data presented in the cells of a table that is part of a report on a science experiment)

**Benchmark 5.5.3: Evaluate and use data from graphic organizers**

**Indicators:**

- 5.5.3.1 Recognize that graphs, tables, and charts can present data with accuracy or bias
- 5.5.3.2 Analyze how data were collected and discuss the reasonableness of the results
- 5.5.3.3 Explain and/or compare the statistics of a set of data

**Benchmark 5.5.4: Demonstrate an understanding of probability concepts and use mathematical symbols**

**Indicators:**

- 5.5.4.1 Connect real-life statements with probability concepts (e.g., if I am one of five people in a group, the probability of being chosen is 1 out of 5)
- 5.5.4.2 Predict probability in simple experiments and use fractions to describe probability
- 5.5.4.3 Use tree diagrams to record the results of simple probability experiments

Key: 1. Grade 1.1 Standard 1.1.1 Benchmark 1.1.1.1 Indicator

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**Benchmark 5.5.5: Pose and solve simple problems involving the concept of probability**

**Indicator:**

- 5.5.5.1 Use knowledge of probability to pose and solve simple problems (e.g., what is the probability of snowfall in Santiago during the month of April, in New York)