

Massachusetts State Learning Standards for Grade Four

<p style="text-align: center;">Strand 1: Number Sense and Operations</p> <p style="text-align: center;"><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	Do you cover/teach this concept/skill?	Do most of your students understand the concept and/or demonstrate competency in the skill?	Do you have adequate resources to teach the concept/skill?	Do you use materials other than those provided to you by Lexington Public Schools?	<p>: Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>λ Understand meanings of operations and how they relate to one another</p> <p>σ Compute fluently and make reasonable estimates</p> <p>Comments:</p>
4.N.1 Exhibit an understanding of the base ten number system by reading, modeling, writing, and interpreting whole numbers to at least 100,000; demonstrating an understanding of the values of the digits; and comparing and ordering the numbers. :					
4.N.2 Represent, order, and compare large numbers (to at least 100,000) using various forms, including expanded notation, e.g., $853 = 8 \times 100 + 5 \times 10 + 3$. :					
4.N.3 Demonstrate an understanding of fractions as parts of unit wholes, as parts of a collection, and as locations on the number line. :					
4.N.4 Select, use, and explain models to relate common fractions and mixed numbers ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{12}$, and $1\frac{1}{2}$), find equivalent fractions, mixed numbers, and decimals, and order fractions. :					
4.N.5 Identify and generate equivalent forms of common decimals and fractions less than one whole (halves, quarters, fifths, and tenths). :					
4.N.6 Exhibit an understanding of the base ten number system by reading, naming, and writing decimals between 0 and 1 up to the hundredths. :					

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4.N.7 Recognize classes (in particular, odds, evens; factors or multiples of a given number; and squares) to which a number may belong, and identify the numbers in those classes. Use these in the solution of problems. :					
4.N.8 Select, use, and explain various meanings and models of multiplication and division of whole numbers. Understand and use the inverse relationship between the two operations. λ					
4.N.9 Select, use, and explain the commutative, associative, and identity properties of operations on whole numbers in problem situations, e.g., $37 \times 46 = 46 \times 37$, $(5 \times 7) \times 2 = 5 \times (7 \times 2)$. λ					
4.N.10 Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money. λ					
4.N.11 Know multiplication facts through 12 x 12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g., 3 x 5 is related to 30 x 50, 300 x 5, and 30 x 500. σ					
4.N.12 ¹ Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently. σ					

¹ Although this standard is appropriate as stated for this grade span, the state assessment program at the 3–4 grade span will test multiplication of only up to two digits by two digits at the present time.

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4.N.13 Divide up to a three-digit whole number with a single-digit divisor (with or without remainders) accurately and efficiently. Interpret any remainders. σ					
4.N.14 Demonstrate in the classroom an understanding of and the ability to use the conventional algorithms for addition and subtraction (up to five-digit numbers), and multiplication (up to three digits by two digits). σ					
4.N.15 Demonstrate in the classroom an understanding of and the ability to use the conventional algorithm for division of up to a three-digit whole number with a single-digit divisor (with or without remainders). σ					
4.N.16 Round whole numbers through 100,000 to the nearest 10, 100, 1000, 10,000, and 100,000. σ					
4.N.17 Select and use a variety of strategies (e.g., front-end, rounding, and regrouping) to estimate quantities, measures, and the results of whole-number computations up to three-digit whole numbers and amounts of money to \$1000, and to judge the reasonableness of the answer. σ					
4. N.18 Use concrete objects and visual models to add and subtract common fractions. σ					

Exploratory Concepts and Skills

- ✓ Extend multiplication and division to larger-digit numbers.
- ✓ Use models to explore multiplication and division with fractions (to twelfths) and decimals.
- ✓ Investigate number theory concepts, e.g., prime and composite numbers.
- ✓ Investigate the concept of ratio, e.g., the number of students to the number of teachers.

- ✓ Use concrete objects and visual models to add and subtract common decimals.
- ✓ Explore numbers less than zero by extending the number line and by using familiar applications such as temperature.
- ✓ Investigate the distributive property of multiplication over addition for single-digit multipliers, e.g., 7×28 is equivalent to $7 \times (10 + 5)$ is equivalent to $7 \times 10 + 7 \times 5$.

<p>Strand 2: Patterns, Relations, and Algebra <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	Do you cover/teach this concept/skill?	Do most of your students understand the concept and/or demonstrate competency in the skill?	Do you have adequate resources to teach the concept/skill?	Do you use materials other than those provided to you by Lexington Public Schools?	<p>: Understand patterns, relations, and functions λ <u>Represent and analyze</u> mathematical situations and structures using algebraic symbols σ <u>Use mathematical models</u> to represent and understand quantitative relationships ν <u>Analyze change</u> in various contexts</p> <p>Comments</p>
4.P.1 Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiplication patterns like 3, 30, 300, 3000, : λ					
4.P.2 Use symbol and letter variables (e.g., Δ , x) to represent unknowns or quantities that vary in expressions and in equations or inequalities (mathematical sentences that use =, <, >). λ					
4.P.3 Determine values of variables in simple equations, e.g., $4106 - \nabla = 37$, $5 = \mu + 3$, and $\square - \mu = 3$. λ					
4.P.4 Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. σ					
4.P.5 Solve problems involving proportional relationships, including unit pricing (e.g., four apples cost 80¢, so one apple costs 20¢) and map interpretation (e.g., one inch represents five miles, so two inches represent ten miles). σ					
4.P.6 Determine how change in one variable relates to a change in a second variable, e.g., input-output tables. ν					

Exploratory Concepts and Skills

- ✓ Use concrete materials to build an understanding of equality and inequality.

- ✓ Explore properties of equality in number sentences: when equals are added to equals, then the sums are equal; when equals are multiplied by equals, then the products are equal, e.g., if $\square = 5$, then $3 \times \square = 3 \times 5$.

<p>Strand 3: Geometry <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	Do you cover/teach this concept/skill?	Do most of your students understand the concept and/or demonstrate competency in the skill?	Do you have adequate resources to teach the concept/skill?	Do you use materials other than those provided to you by Lexington Public Schools?	<p>: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships λ Specify locations and describe spatial relationships using coordinate geometry and other representational systems σ Apply transformations and use symmetry to analyze mathematical situations ν Use visualization, spatial reasoning, and geometric modeling to solve problems Comments:</p>
4.G.1 Compare and analyze attributes and other features (e.g., number of sides, faces, corners, right angles, diagonals, and symmetry) of two- and three-dimensional geometric shapes. :					
4.G.2 Describe, model, draw, compare, and classify two- and three-dimensional shapes, e.g., circles, polygons—especially triangles and quadrilaterals—cubes, spheres, and pyramids. :					
4.G.3 Recognize similar figures. :					
4.G.4 Identify angles as acute, right, or obtuse. :					
4.G.5 Describe and draw intersecting, parallel, and perpendicular lines. :					
4.G.6 Using ordered pairs of numbers and/or letters, graph, locate, identify points, and describe paths (first quadrant). λ					
4.G.7 Describe and apply techniques such as reflections (flips), rotations (turns), and translations (slides) for determining if two shapes are congruent. σ					
4.G.8 Identify and describe line symmetry in two-dimensional shapes. σ					
4.G.9 Predict and validate the results of partitioning, folding, and combining two- and three-dimensional shapes. σ					

Exploratory Concepts and Skills

- ✓ Predict and describe results of transformations (e.g., translations, rotations, and reflections) on two-dimensional shapes.
- ✓ Investigate two-dimensional representations of three-dimensional objects.

<p>Strand 4: Measurement <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	Do you cover/teach this concept/skill?	Do most of your students understand the concept and/or demonstrate competency in the skill?	Do you have adequate resources to teach the concept/skill?	Do you use materials other than those provided to you by Lexington Public Schools?	<p>: Understand measurable attributes of objects and the units, systems, and processes of measurement λ Apply appropriate techniques, tools, and formulas to determine measurements</p> <p>Comments:</p>
4.M.1 Demonstrate an understanding of such attributes as length, area, weight, and volume, and select the appropriate type of unit for measuring each attribute. :					
4.M.2 Carry out simple unit conversions within a system of measurement, e.g., hours to minutes, cents to dollars, yards to feet or inches, etc. :					
4.M.3 Identify time to the minute on analog and digital clocks using a.m. and p.m. Compute elapsed time using a clock (e.g., hours and minutes since...) and using a calendar (e.g., days since...). λ					
4.M.4 Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, and grids or by measuring. λ					
4.M.5 Identify and use appropriate metric and English units and tools (e.g., ruler, angle ruler, graduated cylinder, thermometer) to estimate, measure, and solve problems involving length, area, volume, weight, time, angle size, and temperature. λ					

Exploratory Concepts and Skills

- ✓ Develop the concepts of area and perimeter by investigating areas and perimeters of regular and irregular shapes created on dot paper, coordinate grids, or geoboards.
- ✓ Use concrete objects to explore volumes and surface areas of rectangular prisms.
- ✓ Investigate the use of protractors to measure angles.
- ✓ Identify common measurements of turns, e.g., 360° in one full turn, 180° in a half turn, and 90° in a quarter turn.
- ✓ Investigate areas of right triangles.
- ✓ Understand that measurements are approximations and investigate how differences in units affect precision.

<p>Strand 5: Data Analysis, Statistics, and Probability <i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	Do you cover/teach this concept/skill?	Do most of your students understand the concept and/or demonstrate competency in the skill?	Do you have adequate resources to teach the concept/skill?	Do you use materials other than those provided to you by Lexington Public Schools?	<p>: Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them λ Select and use appropriate statistical methods to analyze data σ Develop and evaluate inferences and predictions that are based on data ν Understand and apply basic concepts of probability Comments:</p>
4.D.1 Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. :					
4.D.2 Match a representation of a data set such as lists, tables, or graphs (including circle graphs) with the actual set of data. λ					
4.D.3 Construct, draw conclusions, and make predictions from various representations of data sets, including tables, bar graphs, pictographs, line graphs, line plots, and tallies. σ					
4.D.4 Represent the possible outcomes for a simple probability situation, e.g., the probability of drawing a red marble from a bag containing three red marbles and four green marbles. ν					
4.D.5 List and count the number of possible combinations of objects from three sets, e.g., how many different outfits can one make from a set of three shirts, a set of two skirts, and a set of two hats? ν					
4.D.6 Classify outcomes as certain, likely, unlikely, or impossible by designing and conducting experiments using concrete objects such as counters, number cubes, spinners, or coins. ν					

Exploratory Concepts and Skills

- ✓ Explore the concepts of median, mode, maximum and minimum, and range.
- ✓ Discuss what data-collection methods are appropriate for various types of investigations.
- ✓ Explore situations that involve probabilities of equally likely events.

- ✓ Investigate the construction of simple circle graphs.