

**Beverly Public Schools Curriculum
MATHEMATICS GRADE K**

| STRAND: NUMBER SENSE AND OPERATIONS | | |
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| DOE Standard Number | State Standard | Students will be able to: |
| K.N.1 | Count by ones to at least 20. | <ul style="list-style-type: none"> • Count by ones orally beginning from any number in the sequence from 0-20. • Order the numerals 0-20. |
| K.N.2 | Match quantities up to at least 10 with numerals and words. | <ul style="list-style-type: none"> • Create sets of objects to represent quantities from 0-10. • Recognize and write numeric symbols for quantities from 0-10. • Represent an empty set with the numeral "0". |
| K.N.3 | Identify positions of objects in sequences (e.g., first, second) up to fifth. | <ul style="list-style-type: none"> • Use ordinal numbers, 1st, 2nd, 3rd, 4th, and 5th verbally to identify positions. |
| K.N.4 | Compare sets of up to at least 10 concrete objects using appropriate language (e.g., none, more than, fewer than, same number of, one more than) and order numbers. | <ul style="list-style-type: none"> • Determine whether a group of objects is getting "more", "less", or "staying the same". • Represent two equal sets containing up to 10. • Compare sets of up to 10 objects using appropriate language. |
| K.N.5 | Understand the concepts of whole and half. | <ul style="list-style-type: none"> • Identify something that is whole. • Identify if something whole cut into 2 pieces has been fairly cut in half. • Tell or show how to cut something equally in half. |
| K.N.6 | Identify U.S. coins by name. | <ul style="list-style-type: none"> • Identify U.S. coins by name, e.g., penny, nickel, dime, quarter. |
| K.N.7 | Use objects and drawings to model and solve related addition and subtraction problems to ten. | <ul style="list-style-type: none"> • Interpret number sentences for addition and subtraction problems using numbers 0-10 with manipulatives (e.g., with number tiles, counters). • Use correct terminology (e.g., "plus", "minus", "equals"). • Create and interpret simple stories that can be solved using addition and subtraction. • Use objects and drawings to model and solve related addition and subtraction problems to 10. |
| K.N.8 | Estimate the number of objects in a group and verify results. | <ul style="list-style-type: none"> • Use the strategy of "guess and check" to estimate quantities of like objects from 0-10 and verify results. (Show one object in a container and ask, "How many more will fit?") • Use correct terminology (e.g., estimate, check, actual/real, amount) |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
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| K.P.1 | Identify the attributes of objects as a foundation for sorting and classifying, e.g., a red truck, a red block, and a red ball share the attribute of being red; a square block, a square cracker, and a square book share the attribute of being square shaped. | <ul style="list-style-type: none"> Identify objects by color, shape, and size that are the same or different. Identify common attributes after sorting and classifying objects. |
| K.P.2 | Sort and classify objects by color, shape, size, number, and other properties. | <ul style="list-style-type: none"> Sort and classify objects by color, shape, size, using attribute blocks, pattern blocks, etc Sort and classify objects by other properties (e.g., stripes, plain). Give reasons why objects were grouped together. |
| K.P.3 | Identify, reproduce, describe, extend, and create color, rhythmic, shape, number, and letter repeating patterns with simple attributes, e.g., ABABAB... | <ul style="list-style-type: none"> Predict what comes next in a two-part pattern. Make their own two-part pattern. Extend a two-part pattern. |
| K.P.4 | Count by fives and tens at least up to 50. | <ul style="list-style-type: none"> Same as state standard. |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
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| K.G.1 | Name, describe, sort, and draw simple two-dimensional shapes. | <ul style="list-style-type: none"> Name and identify two-dimensional shapes (circle, square, triangle, rectangle, rhombus, trapezoid, hexagon, oval). Describe and sort two-dimensional shapes using number of sides and corners. Draw two-dimensional shapes (circle, square, triangle, rectangle). |
| K.G.2 | Describe attributes of two-dimensional shapes, e.g., number of sides, number of corners. | <ul style="list-style-type: none"> Describe attributes (e.g., number of sides, number of corners) of a square, circle, rectangle, and triangle. |
| K.G.3 | Name and compare three-dimensional shapes. | <ul style="list-style-type: none"> Name three-dimensional shapes: sphere, cone, cylinder, and cube. |
| K.G.4 | Identify positions of objects in space, and use appropriate language (e.g., beside, inside, next to, close to, above, below, apart) to describe and compare their relative positions. | <ul style="list-style-type: none"> Same as state standard. See Math Frameworks, Nov. 2000, p. 37 |

STRAND: MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
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| K.M.1 | Recognize and compare the attributes of length, volume/capacity, weight, area, and time using appropriate language, e.g., longer, taller, shorter, same length; heavier, lighter, same weight; holds more, holds less, holds the same amount. | <ul style="list-style-type: none">• Choose the tallest/shortest tower, when given 2 or more towers of unifix cubes.• Identify the heavier/lighter object, using a two-pan balance.• Identify which of two containers will hold a given group of objects. |
| K.M.2 | Make and use estimates of measurements from everyday experiences. | <ul style="list-style-type: none">• Estimate in a variety of ways (e.g., using the calendar and weather chart: Which type of weather has the most/least links or tallies? Are there more days completed on the calendar? Given a space in the classroom: Will the class line fit there?) |
| K.M.3 | Use nonstandard units to measure length, area, weight, and capacity. | <ul style="list-style-type: none">• Use nonstandard units to measure (e.g., unifix cubes, footprints, teddy bear counters, cotton balls, hands, markers, etc.) |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
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| K.D.1 | Collect, sort, organize, and draw conclusions about data using concrete objects, pictures, numbers, and graphs. | <ul style="list-style-type: none">• Collect and organize data about themselves and their surroundings, using concrete objects, pictures, and numbers.• Place classmates into groups according to hair color, clothing, etc.• Create a simple graph using classroom manipulatives (teddy bear counters, buttons, unifix cubes, etc.) |

**Beverly Public Schools Curriculum
MATHEMATICS GRADE 1**

STRAND: NUMBER SENSE AND OPERATIONS

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.N.1 | Name and write (in numerals) whole numbers to 1000, identify the place values of the digits, and order the numbers. | <ul style="list-style-type: none"> • Count out loud to 100. • Write numbers to 100 in order. • Demonstrate an understanding of the concepts of tens and ones (e.g., base ten blocks, number lines) using a variety of manipulatives. • Identify the ones place and tens place in two-digit numbers. • Identify dictated numbers from 0-100. |
| 2.N.2 | Identify and distinguish among multiple uses of numbers, including cardinal (to tell how many) and ordinal (to tell which one in an ordered list), and numbers as labels and measurements. | <ul style="list-style-type: none"> • Match a group of objects one to one. • Identify ordinal numbers from lists, pictures, or objects (1st through 10th). • Create and label sets of objects using cardinal numbers (0 – 100). |
| 2.N.3 | Identify and represent common fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$) as parts of wholes, parts of groups, and numbers on the number line. | <ul style="list-style-type: none"> • Identify fair shares in halves, thirds, and fourths. • Describe one unit of a fraction as “one-half”, “one-third”, or “one-fourth”. |
| 2.N.4 | Compare whole numbers using terms and symbols, e.g., less than, equal to, greater than (<, =, >). | <ul style="list-style-type: none"> • Compare numbers to 100. • Tell if numbers are greater than, less than, or equal to. • Identify the number that comes before, between, or after any number(s) 1-100. |
| 2.N.5 | Identify odd and even numbers and determine whether a set of objects has an odd or even number of elements. | <ul style="list-style-type: none"> • Same as state standard. |
| 2.N.6 | Identify the value of all U.S. coins, and \$1, \$5, \$10, and \$20 bills. Find the value of a collection of coins and dollar bills and different ways to represent an amount of money up to \$5. Use appropriate notation, e.g., 69¢, \$1.35. | <ul style="list-style-type: none"> • Recognize the name and value of all U.S. coins. • Count coins of the same value (pennies, nickels, dimes) up to \$1.00. • Use appropriate notation e.g., 10¢, \$.10. |

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| 2.N.7 | Demonstrate an understanding of various meanings of addition and subtraction, e.g., addition as combination (plus, combined with, more); subtraction as comparison (how much less, how much more), equalizing (how many more are needed to make these equal), and separation (how many remaining). | <ul style="list-style-type: none"> • Use concrete materials to model addition and subtraction without regrouping. • Represent visually presented addition or subtraction problems (acted out or in pictures) with a number sentence (0-20). |
| 2.N.8 | Understand and use the inverse relationship between addition and subtraction (e.g., $8 + 6 = 14$ is equivalent to $14 - 6 = 8$ and is also equivalent to $14 - 8 = 6$) to solve problems and check solutions. | <ul style="list-style-type: none"> • Use numbers to solve real problems 0-20. (How many cartons of milk do we need if everyone needs one?) • Show a basic understanding of how to reverse a simple addition or subtraction problem. • Understand the concept of number families. |
| 2.N.9 | Know addition facts (addends to 10) and related subtraction facts, and use them to solve problems. | <ul style="list-style-type: none"> • Use manipulatives to demonstrate an understanding of the concepts of addition and subtraction. • Perform addition and subtraction to 10. • Know the meaning of symbols +, -, and =. • Add or subtract using numbers vertically or horizontally. • Add or subtract by counting on and counting back on a number line. |
| 2.N.10 | Demonstrate the ability to add and subtract three-digit numbers accurately and efficiently. | <ul style="list-style-type: none"> • Demonstrate the ability to add and subtract two-digit numbers using manipulatives (without regrouping). |
| 2.N.11 | Demonstrate in the classroom an understanding of and the ability to use the conventional algorithms for addition (two 3-digit numbers and three 2-digit numbers) and subtraction (two 3-digit numbers). | <ul style="list-style-type: none"> • Demonstrate an understanding of the conventional algorithms for addition and subtraction of two-digit numbers, without regrouping. |

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| 2.N.12 | Estimate, calculate, and solve problems involving addition and subtraction of two-digit numbers. Describe differences between estimate and actual calculations. | <ul style="list-style-type: none"> Estimate whether a sum or difference will be closer to 0, 10, or 20. Solve addition and subtraction problems accurately after making reasonable estimations (sets up to 20). |
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STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.P.1 | Identify, reproduce, describe, extend, and create simple rhythmic shape, size, number, color, and letter repeating patterns. | <ul style="list-style-type: none"> Identify, extend, and construct a variety of rhythmic, shape, size, color, letter, number, verbal, and visual patterns up to three elements. |
| 2.P.2 | Identify different patterns on the hundreds chart. | <ul style="list-style-type: none"> Describe various simple patterns on a number chart 1-100 (e.g., odds, evens, 5's, 10's, all numbers that end with 2). |
| 2.P.3 | Describe and create addition and subtraction number patterns, e.g., 1, 4, 7, 10..., or 25, 23, 21.... | <ul style="list-style-type: none"> Describe and create addition and subtraction number patterns (e.g., 2, 4, 6 or 5, 10, 15 or 100, 90, 80). |
| 2.P.4 | Skip count by twos, fives, and tens up to at least 50, starting at any number. | <ul style="list-style-type: none"> Skip count by twos up to at least 50; fives and tens to 100, starting at any number. |
| 2.P.5 | Construct and solve open sentences that have variables, e.g., $c + 7 = 10$. | <ul style="list-style-type: none"> Construct and solve open sentences that have missing addends and subtrahends (up to 20). |
| 2.P.6 | Write number sentences using +, -, <, =, and/or > to represent mathematical relationships in everyday situations. | <ul style="list-style-type: none"> Write number sentences to represent mathematical relationships in real world situations with numbers 1-10. Write number sentences using <, >, = (e.g., 1 week ___ 5 days; 1 dime ___ 2 nickels). |
| 2.P.7 | Describe functions related to trading, including coin trades and measurement trades, e.g., five pennies make one nickel, four cups make one quart, 11 nickels are worth more than 5 dimes. | <ul style="list-style-type: none"> Make coin trades using pennies, nickels, and dimes. (5 pennies = 1 nickel) (1 dime = 2 nickels, 1 nickel + 5 pennies, or 10 pennies). |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.G.1 | Describe attributes and parts of two- and three-dimensional shapes, e.g., length of sides, and number of corners, edges, faces, and sides. | <ul style="list-style-type: none"> Describe attributes and parts of two- and three dimensional shapes (e.g., faces, sides, and corners). |
| 2.G.2 | Identify, describe, draw, and compare two-dimensional shapes, including both polygonal (up to six sides) and curved figures such as circles. | <ul style="list-style-type: none"> Identify, describe, draw, and compare two-dimensional shapes including polygons (up to four sides) and circles. |
| 2.G.3 | Recognize congruent shapes. | <ul style="list-style-type: none"> Recognize congruent shapes (see above). Use the term “congruent” (same size and shape). |
| 2.G.4 | Identify shapes that have been rotated (turned), reflected (flipped), translated (slid), and enlarged. Describe the direction of translations, e.g., left, right, up, down. | <ul style="list-style-type: none"> Identify shapes that have been turned, flipped, slid, and enlarged. |
| 2.G.5 | Identify symmetry in two-dimensional shapes. | <ul style="list-style-type: none"> Identify horizontal and vertical lines of symmetry in two-dimensional shapes. |
| 2.G.6 | Predict the results of putting shapes together and taking them apart. | <ul style="list-style-type: none"> Predict and confirm the results of putting shapes together and taking them apart. |
| 2.G.7 | Relate geometric ideas to numbers, e.g., seeing rows in an array as a model of repeated addition. | <ul style="list-style-type: none"> Relate geometric ideas to numbers (e.g., seeing rows in an array as a model of repeated addition, using geoboards (squares and rectangles). |

STRAND: MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.M.1 | Identify parts of the day (e.g., morning, afternoon, | <ul style="list-style-type: none"> Describe different activities done during different parts of the day (morning, |

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| | evening), days of the week, and months of the year. Identify dates using a calendar. | <p>afternoon, evening).</p> <ul style="list-style-type: none"> • Recognize different parts of the day using pictures from stories. • Identify the day, date, and month during calendar activities. • Create individual monthly calendars. • Draw pictures comparing activities you do at 6 a.m. and 6 p.m. (or any a.m. and p.m. times). |
| 2.M.2 | Tell time at quarter-hour intervals on analog and digital clocks using a.m. and p.m. | <ul style="list-style-type: none"> • Tell time at half-hour intervals on analog and digital clocks, using a.m. and p.m. |
| 2.M.3 | Compare the length, weight, area, and volume of two or more objects by using direct comparison. | <ul style="list-style-type: none"> • Compare the length and weight of two or more objects by using direct comparison or nonstandard units. • Use two or more objects and compare lengths using nonstandard units (pennies, paper clips, cubes). • Order objects by weight using a balance scale. |
| 2.M.4 | Measure and compare common objects using metric and English units of length measurement, e.g., centimeter, inch. | <ul style="list-style-type: none"> • Same as state standard. |
| 2.M.5 | Select and correctly use the appropriate measurement tools, e.g., ruler, balance scale, thermometer. | <ul style="list-style-type: none"> • Same as state standard. |
| 2.M.6 | Make and use estimates of measurement, including time, volume, weight, and area | <ul style="list-style-type: none"> • Make and use estimates of measurement, including time and weight. |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.D.1 | Use interviews, surveys, and observations to gather data about themselves and their surroundings. | <ul style="list-style-type: none">• Take varied surveys (e.g., class, grade, home) and gather data. |
| 2.D.2 | Organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams; interpret the representations. | <ul style="list-style-type: none">• Represent data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams.• Interpret the data. |
| 2.D.3 | Formulate inferences (draw conclusions) and make educated guesses (conjectures) about a situation based on information gained from data. | <ul style="list-style-type: none">• Use the collected data to make predictions for extended surveys (e.g., larger groups, time variable, different population). |
| 2.D.4 | Decide which outcomes of experiments are most likely. | <ul style="list-style-type: none">• Decide which outcomes of experiments are most likely, based on data gathered. |

**Beverly Public Schools Curriculum
MATHEMATICS GRADE 2**

| STRAND: NUMBER SENSE AND OPERATIONS | | |
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| DOE Standard Number | State Standard | Students will be able to: |
| 2.N.1 | Name and write (in numerals) whole numbers to 1000, identify the place values of the digits, and order the numbers. | <ul style="list-style-type: none"> • Know that the value of a number is dependent on the place its in (ones, tens, hundreds place). • Name and identify up to three-digit numbers. • Write the smallest and largest three-digit number, given three digits. |
| 2.N.2 | Identify and distinguish among multiple uses of numbers, including cardinal (to tell how many) and ordinal (to tell which one in an ordered list), and numbers as labels and measurements. | <ul style="list-style-type: none"> • Know when to use ordinal numbers (e.g., calendars, line order, grades). • Know when to use cardinal numbers (e.g., counting, facts, and computation) |
| 2.N.3 | Identify and represent common fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$) as parts of wholes, parts of groups, and numbers on the number line. | <ul style="list-style-type: none"> • Fold a square into 2, 3, and 4 equal parts, labeling them as $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. • Identify halves, thirds, and fourths on a number line from 0 to 5. • Use the term “numerator” to mean part and “denominator” to mean whole. • Add simple fractions with like denominators, using manipulatives. |
| 2.N.4 | Compare whole numbers using terms and symbols, e.g., less than, equal to, greater than (<, =, >). | <ul style="list-style-type: none"> • Compare whole numbers using terms and symbols, e.g., less than, equal to, greater than (<, =, >) up to 1000. • Know that each place (hundreds, tens, ones) can be any digit 0-9. • Order any three-digit numbers from largest to smallest, smallest to largest. |
| 2.N.5 | Identify odd and even numbers and determine whether a set of objects has an odd or even number of elements. | <ul style="list-style-type: none"> • Draw a picture to show whether a set of objects is an odd or even number (sets of 2's, or 2 sets with a remainder of one). • Look at the ones place of a 2- or 3-digit number and tell whether that number is odd or even. |
| 2.N.6 | Identify the value of all U.S. coins, and \$1, \$5, \$10, and \$20 bills. Find the value of a collection of coins and dollar bills and different ways to represent an amount of money up to \$5. Use appropriate notation, e.g., 69¢, \$1.35. | <ul style="list-style-type: none"> • Count out any combination of coins (pennies, nickels, dimes, quarters, and half-dollars). • Use different coins/dollars to show the same amount of money. • Use the ¢ when writing amounts less than a dollar, and the \$ with a decimal point for amounts more than one dollar. |

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| 2.N.7 | Demonstrate an understanding of various meanings of addition and subtraction, e.g., addition as combination (plus, combined with, more); subtraction as comparison (how much less, how much more), equalizing (how many more are needed to make these equal), and separation (how many remaining). | <ul style="list-style-type: none"> • Write a number sentence to represent visually presented addition or subtraction problems. • Use concrete materials to model addition and subtraction. • Estimate, calculate, and solve problems involving addition and subtraction of two-digit numbers. • Demonstrate in the classroom an understanding of and the ability to use the conventional algorithm for addition (two 3-digit numbers and three 2-digit numbers) and subtraction (two 3-digit numbers). |
| 2.N.8 | Understand and use the inverse relationship between addition and subtraction (e.g., $8 + 6 = 14$ is equivalent to $14 - 6 = 8$ and is also equivalent to $14 - 8 = 6$) to solve problems and check solutions. | <ul style="list-style-type: none"> • Write addition and subtraction facts when given a set of digits (fact families), e.g., 5,2,7: $5+2=7$; $2+5=7$; $7-5=2$; $7-2=5$. |
| 2.N.9 | Know addition facts (addends to 10) and related subtraction facts, and use them to solve problems. | <ul style="list-style-type: none"> • Use the appropriate operation (addition or subtraction) to solve single-step problems. |
| 2.N.10 | Demonstrate the ability to add and subtract three-digit numbers accurately and efficiently. | <ul style="list-style-type: none"> • Demonstrate an understanding of and the ability to use the conventional algorithm for addition (two 3-digit numbers and three 2-digit numbers) and subtraction (two 3-digit numbers), with and without regrouping in the one's place. |
| 2.N.11 | Demonstrate in the classroom an understanding of and the ability to use the conventional algorithms for addition (two 3-digit numbers and three 2-digit numbers) and subtraction (two 3-digit numbers). | <ul style="list-style-type: none"> • Same as state standard |
| 2.N.12 | Estimate, calculate, and solve problems involving addition and subtraction of two-digit numbers. Describe differences between estimate and actual calculations. | <ul style="list-style-type: none"> • Estimate a logical solution to a problem and recognize when an estimate is appropriate. • Estimate sums and differences when working with quantities, measurement, and computation to 100. • Explain how an estimate differs from an actual calculation. • Round whole numbers through 100 to the nearest 10. |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| State Standard | | Students will be able to: |
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| 2.P.1 | Identify, reproduce, describe, extend, and create simple rhythmic shape, size, number, color, and letter repeating patterns. | <ul style="list-style-type: none"> • Identify and repeat a simple rhythmic or movement pattern. • Create and extend their own pattern using pictures, letters, shapes, symbols, etc. • Verbally describe a set pattern (red,red,blue; circle, square, triangle), and continue the pattern. |

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| 2.P.2 | Identify different patterns on the hundreds chart. | <ul style="list-style-type: none"> Cover numbers on the 100's chart (12, 18, 24) and identify by the numbers skipped, what the counting pattern is. |
| 2.P.3 | Describe and create addition and subtraction number patterns, e.g., 1, 4, 7, 10..., or 25, 23, 21, 19.... | <ul style="list-style-type: none"> Identify the counting pattern (e.g., plus 3, or minus 2) and continue the pattern. |
| 2.P.4 | Skip count by twos, fives, and tens up to at least 50, starting at any number. | <ul style="list-style-type: none"> Same as state standard |
| 2.P.5 | Construct and solve open sentences that have variables, e.g., $c + 7 = 10$. | <ul style="list-style-type: none"> Same as state standard |
| 2.P.6 | Write number sentences using +, -, <, =, and/or > to represent mathematical relationships in everyday situations. | <ul style="list-style-type: none"> Use <, =, > in number sentences. Examples: 11 nickels ____ 5 dimes 2 quarters ____ 55 pennies 2 dimes & 3 nickels ____ 1 quarter & 2 dimes 2 weeks ____ 15 days 13 cups ____ 2 quarts |
| 2.P.7 | Describe functions related to trading, including coin trades and measurement trades, e.g., five pennies make one nickel, four cups make one quart, 11 nickels are worth more than 5 dimes. | <ul style="list-style-type: none"> Identify equivalent amounts in money, time, weight, distance, etc. |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
|---------------------|--|--|
| 2.G.1 | Describe attributes and parts of two- and three-dimensional shapes, e.g., length of sides, and number of corners, edges, faces, and sides. | <ul style="list-style-type: none"> Same as state standard |
| 2.G.2 | Identify, describe, draw, and compare two-dimensional shapes, | <ul style="list-style-type: none"> Same as state standard |

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| | including both polygonal (up to six sides) and curved figures such as circles. | |
| 2.G.3 | Recognize congruent shapes. | <ul style="list-style-type: none"> Understand that congruent means same size and same shape. |
| 2.G.4 | Identify shapes that have been rotated (turned), reflected (flipped), translated (slid), and enlarged. Describe the direction of translations, e.g., left, right, up, down. | <ul style="list-style-type: none"> Demonstrate flips, slides, and turns with manipulatives. Identify shapes that have been turned, flipped, slid, and enlarged. |
| 2.G.5 | Identify symmetry in two-dimensional shapes. | <ul style="list-style-type: none"> Identify multiple lines of symmetry. |
| 2.G.6 | Predict the results of putting shapes together and taking them apart. | <ul style="list-style-type: none"> Same as state standard |
| 2.G.7 | Relate geometric ideas to numbers, e.g., seeing rows in an array as a model of repeated addition. | <ul style="list-style-type: none"> Draw and recognize rectangular and square arrays. (e.g. $3 \times 3 = 9$ is a square and $3 \times 5 = 15$ is a rectangle) |

STRAND: MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
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| 2.M.1 | Identify parts of the day (e.g., morning, afternoon, evening), days of the week, and months of the year. Identify dates using a calendar. | <ul style="list-style-type: none"> See state standard. Relate specific months to seasons. |
| 2.M.2 | Tell time at quarter-hour intervals on analog and digital clocks using a.m. and p.m. | <ul style="list-style-type: none"> Same as state standard. |
| 2.M.3 | Compare the length, weight, area, and volume of two or more objects by using direct comparison. | <ul style="list-style-type: none"> Use standard and non-standard units of measurement. |
| 2.M.4 | Measure and compare common objects using metric and English units of length measurement, e.g., | <ul style="list-style-type: none"> Measure to the nearest $\frac{1}{2}$ inch and nearest centimeter. |

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| | centimeter, inch. | |
| 2.M.5 | Select and correctly use the appropriate measurement tools, e.g., ruler, balance scale, thermometer. | <ul style="list-style-type: none"> • Same as state standard |
| 2.M.6 | Make and use estimates of measurement, including time, volume, weight, and area. | <ul style="list-style-type: none"> • Select the appropriate unit of measurement to solve the problem. |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
|---------------------|---|---|
| 2.D.1 | Use interviews, surveys, and observations to gather data about themselves and their surroundings. | <ul style="list-style-type: none"> • Decide when interviews, surveys, and observations would be appropriate to gather specific data. |
| 2.D.2 | Organize, classify, represent, and interpret data using tallies, charts, tables, bar graphs, pictographs, and Venn diagrams; interpret the representations. | <ul style="list-style-type: none"> • Summarize information from the various representations to make meaning of data. |
| 2.D.3 | Formulate inferences (draw conclusions) and make educated guesses (conjectures) about a situation based on information gained from data. | <ul style="list-style-type: none"> • Draw conclusions and make predictions based upon the gathered data. |
| 2.D.4 | Decide which outcomes of experiments are most likely. | <ul style="list-style-type: none"> • Explain why the outcome of a given situation is likely or unlikely to happen. |

Beverly Public Schools Curriculum MATHEMATICS GRADE 3

| STRAND: NUMBER SENSE AND OPERATIONS | | |
|-------------------------------------|---|---|
| DOE Standard Number | State Standard | Students will be able to: |
| 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. | <ul style="list-style-type: none"> • Read, model, identify, and write numbers up to 9,999; demonstrating an understanding of the values of the digits; and comparing the magnitudes of numbers. • Regroup numbers to 9,999 for addition and subtraction • Order numbers from least to greatest, greatest to least. • Identify odd and even numbers. • Identify cardinal and ordinal numbers. |
| 4.N.2 | Represent, order, and compare large numbers (to at least 100,000) using various forms, including expanded notation, e.g., $853 = 8 \times 100 + 5 \times 10 + 3$. | <ul style="list-style-type: none"> • Represent, order, and compare large numbers (up to 1,000) 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. | <ul style="list-style-type: none"> • Locate on a number line, fractions between numbers, e.g., $31/2$, $33/4$, $41/4$. • Use a ruler to find fraction locations. |
| 4.N.4 | Select, use, and explain models to relate common fractions and mixed numbers ($1/2$, $1/3$, $1/4$, $1/5$, $1/6$, $1/8$, $1/10$, $1/12$, and $11/2$), find equivalent fractions, mixed numbers, and decimals, and order fractions. | <ul style="list-style-type: none"> • Show equivalent fractions through the use of manipulatives. • Select, use, and explain models to relate common fractions and mixed numbers up through eighths. • Compare ($<$, $>$, $=$) and order decimal numbers to hundredths. |
| 4.N.5 | Identify and generate equivalent forms of common decimals and fractions less than one whole (halves, quarters, fifths, and tenths). | <ul style="list-style-type: none"> • Identify a variety of common decimals and their equivalent fractions and vice versa (halves, fourths, 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. | <ul style="list-style-type: none"> • Read and write decimals between 0 and 1, up to the tenths. |
| 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. | <ul style="list-style-type: none"> • Apply and explain number theory concepts (e.g., odd or even, factors or multiples, number sequences) to the solution of problems. • Predict and confirm whether an addition or subtraction problem will have an odd or even answer. |
| 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. | <ul style="list-style-type: none"> • Understand the meanings of operations, e.g., multiplication as repeated addition and division as repeated subtraction, and how they relate to one another (fact families). |
| 4.N.9 | Select, use, and explain the commutative, associative, and identify properties of operations on whole numbers in problem situations, e.g., $37 \times 46 = 46 \times 37$; $(5 \times 7) \times 2 = 5 \times (7 \times 2)$ | <ul style="list-style-type: none"> • Understand the commutative property of whole numbers, e.g., $37 = 46 = 46 + 37$; $3 \times 4 = 4 \times 3$. • Understand the associative property of whole numbers, e.g., $(5 \times 7) \times 2 = 5 \times (7 \times 2)$; $3 + (4 + 5) = (3 + 4) + 5$. |

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| 4.N.10 | Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money. | <ul style="list-style-type: none"> Solve addition, subtraction, multiplication, and division problems, including those involving money. |
| 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. | <ul style="list-style-type: none"> Use multiplication and related division facts in computation (through 10 x 10). |
| 4.N.12 | *Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently. | <ul style="list-style-type: none"> Add and subtract (up to 4 digits) and multiply (up to two digits by one digit) accurately and efficiently. |
| 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. | <ul style="list-style-type: none"> Divide up to a two-digit whole number with a single digit divisor (with and without remainders) accurately and efficiently. |
| 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). | <ul style="list-style-type: none"> Demonstrate an understanding of and the ability to use the conventional algorithms for addition and subtraction (up to 4 digits), and multiplication (up to 2 digits by 1 digit). Understand the use of regrouping. |
| 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). | <ul style="list-style-type: none"> Demonstrate an understanding of the conventional algorithm for division of up to a two-digit whole number with a single digit divisor (with and without remainders). |
| 4.N.16 | Round whole numbers through 100,000 to the nearest 10, 100, 1000, 10,000, and 100,000. | <ul style="list-style-type: none"> Round whole numbers through 1,000 to the nearest 10 and 100. |
| 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. | <ul style="list-style-type: none"> Same as state standard |
| 4.N.18 | Use concrete objects and visual models to add and subtract common fractions. | <ul style="list-style-type: none"> Use manipulatives to show examples, e.g., $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$, $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$ |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
|---------------------|--|---|
| 4.P.1 | Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiplication patterns like 3, 30, 300, 3000, | <ul style="list-style-type: none"> • Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiples of whole numbers like 3, 6, 9, 12, ... |
| 4.P.2 | Use symbol and letter variables (e.g., \triangle , x) to represent unknowns or quantities that vary in expressions and in equations or inequalities (mathematical sentences that use =, <, >). | <ul style="list-style-type: none"> • Same as state standard. |
| 4.P.3 | Determine values of variables in simple equations, e.g., $4106 - \triangle = 37$; $5 = \bigcirc + 3$ and $\square - \bigcirc = 3$. | <ul style="list-style-type: none"> • Same as state standard. |
| 4.P.4 | Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. | <ul style="list-style-type: none"> • Same as state standard. |
| 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). | <ul style="list-style-type: none"> • Same as state standard. |
| 4.P.6 | Determine how change in one variable relates to a change in a second variable, e.g., input-output tables. | <ul style="list-style-type: none"> • Solve function problems with tables of data, e.g., input-output machines. |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
|---------------------|--|---|
| 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. | <ul style="list-style-type: none"> • Describe, model, draw, compare, and classify the attributes and other features (e.g., diagonals, number of sides, faces, corners, right angles, symmetry) of two- and three-dimensional shapes, e.g., circles, polygons, squares, cubes, spheres, and pyramids. |
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| 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. | <ul style="list-style-type: none"> Describe, model, draw, compare, and classify two- and three-dimensional shapes, e.g., circles, triangles, squares, cubes, spheres, and pyramids. |
| 4.G.3 | Recognize similar figures. | <ul style="list-style-type: none"> Recognize similar figures. |
| 4.G.4 | Identify angles as acute, right, or obtuse. | <ul style="list-style-type: none"> Identify angles as right angles. |
| 4.G.5 | Describe and draw intersecting, parallel, and perpendicular lines. | <ul style="list-style-type: none"> Describe and draw parallel and intersecting lines. |
| 4.G.6 | Using ordered pairs of numbers and/or letters, graph, locate, identify points, and describe paths (first quadrant). | <ul style="list-style-type: none"> Graph, locate, and identify points using ordered pairs, in the first quadrant. |
| 4.G.7 | Describe and apply techniques such as reflections (flips), rotations (turns), and translations (slides) for determining if two shapes are congruent. | <ul style="list-style-type: none"> Same as state standard. |
| 4.G.8 | Identify and describe line symmetry in two-dimensional shapes. | <ul style="list-style-type: none"> Find the line of symmetry in a two-dimensional figure, which has length and area, but no volume. Know that the line of symmetry divides the 2-D figure into two congruent parts that are mirror images of each other. |
| 4.G.9 | Predict and validate the results of partitioning, folding, and combining two- and three-dimensional shapes. | <ul style="list-style-type: none"> Predict and validate the results of partitioning, folding, and combining two-dimensional shapes. |

STRAND: MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
|----------------------------|---|---|
| 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. | <ul style="list-style-type: none"> • Same as state standard. |
| 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. | <ul style="list-style-type: none"> • Same as state standard. |
| 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...). | <ul style="list-style-type: none"> • Identify time to the minute on analog and digital clocks using a.m. and p.m. • Compute elapsed time. • Make and interpret schedules. • Use a calendar to measure days since and/or days until. |
| 4.M.4 | Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, and grids or by measuring. | <ul style="list-style-type: none"> • Estimate the area and perimeter of a square and rectangle, using diagrams, models, grids, or by measuring. |
| 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, time, angle size, and temperature. | <ul style="list-style-type: none"> • Identify and use appropriate metric and English units and tools (e.g., ruler, grids, graduated cylinder, thermometer) to estimate, measure, and solve problems involving length, area, weight, volume, time, and temperature. |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
|----------------------------|---|--|
| 4.D.1 | Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. | <ul style="list-style-type: none"> • Collect data to draw simple bar graphs, line graphs, and pictographs, and to compare and explain what is recorded. |
| 4.D.2 | Match representations of a data set such as lists, tables, or graphs (including circle graphs) with the actual set of data. | <ul style="list-style-type: none"> • Match representations of a data set such as lists, tables, or graphs, with the actual set of data. |

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| 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. | <ul style="list-style-type: none"> Construct, draw conclusions, and make predictions from various representations of data sets, including tables, bar graphs, pictographs, and tallies. |
| 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. | <ul style="list-style-type: none"> Tell 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). See Math Frameworks, Nov. 2000, p. 57 |
| 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? | <ul style="list-style-type: none"> List and count the number of possible combinations of objects from two sets. |
| 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. | <ul style="list-style-type: none"> Understand and apply basic concepts of probability, e.g., When you spin a spinner that has three-fourths blue and one-fourth green, two things can happen. |

Beverly Public Schools Curriculum MATHEMATICS GRADE 4

| STRAND: NUMBER SENSE AND OPERATIONS | | |
|-------------------------------------|---|---|
| DOE Standard Number | State Standard | Students will be able to: |
| 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. | <ul style="list-style-type: none"> Read, write, order, and compare numbers up to 100,000. Know place value to the hundred thousands. |
| 4.N.2 | Represent, order, and compare large numbers (to at least 100,000) using various forms, including expanded notation, e.g., $853 = 8 \times 100 + 5 \times 10 + 3$. | <ul style="list-style-type: none"> Represent, order, and compare large numbers (up to 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. | <ul style="list-style-type: none"> Demonstrate an understanding of fractions as parts of unit wholes, as parts of a collection, and as locations on the number line. Measure on a ruler to the nearest $\frac{1}{8}$ inch. |
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| 4.N.4 | <p>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.</p> | <ul style="list-style-type: none"> Name fractional parts of a whole shape and parts of a group. Use models to illustrate and compare fractions (to twelfths) and decimals (including amounts of money). Know placement of numerator and denominator. Say and write fractions correctly. Understand meaning of denominator as the whole and numerator as parts of the whole and be able to tell which fraction is larger. Compare and order fractions and mixed numbers with like denominators up to twelfths. Represent mixed numbers as improper fractions and vice versa. |
| 4.N.5 | Identify and generate equivalent forms of common decimals and fractions less than one whole (halves, quarters, fifths, and tenths). | <ul style="list-style-type: none"> Same as state standard. |
| 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. | <ul style="list-style-type: none"> Same as state standard. |
| 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. | <ul style="list-style-type: none"> 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. Make predictions about the solutions to problems using an understanding of the classes of numbers (i.e., even x even) |
| 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. | <ul style="list-style-type: none"> Select, use, and explain various meanings and models of multiplication (up to 10×10) and division of whole numbers. Understand and use the inverse relationship between the two operations. Model and describe multiplication as repeated addition. Model and describe division as repeated subtraction. |
| 4.N.9 | Select, use, and explain the commutative, associative, and identity properties of operations on whole numbers in problem situations, e.g., $37 \times 46 = 46 \times 37$; $(5 \times 7) \times 2 = 5 \times (7 \times 2)$ | <ul style="list-style-type: none"> Same as state standard. |
| 4.N.10 | Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money. | <ul style="list-style-type: none"> Use key terms (e.g., altogether, in all, difference) to select appropriate operations to solve problems. Analyze a problem to develop strategies for solving, and check the reasonableness of the answer. |
| 4.N.11 | Know multiplication facts through 12×12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g., 3×5 is related to 30×50 , 300×5 , | <ul style="list-style-type: none"> Extend the use of the basic facts to multiples of 10 and 100 (e.g., $3 \times 5 = 15$; $30 \times 50 = 1,500$). |

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| | and 30 x 500. | |
| 4.N.12 | *Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently. | <ul style="list-style-type: none"> • Same as state standard. |
| 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. | <ul style="list-style-type: none"> • Same as state standard. |
| 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). | <ul style="list-style-type: none"> • Same as state standard. |
| 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). | <ul style="list-style-type: none"> • Same as state standard. |
| 4.N.16 | Round whole numbers through 100,000 to the nearest 10, 100, 1000, 10,000, and 100,000. | <ul style="list-style-type: none"> • Same as state standard. |
| 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. | <ul style="list-style-type: none"> • Use front-end estimation or rounding to estimate whole number computations. • Use estimation to judge the reasonableness of an exact answer. |
| 4.N.18 | Use concrete objects and visual models to add and subtract common fractions. | <ul style="list-style-type: none"> • Use concrete objects and visual models (fraction circles, fraction towers) to add and subtract common fractions. • Simplify fractions to lowest terms (e.g., $9/12 = 3/4$). |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: | | | | | | | | | | | | |
|---------------------|--|--|----|---|-------|---|---|-----|-----|---|---|---|---|-------|
| 4.P.1 | Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiplication patterns like 3, 30, 300, 3000, | <ul style="list-style-type: none"> • Create, describe, extend, and explain symbolic (geometric) and numeric patterns, (e.g., 1,4,9,16,25, __, __; □○○□○ __, __ | | | | | | | | | | | | |
| 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 =, <, >). | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 4.P.3 | Determine values of variables in simple equations, e.g., $4106 - \Delta = 37$; $5 = \bigcirc + 3$ and $\square - \bigcirc = 3$. | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 4.P.4 | Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 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). | <ul style="list-style-type: none"> • Understand and apply proportional relationships in problem solving. | | | | | | | | | | | | |
| 4.P.6 | Determine how change in one variable relates to a change in a second variable, e.g., input-output tables. | <ul style="list-style-type: none"> • Solve function problems with tables of data, e.g., input-output tables. <table style="margin-left: 40px;"> <tr> <td>In</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>(n)</td> </tr> <tr> <td>Out</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>(n-1)</td> </tr> </table> | In | 3 | 4 | 5 | 6 | (n) | Out | 2 | 3 | 4 | 5 | (n-1) |
| In | 3 | 4 | 5 | 6 | (n) | | | | | | | | | |
| Out | 2 | 3 | 4 | 5 | (n-1) | | | | | | | | | |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
|----------------------------|---|--|
| 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. | <ul style="list-style-type: none"> • Same as state standard. |
| 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. | <ul style="list-style-type: none"> • Same as state standard. |
| 4.G.3 | Recognize similar figures. | <ul style="list-style-type: none"> • Recognize similar figures. • Explain how they are similar (shape) and different (size). |
| 4.G.4 | Identify angles as acute, right, or obtuse. | <ul style="list-style-type: none"> • Same as state standard. |
| 4.G.5 | Describe and draw intersecting, parallel, and perpendicular lines. | <ul style="list-style-type: none"> • Same as state standard. |
| 4.G.6 | Using ordered pairs of numbers and/or letters, graph, locate, identify points, and describe paths (first quadrant). | <ul style="list-style-type: none"> • Same as state standard. See Math Frameworks, Nov. 2000, p. 41. |
| 4.G.7 | Describe and apply techniques such as reflections (flips), rotations (turns), and translations (slides) for determining if two shapes are congruent. | <ul style="list-style-type: none"> • Demonstrate the ability to flip, turn, and slide a figure and examine it for congruency in relation to another figure. |
| 4.G.8 | Identify and describe line symmetry in two-dimensional shapes. | <ul style="list-style-type: none"> • Same as state standard. |
| 4.G.9 | Predict and validate the results of partitioning, folding, and combining two- and three-dimensional shapes. | <ul style="list-style-type: none"> • Match a two-dimensional drawing (net) to its three-dimensional shape. |

STRAND: MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
|----------------------------|---|--|
| 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. | <ul style="list-style-type: none">• Same as state standard. |
| 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. | <ul style="list-style-type: none">• Convert measurements of length (e.g., inches to feet, feet to yards).• Convert liquid measurements (e.g., gallons to quarts, pints to quarts).• Convert time (e.g., minutes to hours) and money (e.g., cents to dollars). |
| 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...). | <ul style="list-style-type: none">• Identify time to the minute (a.m. and p.m.) on analog and digital clocks.• Solve problems involving elapsed time.• Create a daily schedule and evaluate it for reasonableness and calculate elapsed time for scheduling activities.• Compute elapsed time using analog and digital clocks and a calendar. |
| 4.M.4 | Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, and grids or by measuring. | <ul style="list-style-type: none">• Same as state standard. |
| 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, time, angle size, and temperature. | <ul style="list-style-type: none">• Same as state standard. |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: | | | | | | | | | | | | |
|----------------------------|--|--|----|---|-------|---|---|-----|-----|---|---|---|---|-------|
| 4.P.1 | Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiplication patterns like 3, 30, 300, 3000, | <ul style="list-style-type: none"> • Create, describe, extend, and explain symbolic (geometric) and numeric patterns, (e.g., 1,4,9,16,25, __, __; $\square \circ \square \circ$, __) | | | | | | | | | | | | |
| 4.P.2 | Use symbol and letter variables (e.g., \triangle , x) to represent unknowns or quantities that vary in expressions and in equations or inequalities (mathematical sentences that use =, <, >). | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 4.P.3 | Determine values of variables in simple equations, e.g., $4106 - \triangle = 37$; $5 = \circ + 3$ and $\square - \circ = 3$. | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 4.P.4 | Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. | <ul style="list-style-type: none"> • Same as state standard. | | | | | | | | | | | | |
| 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). | <ul style="list-style-type: none"> • Understand and apply proportional relationships in problem solving. | | | | | | | | | | | | |
| 4.P.6 | Determine how change in one variable relates to a change in a second variable, e.g., input-output tables. | <ul style="list-style-type: none"> • Solve function problems with tables of data, e.g., input-output tables. <table style="margin-left: 40px;"> <tr> <td>In</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>(n)</td> </tr> <tr> <td>Out</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>(n-1)</td> </tr> </table> | In | 3 | 4 | 5 | 6 | (n) | Out | 2 | 3 | 4 | 5 | (n-1) |
| In | 3 | 4 | 5 | 6 | (n) | | | | | | | | | |
| Out | 2 | 3 | 4 | 5 | (n-1) | | | | | | | | | |

**Beverly Public Schools Curriculum
MATHEMATICS GRADE 5**

| STRAND: NUMBER SENSE AND OPERATIONS | | |
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| DOE Standard Number | State Standard | Students will be able to: |
| 5.N.1 | Demonstrate an understanding of (positive integer) powers of ten, e.g., 10^2 , 10^5 . | <ul style="list-style-type: none"> Identify powers of ten |
| 5.N.2 | Demonstrate an understanding of place value through millions and thousandths. | <ul style="list-style-type: none"> Demonstrate an understanding of place value to millions and thousandths. |
| 5.N.3 | Represent and compare large (millions) and small (thousandths) positive numbers in various forms, such as expanded notation without exponents, e.g., $9724 = 9 \times 1000 + 7 \times 100 = 2 \times 10 + 4$ | <ul style="list-style-type: none"> Compare and order decimals to the 1,000ths. Represent and compare millions. Represent whole numbers in expanded notation. |
| 5.N.4 | Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, and as locations on a number line. <i>This standard is intentionally the same as standard 6.N.4.</i> | <ul style="list-style-type: none"> Tell what part of a whole is shaded. Tell what part of a group is shaded. Plot a given fraction on a number line. Give the ratio of shaded parts or unshaded parts of a whole or group of objects. |
| 5.N.5 | Identify and determine common equivalent fractions (with denominators 2,4,5,10) and mixed numbers (with denominators 2,4,5,10), decimals, and percents (through one hundred percent), e.g., $\frac{3}{4} = 0.75 = 75\%$. | <ul style="list-style-type: none"> Recognize equivalent fractions. Recognize equivalent decimals. Write fractions as equivalent decimals. Write decimals as equivalent fractions. Make equivalent fractions. Make equivalent decimals. Identify and determine percents. Convert fractions to decimals to percents and reverse the order. |
| 5.N.6 | Find and position whole numbers, positive fractions, positive mixed numbers, and positive decimals on a number line. | <ul style="list-style-type: none"> Same as state standard. |

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| 5.N.7 | Compare and order whole numbers, positive fractions, positive mixed numbers, positive decimals, and percents. | <ul style="list-style-type: none"> • Same as state standard. |
| 5.N.8 | Apply the number theory concepts of common factor, common multiple, and divisibility rules for 2,3,5, and 10 to the solution of problems. Demonstrate an understanding of the concepts of prime and composite numbers. | <ul style="list-style-type: none"> • Demonstrate an understanding that a number can be prime or composite and that numbers can be divided into factors. • Recognize when one number is a multiple of another. • Find the greatest common factor and least common multiple for sets of numbers. • Apply divisibility rules for 2, 3, 5, and 10. |
| 5.N.9 | Solve problems involving multiplication and division of whole numbers, and multiplication of positive fractions with whole numbers. | <ul style="list-style-type: none"> • Multiply and divide with two-digit divisors. • Estimate results of computations with fractions and percents. • Solve problems involving multiplication and division with whole numbers and fractions. |
| 5.N.10 | Demonstrate an understanding of how parentheses affect expressions involving addition, subtraction, and multiplication, and use that understanding to solve problems e.g., $3 \times (4 + 2) = 3 \times 6$. | <ul style="list-style-type: none"> • Recognize and demonstrate that addition, subtraction, multiplication, and division follow an Order of Operations, and that parentheses can affect the order. |
| 5.N.11 | <p>Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems.</p> <p><i>This standard is intentionally the same as standard 6.N.12</i></p> | <ul style="list-style-type: none"> • Explain how addition and subtraction, and multiplication and division are related. • Check addition, subtraction, multiplication and/or division problems using the inverse operation. |
| 5.N.12 | Accurately and efficiently add and subtract whole numbers and positive decimals. Multiply and divide (using double-digit divisors) whole numbers. Multiply positive decimals with whole numbers. | <ul style="list-style-type: none"> • Use algorithms to multiply with two-digit multipliers. • Use algorithms to perform division with two-digit divisors. • Add, subtract, and multiply whole numbers and decimals. |

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| 5.N.13 | Accurately and efficiently add and subtract positive fractions and mixed numbers with like denominators and with unlike denominators (2,4,5,10 only); multiply positive fractions with whole numbers. Simplify fractions in cases when both the numerator and denominator have 2,3,4,5, or 10 as a common factor. | <ul style="list-style-type: none"> • Same as state standard. |
| 5.N.14 | Estimate sums and differences of whole numbers positive fractions, and positive decimals. Estimate products of whole numbers and products of positive decimals with whole numbers. Use a variety of strategies and judge the reasonableness of the answer. | <ul style="list-style-type: none"> • Same as state standard. |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
|----------------------------|---|---|
| 5.P.1 | Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and progressions, e.g., ABBCCC; 1, 5, 9, 13,...; 3, 9, 27,... <i>This standard is intentionally the same as standard 6.P.1</i> | <ul style="list-style-type: none"> • Recognize, describe, and extend whole number sequences (e.g., square numbers 1, 4, 9, 16... and Fibonacci Numbers 1, 1, 2, 3, 5...). • Recognize and extend patterns involving various two-dimensional geometric shapes. • Represent patterns with manipulatives by building towers, pyramids, or other patterns. |
| 5.P.2 | Replace variables with given values and evaluate/simplify, e.g., $2(O) + 3$ when $O = 4$. <i>This standard is intentionally the same as standard 6.P.2</i> | <ul style="list-style-type: none"> • Find the “missing number” in a number sentence. • Recognize and describe the concept of variable as the “missing number” in a number sentence. |
| 5.P.3 | Use the properties of equality to solve problems with whole numbers e.g., if $\square + 7 = 13$, then $\square = 13 - 7$, therefore $\square = 6$; if $3 \times \square = 15$, then $1/3 \times 3 \times \square = 1/3 \times 15$, therefore $\square = 5$. | <ul style="list-style-type: none"> • Identify properties of equality with whole numbers in addition, subtraction, multiplication, and division. |
| 5.P.4 | Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables. <i>This standard is intentionally the same as standard 6.P.4</i> | <ul style="list-style-type: none"> • Analyze and describe the data orally and in writing, commenting on patterns and trends. • Organize data logically with a table, chart, or other model. |

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| 5.P.5 | Solve problems involving proportional relationships using concrete models, tables, graphs, and paper-pencil methods. | <ul style="list-style-type: none"> • Substitute a number value when given a letter in an equation (e.g., what is $7 - C$ if $C = 3.5$?). • Solve equations with one variable, using the “guess and check” method as well as concrete objects. |
| 5.P.6 | Interpret graphs that represent the relationship between two variables in everyday situations. | <ul style="list-style-type: none"> • Create and interpret graphs that represent the relationship between two variables in real-world situations (e.g., graphing data: # of boys walk or ride the bus; # of girls walk or ride the bus). • Determine and express simple ratios from information on a graph. |
| 6.P.7 | Identify and describe relationships between two variables with a constant rate of change. Contrast these with relationships where the rate of change is not constant. | <ul style="list-style-type: none"> • Identify and describe relationships between two variables with a constant rate of change in an equation (e.g., $\text{Distance} = \text{Rate} \times \text{Time}$). |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
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| 5.G.1 | Identify, describe, and compare special types of triangles (isosceles, equilateral, right) and quadrilaterals (square, rectangle, parallelogram, rhombus, trapezoid), e.g., recognize that all equilateral triangles are isosceles, but not all isosceles triangles are equilateral. | <ul style="list-style-type: none"> • Compare and classify acute, right, and obtuse angles. • Identify and compare types of triangles (acute, obtuse, right, scalene, isosceles, and equilateral) and quadrilaterals. • Identify pentagons, hexagons, and octagons. • Draw all acute, right, and obtuse triangles and draw quadrilaterals. • Describe the distinction between similar and congruent figures. |
| 5.G.2 | Identify, describe, and compare special types of three-dimensional shapes (cubes, prisms, spheres, pyramids) based on their properties, such as edges and faces. | <ul style="list-style-type: none"> • Identify three-dimensional shapes based on their properties. |
| 5.G.3 | Identify relationships among points and lines, e.g., intersecting, parallel, perpendicular | <ul style="list-style-type: none"> • Identify and describe points, lines, angles, and circles. • Draw illustrations of points, lines, angles, and line segments. • Describe the properties of points and lines. • Identify segments of lines. • Describe the length of a segment. • Identify and describe rays. • Identify real-world examples that portray points, lines, segments, rays, and planes. • Describe intersecting lines. • Describe parallel lines and perpendicular lines. |

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| 5.G.4 | Using ordered pairs of whole numbers (including zero), graph, locate, and identify points, and describe paths on the Cartesian coordinate plane. | <ul style="list-style-type: none"> Graph points and identify coordinates of points on the Cartesian coordinate plane in the first quadrant. |
| 5.G.5 | Describe and perform transformations on two-dimensional shapes, e.g., translations, rotations, and reflections. | <ul style="list-style-type: none"> Using manipulatives, perform and record simple transformations, i.e., translations (slides), rotations (turns), and reflections (flips). |
| 5.G.6 | Identify and describe line symmetry in two-dimensional shapes, including shapes that have multiple lines of symmetry. | <ul style="list-style-type: none"> Same as state standard. |
| 5.G.7 | Determine if two triangles or two quadrilaterals are congruent by measuring sides or a combination of sides and angles, as necessary; or by motions or series of motions, e.g., translations, rotations, and reflections. | <ul style="list-style-type: none"> Same as state standard. |

MEASUREMENT

| DOE Standard Number | State Standard | Students will be able to: |
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| 5.M.1 | Apply the concepts of perimeter and area to the solution of problems involving triangles and rectangles. Apply formulas where appropriate. | <ul style="list-style-type: none"> Apply correct formulas to find area and perimeter of triangles and rectangles. Describe how to find the perimeter of a polygon. Calculate the area of triangles and rectangles. |
| 5.M.2 | Identify, measure, describe, classify, and draw various angles. Draw triangles given two sides and the angle between them, or given two angles and the side between them, e.g., draw a triangle with one right angle and two sides congruent. | <ul style="list-style-type: none"> Identify, measure, describe, classify, and draw various angles and triangles, (e.g., acute, right, obtuse, equilateral). |
| 5.M.3 | Solve problems involving simple unit conversions within a system of measurement. | <ul style="list-style-type: none"> Apply same system unit conversions, e.g., inches to feet, meters to centimeters. |
| 5.M.4 | Find volumes and surface areas of rectangular prisms. <i>This standard is intentionally the same as standard 6.M.6.</i> | <ul style="list-style-type: none"> Define the surface area of a cube and find its value. |
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| 5.M.5 | Find the sum of the measures of the interior angles in triangles by measuring the angles, and without measuring the angles. | <ul style="list-style-type: none"> • Demonstrate an understanding of the concept that the sum of the angles of a triangle = 180° • Calculate the third angle of a triangle, when two angle measurements are given. |
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DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
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| 5.D.1 | Given a set of data, find the median, mean, mode, maximum, minimum, and range, and apply to solutions of problems. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.D.2 | Construct and interpret line plots, line graphs, and bar graphs. Interpret and label circle graphs. | <ul style="list-style-type: none"> • Same as state standard. |
| 5.D.3 | Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a number cube) and test the predictions. | <ul style="list-style-type: none"> • Predict and find the outcomes of simple events and determine whether the results were likely or unlikely. |

Beverly Public Schools Curriculum MATHEMATICS GRADE 6

STRAND: NUMBER SENSE AND OPERATIONS

| DOE Standard Number | State Standard | Students will be able to: |
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| 6.N.1 | Demonstrate an understanding of positive integer exponents, in particular, when used in powers of ten, e.g., 10^2 , 10^5 . | <ul style="list-style-type: none"> • Write exponents in expanded form. • Define factor, base, exponent, power, squared, and cubed. • Analyze patterns in powers of ten. • Show how to use calculator exponent function key. |
| 6.N.2 | Demonstrate an understanding of place value to billions and thousandths. | <ul style="list-style-type: none"> • Read, write, and use numbers to billions and to the thousandths. |
| 6.N.3 | Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms such as expanded notation without exponents, | <ul style="list-style-type: none"> • Compare and order decimals to thousandths. • Compare and order whole numbers to the billions. • Represent whole numbers and decimals in expanded notation, e.g., |

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| | e.g., $9724 = 9 \times 1000 + 7 \times 100 = 2 \times 10 + 4$ | $0.853 = (8 \times 0.1) + (5 \times 0.01) + (3 \times 0.001)$ |
| 6.N.4 | Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of whole units, as parts of a collection, and as locations on a number line. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.N.5 | Identify and determine common equivalent fractions, mixed numbers, decimals, and percents. | <ul style="list-style-type: none"> • Express common fractions as equivalent fractions, decimals, and percents. • Investigate and describe the relationship among fractions, decimals, and percents. |
| 6.N.6 | Find and position integers, fractions, mixed numbers, and decimals (both positive and negative) on the number line. | <ul style="list-style-type: none"> • Find and position both positive and negative integers, fractions, mixed numbers, and decimals on a number line and in relation to zero. |
| 6.N.7 | Compare and order integers (including negative integers), and positive fractions, mixed numbers, decimals, and percents. | <ul style="list-style-type: none"> • Compare whole numbers, fractions, integers (including negative), in an ordered list. • Compare whole numbers, fractions, integers (including negative), and decimals using the “<” and “>” symbols. • Demonstrate knowledge of the structure of sets of numbers including whole numbers, fractions, and integers using Venn diagrams. • Compare fractions, decimals, and percents. |

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| 6.N.8 | Apply number theory concepts – including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2,3,4,5,6,9, and 10 – to the solution of problems. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.N.9 | Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. | <ul style="list-style-type: none"> • Select the appropriate operation to solve problems. • Demonstrate if there is too much or too little information when solving problems. • Solve problems involving addition, subtraction, multiplication, and division with whole numbers and decimals, fractions, and percents. • Solve problems with positive exponents with whole numbers. |
| 6.N.10 | Use the number line to model addition and subtraction of integers, with the exception of subtracting negative integers. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.N.11 | <p style="text-align: center;">Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, -, x, ÷).</p> | <ul style="list-style-type: none"> • Apply the Order of Operations for expressions involving parentheses, exponents, multiplication, division, addition, and subtraction. * Please excuse my dear Aunt Sally. |
| 6.N.12 | Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems. | <ul style="list-style-type: none"> • Explain how addition and subtraction, and multiplication and division are related. • Check addition, subtraction, multiplication and/or division problems using the inverse operation. |
| 6.N.13 | Accurately and efficiently add, subtract, multiply, and divide (with double-digit divisors) whole numbers and positive decimals. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.N.14 | Accurately and efficiently add, subtract, multiply, and divide positive fractions and mixed numbers. Simplify fractions. | <ul style="list-style-type: none"> • Add and subtract fractions and mixed numbers with unlike denominators. • Multiply and divide fractions and mixed numbers. • Simplify fractions. |

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| 6.N.15 | Add and subtract integers, <u>with the exception of subtracting negative integers.</u> | <ul style="list-style-type: none"> Add and subtract integers using a number line, with the exception of subtracting negative numbers. |
| 6.N.16 | Estimate results of computations with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. Describe reasonableness of estimates. | <ul style="list-style-type: none"> Estimate sums, differences, products, and quotients with whole numbers, fractions, and decimals with reasoned strategies. |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
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| 6.P.1 | Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and progressions, e.g., ABBCCC; 1, 5, 9, 13,...; 3, 9, 27,... | <ul style="list-style-type: none"> Recognize and extend sequences of numbers involving whole numbers, fractions, and decimals. Recognize and extend patterns of various two- and three-dimensional shapes. Extend patterns, organize information, and make tables to solve problems. |
| 6.P.2 | Replace variables with given values and evaluate/simplify, e.g., $2(O) + 3$ when $O = 4$. | <ul style="list-style-type: none"> Recognize the term “variable” as used in an equation. Determine the numerical value of an algebraic expression, given the value of the variable in the expression. |
| 6.P.3 | Use the properties of equality to solve problems, e.g., if $\square + 7 = 13$, then $\square = 13 - 7$, therefore $\square = 6$; if $3 \times \square = 15$, then $1/3 \times 3 \times \square = 1/3 \times 15$, therefore $\square = 5$. | <ul style="list-style-type: none"> Identify and use the properties of equality to solve problems. |
| 6.P.4 | Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input-output tables. | <ul style="list-style-type: none"> Construct expressions, equations, and inequalities that describe real-world problems using a variable. Collect data from an experiment and express the data in a table of values. |
| 6.P.5 | Solve linear equations using concrete models, tables, graphs, and paper-pencil methods. | <ul style="list-style-type: none"> Solve first-degree equations in one variable using manipulatives and “guess and check”. Recognize variables and solve basic equations with one variable by using properties of equality. |
| 6.P.6 | Produce and interpret graphs that represent the relationship between two variables in everyday situations. | <ul style="list-style-type: none"> Analyze and describe data in tables and graphs, orally and in writing, commenting on patterns and trends. Create a graph using data from a table of values. |

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| 6.P.7 | Identify and describe relationships between two variables with a constant rate of change. Contrast these relationships where the rate of change is not constant. | <ul style="list-style-type: none"> • Same as state standard. |
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STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
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| 6.G.1 | Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides, e.g., squares, rectangles, rhombuses, parallelograms, trapezoids, and isosceles, equilateral, and right triangles. | <ul style="list-style-type: none"> • Describe the distinction between similar and congruent figures. • Recognize complimentary and supplementary angles formed by intersecting lines. • Describe the sum of angles of a quadrilateral. • Use the correct terminology to describe parts of angles. • Use the correct terminology to describe parts of triangles and quadrilaterals. • Draw all types of triangles, including scalene, isosceles, and equilateral triangles. |
| 6.G.2 | Identify three-dimensional shapes (e.g., cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges and faces. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.G.3 | Identify relationships among points, lines, and planes, e.g., intersecting, parallel, perpendicular | <ul style="list-style-type: none"> • Identify relationships among points, rays, lines, and planes, e.g., intersecting, parallel, and perpendicular. |
| 6.G.4 | *Graph points and identify coordinates of points on the Cartesian coordinate plane (all four quadrants). | <ul style="list-style-type: none"> • Graph points and identify coordinates of points on the Cartesian coordinate plane in the first quadrant. • Although this standard is important and appropriate for this grade span, it will not be included in the state assessment program at the 5-6 grade span at the present time. |
| 6.G.5 | Find the distance between two points on horizontal or vertical number lines. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.G.6 | Predict, describe, and perform transformations on two-dimensional shapes, e.g., translations, rotations, and reflections. | <ul style="list-style-type: none"> • Same as state standard. |

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| 6.G.7 | Identify types of symmetry, including line and rotational. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.G.8 | Determine if two shapes are congruent by measuring sides or a combination of sides and angles, as necessary; or by motions or series of motions, e.g., translations, rotations, and reflections. | <ul style="list-style-type: none"> • Recognize reflections, slides, and rotations. • Determine congruence through measurements and transformations. |
| 6.G.9 | Match three-dimensional objects and their two-dimensional representations, e.g., nets, projections, and perspective drawings | <ul style="list-style-type: none"> • Identify and draw shapes and figures from different views/perspectives (e.g., nets, projections, orthogonal and isometric perspectives). |

| MEASUREMENT | | |
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| DOE Standard Number | State Standard | Students will be able to: |
| 6.M.1 | Apply the concepts of perimeter and area to the solution of problems. Apply formulas where appropriate. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.M.2 | Identify, measure, describe, classify, and construct various angles, triangles, and quadrilaterals. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.M.3 | Solve problems involving proportional relationships and units of measurement, e.g., same system unit conversions, scale models, maps, and speed. | <ul style="list-style-type: none"> • Use a ratio to create a simple scale drawing or map. • Recognize unit conversions as ratios and proportions. |
| 6.M.4 | Find areas of triangles and parallelograms. Recognize that shapes with the same number of sides but different appearances can have the same area. Develop strategies to find the area of more complex shapes. | <ul style="list-style-type: none"> • Find areas of triangles and parallelograms. • Recognize that shapes with the same number of sides but different appearances can have the same areas. Develop strategies to find the area of more complex shapes. • Recognize that complex regions can be divided into simpler shaped regions. |
| 6.M.5 | Identify, measure, and describe circles and the relationships of the radius, diameter, circumference, and area (e.g., $d=2r$, $p=C/d$), and use the concepts to solve problems. | <ul style="list-style-type: none"> • Same as state standard. |

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| 6.M.6 | Find volumes and surface areas of rectangular prisms. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.M.7 | Find the sum of the angles in simple polygons (up to eight sides) with and without measuring the angles. | <ul style="list-style-type: none"> • Using a protractor, measure with accuracy to find sums of angles in simple polygons. • Without a protractor, find the sum of the angles in a polygon (3-8 sides). |

DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | State Standard | Students will be able to: |
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| 6.D.1 | Describe and compare data sets using the concepts of median, mean, mode, maximum, and minimum, and range. | <ul style="list-style-type: none"> • Collect, organize, and record data using the concepts of median, mean, mode, maximum and minimum, and range. |
| 6.D.2 | Construct and interpret stem-and-leaf plots, line plots, and circle graphs | <ul style="list-style-type: none"> • Construct circle graphs. • Describe and interpret circle graphs. • Construct and interpret stem-and-leaf plots. • Construct and interpret box and whisker plots. |
| 6.D.3 | Use tree diagrams and other models (e.g., lists and tables) to represent possible or actual outcomes of trials. Analyze the outcomes. | <ul style="list-style-type: none"> • Same as state standard. |
| 6.D.4 | Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a die) and test the predictions. Use appropriate ratios between 0 and 1 to represent the probability of the outcome and associate the probability with the likelihood of the event. | <ul style="list-style-type: none"> • Compare the theoretical probability of an event occurring with experimental results. • Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a die) and test the predictions. |

Beverly Public Schools Curriculum MATHEMATICS GRADE 7

Continue to address PreK-6 Standards as needed

Students engage in problem solving, communicating, reasoning, connecting, and representing.

| STRAND: NUMBER SENSE AND OPERATIONS | | |
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| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
| 7.N.1 | Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents. (8.N.1) | <ul style="list-style-type: none"> • Compare, order, estimate and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents. • Compare integers and rational numbers using $>$, $<$, or $=$ symbols. • Arrange integers and rational numbers in order from least to greatest. |
| 7.N.2 | Use ratios and proportions in the solution of problems involving unit rates, scale drawings, and reading of maps. | <ul style="list-style-type: none"> • Simplify ratios. • Use unit rate. • Identify proportions. • Solve proportions. • Change percent to a decimal and fraction. • Set up and solve percentage problems. • Incorporate a calculator to solve problems relating to ration, proportion and percent. • Identify parts of a proportion • Solve a proportion using cross multiplication. • Use ratios and proportions in the solution of problems, in particular, problems using unit rates, scale factors, and rate of change. |
| 7.N.3 | Represent numbers in scientific notation (positive powers of ten only) and use that notation in problem situations. | <ul style="list-style-type: none"> • Same |

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| 7.N.4 | Demonstrate an understanding of absolute value, e.g., $ -3 = 3 = 3$. (8.N.6) | <ul style="list-style-type: none"> • Same |
| 7.N.5 | Apply the rules of positive integer exponents to the solution of problems. Extend the Order of Operations to include positive integer exponents. | <ul style="list-style-type: none"> • Apply the rules of powers and roots to the solution of problems. • Extend the Order of Operations to include positive integer exponents and square roots. |
| 7.N.6 | Use the inverse relationships of addition and subtraction, and of multiplication and division to simplify computations and solve problems, e.g. multiplying by $\frac{1}{2}$ or 0.5 is the same as dividing by 2. | <ul style="list-style-type: none"> • Work with inverse operations. • Solve equations using guess and check (mental math). |
| 7.N.7 | Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1). (8.N.10) | <ul style="list-style-type: none"> • Same |
| 7.N.8 | Determine when an estimate rather than an exact answer is appropriate and apply them in problem situations. (8.N.11) | <ul style="list-style-type: none"> • Describe conditions under which an estimate rather than an exact answer is appropriate and apply in problem situations. • Use estimation in solving word problems. |
| 7.N.9 | Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer components—to solve problems with rational numbers (including negatives). (8.N.12) | <ul style="list-style-type: none"> • Same |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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| 7.P.1 | Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g. compounding. | <ul style="list-style-type: none"> • Write an algebraic expression for the outcome of a number pattern. • Make predictions about number outcomes. • Determine a rule for extension and general term for arithmetic |

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| | (8.P.1) | and geometric progressions. |
| 7.P.2 | Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$. (8.P.2) | <ul style="list-style-type: none"> Summarize the meaning of variables. Distinguish between an expression and an equation. Solve one-step equations. Evaluate simple algebraic expressions for given variable values. |
| 7.P.3 | Create and use symbolic expressions for linear relationships and relate them to verbal, tabular, and graphical representations. | <ul style="list-style-type: none"> Use number patterns to help solve word problems. Explain orally the patterns and rules. |
| 7.P.4 | Solve linear equations using tables, graphs, models, and algebraic methods. | <ul style="list-style-type: none"> Represent and solve linear equations and/or inequalities with one or two variables using models, symbols, and/or graphs. |
| 7.P.5 | Identify, describe, and analyze linear relationships between two variables. Compare positive rate of change, e.g. $y = 3x + 1$, to negative rate of change, e.g. $y = -3x + 1$. | <ul style="list-style-type: none"> Same |
| 7.P.6 | Use linear equations to model and analyze problems involving proportional relationships. Use technology standard as appropriate. (8.P.9) | <ul style="list-style-type: none"> Model situations with proportional relationships and solve problems. |

STRAND: GEOMETRY

| DOE Standard Number | State Standard | Students will be able to: |
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| 7.G.1 | Analyze, apply, and explain the relationship between the number of sides and the sums of the interior angle measures of polygons. (8.G.1) | <ul style="list-style-type: none"> Same |
| 7.G.2 | Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems. (8.G.2) | <ul style="list-style-type: none"> Same |
| 7.G.3 | Demonstrate and understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal. (8.G.3) | <ul style="list-style-type: none"> Same |
| 7.G.4 | Graph points and identify coordinates of points on a | <ul style="list-style-type: none"> Same |

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| | Cartesian coordinate plane (all four quadrants). | |
| 7.G.5 | Use a ruler, protractor, and compass to draw polygons and circles. | <ul style="list-style-type: none"> • Same |
| 7.G.6 | Predict the results of translations and reflections of figures on unmarked or coordinate planes and draw the transformed figure. | <ul style="list-style-type: none"> • Same |
| 7.G.7 | Identify three-dimensional figures (e.g. prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces. (8.G.7) | <ul style="list-style-type: none"> • Same |

STRAND: MEASUREMENT

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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| 7.M.1 | Select, convert (within the same system of measurement) and use appropriate units of measurement scale. (8.M.1) | <ul style="list-style-type: none"> • Work with metrics and standard measurement. • Use measuring devices. • Develop and understand measurement. • Select, convert (with the same system of measurement), and use appropriate units of measurement or scale. |
| 7.M.2 | Given the formulas, convert from one system of measurement to another. Use technology as appropriate. (8.M.2) | <ul style="list-style-type: none"> • Same |
| 7.M.3 | Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms and cylinders. Use technology as appropriate. (8.M.3) | <ul style="list-style-type: none"> • Draw conclusions using geometric principles. • Solve problems using geometric principles. • Identify various geometric figures. • Work with geometric models to find perimeter, circumference, area. • Measure and construct lengths, angles, and plane geometric figures. • Calculate and compare area, perimeter, circumference, and |

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| | | <p>volume of geometric figures.</p> <ul style="list-style-type: none"> • Use pi in finding the circumference and area of a circle. Demonstrate and understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter of polygons and circles. • Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. |
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STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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| 7.D.1 | Select, create, interpret, and utilize the following tabular and graphical representations of data: circle graphs, Venn Diagrams, stem-and-leaf plots, tables, and charts. | <ul style="list-style-type: none"> • Collect and organize data in some graphical form. • Apply this data to making predictions or convincing arguments. • Construct a simple space. • Record all probable outcomes to determine probability. |
| 7.D.2 | Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data. (8.D.3) | <ul style="list-style-type: none"> • Describe the characteristics and limitations of a data sample. • Identify the different ways of selecting a sample, e.g. convenience sampling, responses to a survey, random sampling. • Same |
| 7.D.3 | Use tree diagrams, tables, organized lists, and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of number cubes. | <ul style="list-style-type: none"> • Same |

Beverly Public Schools Curriculum MATHEMATICS GRADE 8

STRAND: NUMBER SENSE AND OPERATIONS

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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[Understand numbers](#), ways of representing numbers, relationships among numbers, and number systems
[Understand meanings](#) of operations and how they relate to one another
[Compute fluently](#) and make reasonable estimates

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| 8.N.1 | Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents. (7.N.1) | <ul style="list-style-type: none"> • Compare, order, estimate, and translate among integers, fractions, and mixed numbers (i.e., rational numbers), decimals, and percents. • Compare integers and rational numbers using $>$, $<$, or $=$ symbols. • Arrange integers and rational numbers in order from least to greatest. |
| 8.N.2 | Define, compare, order and apply frequently used irrational numbers such as $\sqrt{2}$ and π . | <ul style="list-style-type: none"> • Same |
| 8.N.3 | Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change. | <ul style="list-style-type: none"> • Simplify ratios. • Use unit rate. • Identify proportions. • Change percent to decimal and fraction. • Set up and solve percentage problems. • Incorporate a calculator to solve problems relating to ratio, proportion, and percent. • Identify parts of a proportion. • Solve a proportion using cross multiplication. • Use ratios and proportions in the solution of problems, in |

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| | | particular, problems involving unit rates, scale factors, and rate of change. |
| 8.N.4 | Represent numbers in scientific notation, and use them in calculations and problem situations. | <ul style="list-style-type: none"> • Same |
| 8.N.5 | Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems. | <ul style="list-style-type: none"> • Same |
| 8.N.6 | Demonstrate an understanding of absolute value, e.g., $ -3 = 3 = 3$. (7.N.4) | <ul style="list-style-type: none"> • Same |
| 8.N.7 | Apply the rules of powers and roots to the solution of problems. Extend the Order of Operations to include positive integer exponents and square roots. | <ul style="list-style-type: none"> • Same |
| 8.N.8 | Demonstrate an understanding of the properties of arithmetic operations on rational numbers. Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., $-7 + 7 = 0$; $3/4 \times 4/3 = 1$); and the notion of closure of a subset of the rational numbers under an operation (e.g., the set of odd integers is closed under multiplication but not under addition). | <ul style="list-style-type: none"> • Choose appropriate operations to solve problems involving integers and rational numbers. • Apply form operations to integers, fractions. |
| 8.N.9 | Use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems, e.g. multiplying by $1/2$ or 0.5 is the same as dividing by 2 . | <ul style="list-style-type: none"> • Same |
| 8.N.10 | Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1). (7.N.7) | <ul style="list-style-type: none"> • Represent numbers as fractions, decimals and percents and make conversions from one form to another. • Solve problems involving percent applications. • Apply estimation techniques to check reasonableness of results. |
| 8.N.11 | Determine when an estimate rather than an exact answer is appropriate and apply in problem situations. (7.N.8) | <ul style="list-style-type: none"> • Same |
| 8.N.12 | Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives). (7.N.9) | <ul style="list-style-type: none"> • Multiply and divide negative fractions and decimals |

STRAND: PATTERNS, RELATIONS, AND ALGEBRA

| DOE Standard Number | State Standard | Students will be able to: |
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[Understand patterns](#), relations, and functions
[Represent and analyze](#) mathematical situations and structures using algebraic symbols
[Use mathematical models](#) to represent and understand quantitative relationships
[Analyze change](#) in various contexts

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| 8.P.1 | Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g. compounding. (7.P.1) | <ul style="list-style-type: none"> • Write an algebraic expression for the outcome of a number pattern. • Make predictions about number outcomes. • Determine a rule for extension and the general term for arithmetic and geometric progressions. |
| 8.P.2 | Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$. (7.P.2) | <ul style="list-style-type: none"> • Summarize the meaning of variables. • Distinguish between expression and equation. • Solve one-step equations. • Same |
| 8.P.3 | Demonstrate an understanding of the identity $(-x)(-y) = xy$. Use this identity to simplify algebraic expressions, e.g., $(-2)(-x+2) = 2x - 4$. | <ul style="list-style-type: none"> • Same |
| 8.P.4 | Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations. | <ul style="list-style-type: none"> • Represent English expressions as algebraic expressions. • Represent English sentences as algebraic equations or inequalities. • See a pattern in data. • Set up a general rule for a pattern. • Graph points on a coordinate plane. • Evaluate the relationships between two variables. • Graph lines represented by data. • Solve problems such as coin, age, distance, rate, time, and consecutive integer; as well as real life problems using algebraic methods. |
| 8.P.5 | Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems. | <ul style="list-style-type: none"> • Same |
| 8.P.6 | Identify the roles of variables within an equation, | <ul style="list-style-type: none"> • Same |

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| | e.g., $y = mx + b$, expressing y as a function of x with parameters m and b . | |
| 8.P.7 | Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs. | <ul style="list-style-type: none"> • Use the number line symbolism ($\#m, <, >, \leq, \geq$) • Graph points on all four quadrants of the Cartesian coordinate plane and identify the coordinates of the points. • Solve inequalities and non linear equations by informal methods such as guess and check. • Solve equations and in equalities on a number line. • Graph the solutions to equations and inequalities on a number line. |
| 8.P.8 | Explain and analyze—both quantitatively and qualitatively, using pictures, graphs, charts, or equations—how a change in one variable results in a change in another variable in functional relationships, e.g., $C = \pi d$, $A = \pi r^2$ (A as a function of r), $A_{\text{rectangle}} = lw$ ($A_{\text{rectangle}}$ as a function of l and w). | <ul style="list-style-type: none"> • Same • Evaluate an expression for several different values of the variable. • Apply the evaluating expression as to solving real life problems. • Deduce range and domain. |
| 8.P.9 | Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate. (7.P.6) | <ul style="list-style-type: none"> • Same |
| 8.P.10 | Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and x - and y -intercepts of different linear patterns. | <ul style="list-style-type: none"> • Same |

STRAND: GEOMETRY

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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[Analyze characteristics](#) and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

[Specify locations](#) and describe spatial relationships using coordinate geometry and other representational systems

[Apply transformations](#) and use symmetry to analyze mathematical situations

[Use visualization](#), spatial reasoning, and geometric modeling to solve problems

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| 8.G.1 | Analyze, apply, and explain the relationship between the number of sides and the sums of the interior angle measures of polygons. (7.G.1) | <ul style="list-style-type: none"> • Same |
| 8.G.2 | Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems. (7.G.2) | <ul style="list-style-type: none"> • Plot geometric figures on a coordinate plane. • Reflect a geometric figure over an axis on a coordinate plane. • Magnify or reduce a geometric figure on a coordinate plane. |
| 8.G.3 | Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal. (7.G.3) | <ul style="list-style-type: none"> • Same |
| 8.G.4 | Demonstrate an understanding of the Pythagorean theorem. Apply the theorem to the solution of problems. | <ul style="list-style-type: none"> • Same • Solve for the missing side of a right triangle using the Pythagorean Theorem. • Create Pythagorens. • Determine if a triangle when given the lengths of 3 sides. |
| 8.G.5 | Use a straightedge, compass, or other tools to formulate and test conjectures, and to draw geometric figures. | <ul style="list-style-type: none"> • Same |
| 8.G.6 | Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure, e.g., predict how tessellations transform under translations, reflections, and rotations. | <ul style="list-style-type: none"> • Same |
| 8.G.7 | Identify three-dimensional figures (e.g. prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces. (7.G.7) | <ul style="list-style-type: none"> • Same |
| 8.G.8 | Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings. | <ul style="list-style-type: none"> • Same |

STRAND: MEASUREMENT

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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Understand measurable attributes of objects and the units, systems, and processes of measurement
Apply appropriate techniques, tools, and formulas to determine measurements

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| 8.M.1 | Select, convert (within the same system of measurement) and use appropriate units of measurement scale. (7.M.1) | <ul style="list-style-type: none">• Same |
| 8.M.2 | Given the formulas, convert from one system of measurement to another. Use technology as appropriate. (7.M.2) | <ul style="list-style-type: none">• Same |
| 8.M.3 | Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms and cylinders. Use technology as appropriate. (7.M.3) | <ul style="list-style-type: none">• Same |
| 8.M.4 | Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement. | <ul style="list-style-type: none">• Same |
| 8.M.5 | Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density. | <ul style="list-style-type: none">• Same |

STRAND: DATA ANALYSIS, STATISTICS, AND PROBABILITY

| DOE Standard Number | <i>State Standard</i> | Students will be able to: |
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[Formulate questions](#) that can be addressed with data and collect, organize, and display relevant data to answer them
[Select and use](#) appropriate statistical methods to analyze data
[Develop and evaluate](#) inferences and predictions that are based on data
[Understand and apply](#) basic concepts of probability

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| 8.D.1 | Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling. | <ul style="list-style-type: none"> • Same |
| 8.D.2 | Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box-and-whisker plots, histograms, tables, and charts. Differentiate between continuous and discrete data and ways to represent them. | <ul style="list-style-type: none"> • Same |
| 8.D.3 | Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data. (7.D.2) | <ul style="list-style-type: none"> • Same |
| 8.D.4 | Use tree diagrams, tables, organized lists, basic combinatorics (“fundamental counting principle”), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice. | <ul style="list-style-type: none"> • Same |