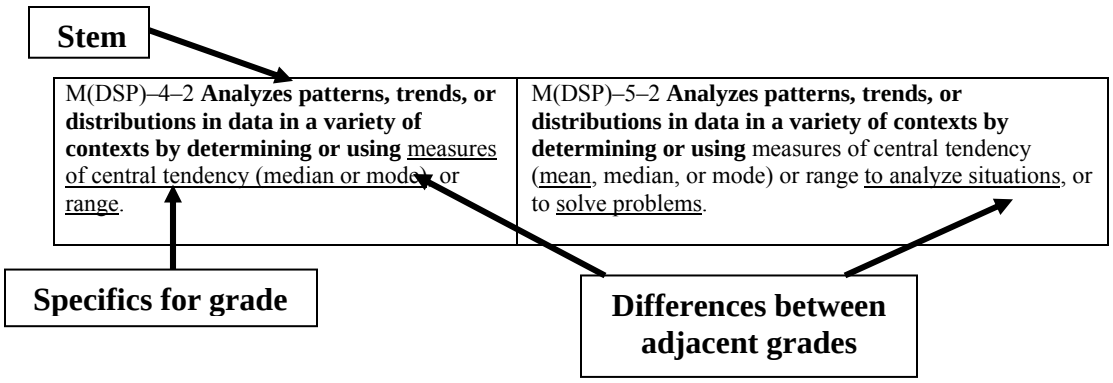
NECAP Mathematics Grade-Level Expectations For Grade 4

The New England Common Assessment Program (NECAP) Mathematics GLEs have been developed as a means to identify the concepts and skills expected of all students for large-scale assessment of mathematics in grades 3–8; they <u>are not intended</u> to represent the full mathematics curriculum at each grade level, but are meant to capture concepts and skills related to "big ideas" of mathematics that can be assessed in an on-demand setting that focus the curriculum, but do not narrow the curriculum. Each partner state intends to develop a set of local GLEs to accompany these GLEs for local assessment purposes that includes the concepts and skills not easily assessable in an on-demand setting, and therefore not included in this set of GLEs.

The NECAP GLEs in this document can be interpreted as describing grade-level expectations for the end of the grade identified, or in the beginning of the next grade.

As you review the NECAP Mathematics Grade-Level Expectations the following are important to understand.

1) The NECAP GLEs are organized into four content strands: Number and Operations; Functions and Algebra; Data, Statistics, and Probability; and Geometry and Measurement.
2) Problem solving, reasoning, connections, and communication are embedded throughout this set of GLEs instead of as separate strands.
3) Each GLE includes a **bolded** statement called the "stem." Each "stem" is the same or similar across the grades for a given GLE, and is meant to communicate the main curriculum and instructional focus of the GLE across the grades.
4) The unbolded text within a GLE indicates how the GLE is specified at a given grade level.
5) At each grade level differences from previous grades are <u>underlined</u>. (Note: Sometimes nothing is underlined within a GLE. In these situations examine other GLEs across the strand to identify the differences.)
6) Each GLE is coded for the content strand, grade level, and the GLE "stem" number (e.g., M(F&A)–6–3: The "M" stands for mathematics, the "F&A" stands for the functions and algebra strand, the "6" stands for grade 6, and the "3" stands for stem 3).
7) An empty cell means that the GLE "stem" will not be assessed at that grade on the state-level on-demand assessment, but is reserved for local curriculum and assessment.
8) Unless otherwise specified the number parameters for a given grade in M(N&O)–X–1 apply to all GLEs at that grade level.
9) Only number concepts identified at a grade level in the NECAP Numbers and Operations strand will be assessed and reported. However, all number concepts acquired up to a grade can be used in other content strands unless otherwise specified.
10) All the concepts and skills identified at a given grade level are "fair game" for assessment purposes. However, conjunctions in this document have specific meaning. The conjunction "and" separates parts of a GLE that will be assessed every year (to the extent possible), while the conjunction "or" separates parts of the GLE that may be assessed each year, but will be more likely to be assessed over several years. In some situations "or[sc]" is used. While students will have choices on strategies they use or methods to communicate their thinking throughout the assessment, there are special cases that the New England partners thought it was necessary to communicate to the test developer that students should not be required to use a specific method (e.g., "…writes in words or[sc] symbols…").



NECAP Mathematics Grade-Level Expectations For Grade 4

Number and Operations

Grade 4

M(N&O)–4–1 **Demonstrates conceptual understanding of rational numbers with respect to:**
whole numbers from 0 to 999,999 through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and

positive fractional numbers (benchmark fractions: *a*/2, *a*/3, *a*/4, *a*/5, *a*/6, *a*/8, or *a*/10, where *a* is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or linear models where the number of parts in the whole are equal to, and a multiple or factor of the denominator; and **decimals** as hundredths within the context of money, or tenths within the context of metric measurements (e.g., 2.3 cm) **using models, explanations, or other representations**.

M(N&O)–4–2 **Demonstrates understanding of the relative magnitude of numbers** from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

M(N&O)–4–3 **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

M(N&O)–4–4 **Accurately solves problems involving** multiple operations on whole numbers or the use of the properties of factors and multiples; and addition or subtraction of decimals and positive proper fractions with like denominators. (Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors.)

(IMPORTANT: *Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses.*)

Geometry and Measurement

M(G&M)–4–1 **Uses properties or attributes of angles** (number of angles) **or sides** (number of sides, length of sides, parallelism, or perpendicularity) **to identify, describe, or distinguish among** triangles, squares, rectangles, rhombi, trapezoids, hexagons, or octagons; or classify angles relative to 90^{o} as more than, less than, or equal to.

M(G&M)–4–3 **Uses properties or attributes** (shape of bases or number of lateral faces) **to identify, compare, or describe three-dimensional shapes** (rectangular prisms, triangular prisms, cylinders, or spheres).

M(G&M)–4–4 **Demonstrates conceptual understanding of congruency** by matching congruent figures using reflections, translations, or rotations (flips, slides, or turns), or as the result of composing or decomposing shapes using models or explanations.

M(G&M)–4–5 **Demonstrates conceptual understanding of similarity** by applying scales on maps, or applying characteristics of similar figures (same shape but not necessarily the same size) to identify similar figures, or to solve problems involving similar figures. Describes relationships using models or^{sc} explanations.

M(G&M)–4–6 **Demonstrates conceptual understanding of perimeter of** polygons, and **the area of** rectangles, polygons or irregular shapes on grids using a variety of models, manipulatives, or formulas. Expresses all measures using appropriate units.

M(G&M)–4–7 **Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems** across the content strands.

Benchmarks in Appendix B.

Functions and Algebra

M(F&A)–4–1 **Identifies and extends to specific cases a variety of patterns** (linear and nonlinear) represented in models, tables or sequences; and writes a rule in words or^{sc} symbols to find the next case.

M(F&A)–4–3 **Demonstrates conceptual understanding of algebraic expressions** by using letters or symbols to represent unknown quantities to write simple linear algebraic expressions involving any one of the four operations; or by evaluating simple linear algebraic expressions using whole numbers.

M(F&A)–4–4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions, by simplifying numerical expressions where left to right computations may be modified only by the use of parentheses [e.g., $14 - (2 \times 5)$] (expressions consistent with the parameters of M(F&A)–4–3), and by solving one-step linear equations of the form $ax = c$, $x \pm b = c$, where a, b, and c are whole numbers with $a \neq 0$.

Data, Statistics, and Probability

M(DSP)–4–1 **Interprets a given representation** (line plots, tables, bar graphs, pictographs, or circle graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (IMPORTANT: *Analyzes data consistent with concepts and skills in M(DSP)–4–2.*)
M(DSP)–4–2 **Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using** measures of central tendency (median or mode), or range.
M(DSP)–4–4 **Uses counting techniques to solve problems** in context involving combinations or simple permutations (e.g., Given a map – Determine the number of paths from point A to point B.) using a variety of strategies (e.g., organized lists, tables, tree diagrams, or[sc] others).
M(DSP)–4–5 **For a probability event in which the sample space may or may not contain equally likely outcomes, determines** the theoretical probability of an event and expresses the result as part to whole (e.g., two out of five).

Appendix B: Measurement Benchmarks

The following is a list of the measurement benchmarks and equivalences that ***can be used*** in problems across the content strands at each grade level to address the expectations in M(G&M)–X–7 for the NECAP Assessment.

M(G&M)–X–7 **Uses units of measures appropriately and consistently, and makes conversions within systems when solving problems** across the content strands.

The type of measure (e.g., length, time, etc.), the unit (e.g., inches, feet, etc.), the degree of accuracy where appropriate (e.g., ½ inch); and equivalences (e.g., 12 inches in a foot) are identified for grades 2 – 8. In addition to measurement benchmarks identified below students will be expected to use the appropriate units when solving problems involving area, volume, surface area, conversions, and rates (e.g., miles per hour, price per pound, pounds per square inch) on the NECAP Assessment.

Measures	**Grade 4**
Length	**Unit (accuracy):** Inch (to 1/4 inch); Foot; Centimeter (to 0.5 centimeter); Meter (to 0.5 centimeter); Yard; Mile (use in scale questions); Kilometer (use in scale questions) **Equivalencies:** 12 inches in 1 foot; 100 centimeters in 1 meter; 3 feet in 1 yard; 36 inches in 1 yard
Time	**Unit (accuracy):** Hour (to 5 minute interval); Day; Year **Equivalencies:** 24 hours in 1 day; 7 days in 1 week; 365 days in 1 year; 60 seconds in 1 minute; 60 minutes in 1 hour
Temperature	**Unit (accuracy):** Cº and Fº (to 1 degree)
Capacity	**Unit (accuracy):** Quart (to whole quart)
Mass	**Unit (accuracy):** Kilogram (to whole kilogram); Gram (to whole gram)
Weight	**Unit (accuracy):** Pound (to whole pound)