LEAP Assessment Guide, Mathematics Grade 6

This guide includes:

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- Introduction to LEAP
- Overview of Mathematics Task Types and Reporting Categories
- Design of LEAP Mathematics Assessments
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I. Purpose of Assessment Guide

This document is designed to assist Louisiana educators in understanding the LEAP mathematics assessment for grade 6, which will be administered in spring 2016.

II. Introduction to LEAP

All students in grades 3–8 will take the LEAP ELA and mathematics assessments. In order for Louisiana to maintain comparability between assessments administered in spring 2015 and spring 2016, a percentage of the items (not more than 49.9%) for the LEAP assessments comes from the Partnership for Assessment of Readiness for College and Careers (PARCC). PARCC is a group of states working together to develop high-quality assessments. The remaining percentage of items for the LEAP assessments comes from the College and Career Readiness Item Bank belonging to Data Recognition Corporation, winner of the LEAP mathematics and ELA test development contract.

The LEAP assessments will offer the following:

- Consistency with the rigor and types of questions used in the spring 2015 Louisiana assessments
- Measurement of the full range of Louisiana content standards in ELA and mathematics
- Ability to measure the full range of student performance, including the performance of high- and low-performing students

- Flexibility in test administration, with both paper- and computer-based testing available
- Information for educators and parents about student readiness in ELA and mathematics and whether students are "on track" for college and careers
- Comparison of Louisiana student performance with the performance of students in other states

III. Overview of LEAP Mathematics Task Types and Reporting Categories

Each item on the LEAP assessment is referred to as a task and is identified by one of three types: Type I, Type II, and Type III. As shown in the table below, each of the three task types is aligned to one of four reporting categories (also called sub-claims): major content, additional and supporting content, reasoning, and modeling. Each task type is designed to align with at least one of the Standards for Mathematical Practice (MP).

Task Type	Description	Sub-Claim	Mathematical Practice(s)
Type I	conceptual understanding, fluency, and application	**Sub-Claim A:** solve problems involving the major content for grade 6 **Sub-Claim B:** solve problems involving the additional and supporting content for grade 6	can involve any or all practices
Type II	written arguments/ justifications, critique of reasoning, or precision in mathematical statements	**Sub-Claim C:** express mathematical reasoning by constructing mathematical arguments and critiques	primarily MP.3 and MP.6, but may also involve any of the other practices
Type III	modeling/application in a real-world context or scenario	**Sub-Claim D:** solve real-world problems engaging particularly in the modeling practice	primarily MP.4, but may also involve any of the other practices

These reporting categories are the same as the reporting categories on the spring 2015 mathematics student reports and will provide parents and educators valuable information about

- overall student performance, including readiness to continue further studies in mathematics;
- student performance broken down by mathematics subcategories, which may help identify when students need additional support or more challenging work; and
- how well schools and districts are helping students achieve higher expectations.

IV. Design of LEAP Mathematics Assessments

The LEAP mathematics assessment in grade 6 contains a total of 66 points. The table below shows the breakdown of task types and point values.

Grade 6 Mathematics Test Design				
Test Session	**Type I (points)**	**Type II (points)**	**Type III (points)**	**Total (points)**
Session 1: No Calculator	20	0	0	20
Session 2: Calculator	10	7	6	23
Session 3: Calculator	10	7	6	23

V. Assessable Content

The tasks on the LEAP mathematics test are aligned directly to the Louisiana Mathematics Standards for all sub-claims. Type I tasks, designed to assess conceptual understanding, fluency, and application, are aligned to the major content for grade 6 (reported in sub-claim A) and additional and supporting content for grade 6 (reported in sub-claim B). Type II tasks are designed to assess student reasoning ability of the major content for grade 6 in applied contexts (reported in sub-claim C). Type III tasks are designed to assess student modeling ability of selected content for grades 5 or 6 in applied contexts (reported in sub-claim D). Type II and III tasks are further aligned to PARCC evidence statements for sub-claims C and D. See the table in the Appendix (section VIII of this document) for a listing of assessable content of the Louisiana Mathematics Standards and PARCC evidence statements.

VI. LEAP Test Administration Policies

Administration Schedule

The spring LEAP ELA and mathematics assessments will be administered during **one** testing window and will be available to districts as paper-based tests (PBT) and computer-based tests (CBT). The table below lists the PBT administration schedule for the spring ELA, mathematics, and science assessments.

Paper–Based Test Administration Schedule: Grade 6		
Day 1 April 25	English Language Arts Session 1: Research Simulation Task	90 minutes
	Mathematics Session 1: No Calculator	75 minutes
Day 2 April 26	English Language Arts Session 2: Literary Analysis Task **OR** Narrative Writing Task + 1-2 passage sets	75 minutes
	Mathematics Session 2: Calculator	75 minutes
Day 3 April 27	English Language Arts Session 3: Reading Literary and Informational Texts	75 minutes
	Mathematics Session 3: Calculator	75 minutes
Day 4 April 28	Science Session 1: Multiple-Choice	Suggested time: 60 minutes
	Science Session 2: Task	Suggested time: 30 minutes
Day 5 April 29	Make–Up Sessions	Depends on session

The table below lists the CBT administration schedule and policies for the spring ELA and mathematics assessments.

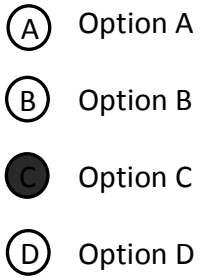
Computer-Based Test Administration Schedule: Grade 6		
Test Window: April 11, 2016 – May 6, 2016		
English Language Arts	Session 1: Research Simulation Task	90 minutes
Mathematics	Session 1: No Calculator	75 minutes
English Language Arts	Session 2: Literary Analysis Task **OR** Narrative Writing Task + 1-2 passage sets	75 minutes
Mathematics	Session 2: Calculator	75 minutes
English Language Arts	Session 3: Reading Literary and Informational Texts	75 minutes
Mathematics	Session 3: Calculator	75 minutes
Computer-Based Test Administration Policies: For the administration of the computer-based tests, schools must follow the policies below.		
• Sessions must be completed in the order listed above. • No more than two sessions can be scheduled per day (one English Language Arts and one Mathematics). • Students must be provided breaks between sessions. • All students in a particular grade must be tested on the same session at the same time as or as close to the same time as possible. If not possible, schools should have procedures in place to isolate students who have tested from those who are waiting to test. • Make-up sessions must be administered as soon as a student returns to school.		

The LEAP ELA and mathematics tests are **strictly timed** and no additional time is permitted, except for students who have a documented extended time accommodation (e.g., an IEP).

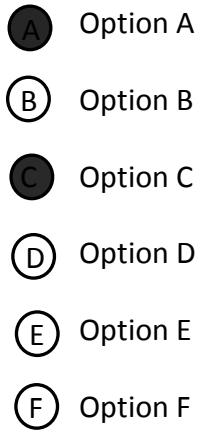
Paper-Based Tests

Students taking the paper-based tests, except those using braille test materials, will enter all answers in their test booklets. There will be no separate answer documents. Each session of the mathematics test booklet will be sealed; day indicator bars will appear on the outside margin of each page. Instructions for how to manage the test booklets, including how to break the seals, will be outlined in the Test Administration Manual.

Multiple-Choice tasks have four options. Students will shade the bubble of the correct answer.

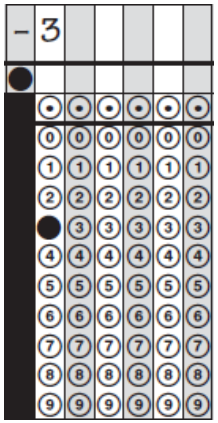


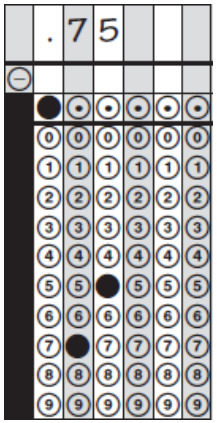
Multiple-Select tasks for grade 6 have five to seven options. Students will fill in the number of correct answers based on the question. The number of correct answers will vary from task to task.



Fill-in-the-Blank Grids

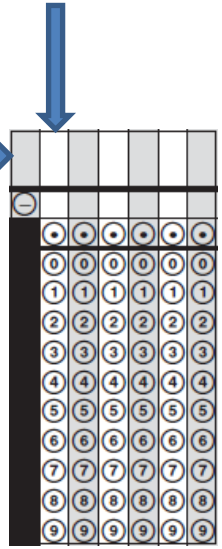
The grid for grade 6 has a column for entering and shading a bubble when the answer is negative. See the example in the grid on the left below. Students will write the number in the boxes at the top of the grid. Numbers are entered **without** commas. Students will then shade the bubble in the column that corresponds to the entry in the top row. The recommended method for entry of the digits and a decimal point (if needed) is to start in column 2. Blank spaces within the answer are not allowed. Equivalent forms of numbers, such as 0.75 or 0.750 for .75 as shown in the second example, are accepted providing that the response fits within any rounding limits that may be required by the question. For example, if a question requires the response to be rounded to the hundredths place, 0.75 or .75 would be accepted as correct, whereas 0.750 would not be.





Enter digit or decimal point starting in column 2. Do not skip boxes when entering the number.

Use only if answer is a negative number.



Note: Should a student mistakenly start in a column other than column 2, the entry will be scored as correct under the following conditions:

- There are no spaces within the answer.
- The answer fits within the remaining columns.
- The negative symbol is used when the answer is a negative number.

Fractional Answers

Type I tasks with potential fractional answers in PBT forms will be presented in multiple-choice or multiple-select formats. Students will be expected to be able to correctly write and apply fractions in Type II (reasoning) and Type III (modeling) constructed-response tasks.

Answering Type II and Type III Tasks

When answering Type II (reasoning) and Type III (modeling) tasks, students need to make sure to write their explanations and/or to show their work in the box provided for each question. Any information written outside the box or which has been scratched out will not be scored.

The following information presents guidelines for marking/writing in the mathematics test booklet.

- Students may use yellow highlighters to highlight text in the test booklet.
- Students may write and do scratch work in the test booklet, but must avoid making stray marks in the answer circles on the multiple-choice and multiple-select tasks or in the fill-in-the-blank grids.
- Highlighting text in options and placing an X to the right of the text in an option are recommended ways for students to eliminate options. However, crossing out options could create scoring issues if students mark through answer circles.

Computer-Based Tests

Students taking the computer-based tests will enter their answers into the online testing system. The way each answer is entered depends on the task type. For example, for a multiple-choice task, a student will select the circle next to the correct answer. For fill-in-the-blank and constructed-response tasks on online test forms, students will type in the number (integer or decimal) or text in the box using the typing tools provided. Some response boxes limit the length of the response that can be typed and whether numbers and/or text can be typed.

Computer-based tests allow for the use of technology-enhanced items (TEI) that use innovative, engaging ways to assess student understanding of material beyond the limitations of a traditional selected-response task. A TEI may require the student to sort shapes into categories by using a drag-and-drop tool, show a fraction or an area by selecting cells in a figure, or create angles by rotating rays.

The computer-based tests include the following online tools, which allow a student to select answer choices, “mark” tasks, eliminate answer options, take notes, enlarge the task, guide the reading of a task line by line, use a calculator, use a ruler and protractor, see the mathematics reference sheet, and use an equation builder for entering special characters (similar to what a student can do on the paper-based tests). A help tool is also featured to assist students as they use the online system.

- Pointer tool 
- Highlighter tool 
- Cross-Off tool 
- Calculator 
- Sticky Note tool 
- Magnifying tool 
- Line Guide 
- Mathematics Reference Sheet 
- Measurement tools 
- Equation Builder 
- Help tool 

All students taking the computer-based tests should work through the Online Tools Training to practice using the online tools so they are well prepared to navigate the online testing system.

Permitted Testing Materials

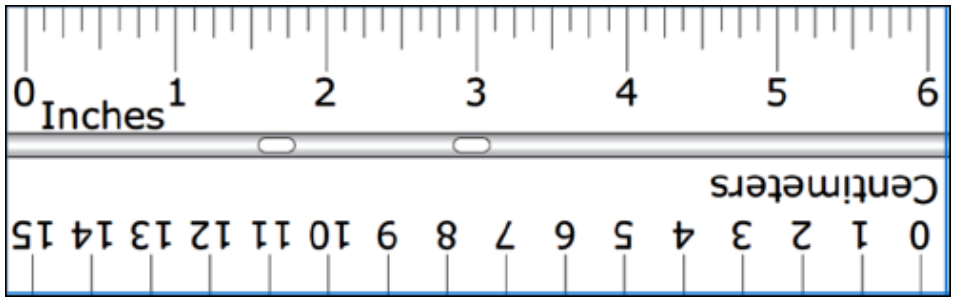
The chart that follows summarizes the tools and resources for the grade 6 mathematics assessment.

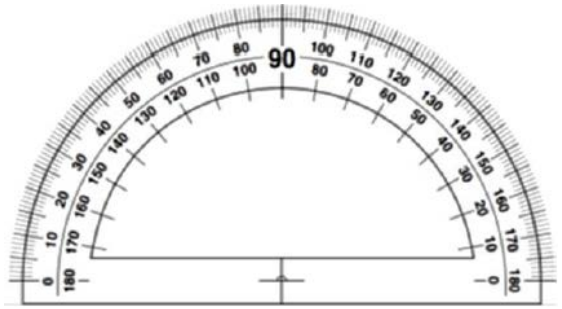
ASSESSMENT RESOURCES/TOOLS FOR GRADE 6

Provided (by vendor or part of online system)	Required (provided by school)	Other Allowable (may be used, not required)
$1/8$ -inch and centimeter ruler, protractor, and mathematics reference sheet	Scratch paper (lined, graph, or un-lined)	Yellow highlighter

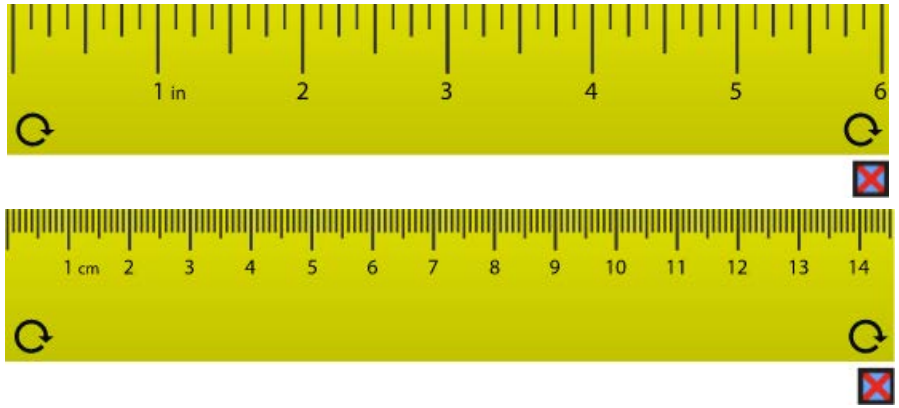
Provided tools are sent by the test vendor to the districts for the districts to distribute during testing; districts and students may **not** substitute their own tools for provided tools. Required tools must be supplied by the school and distributed to all testers during testing. Schools may give or permit students to bring *allowable* tools. If schools permit students to bring their own *allowable* tools, tools must be given to the test administrator prior to testing to ensure that the tools are appropriate for testing (e.g., tools do not have any writing on them).

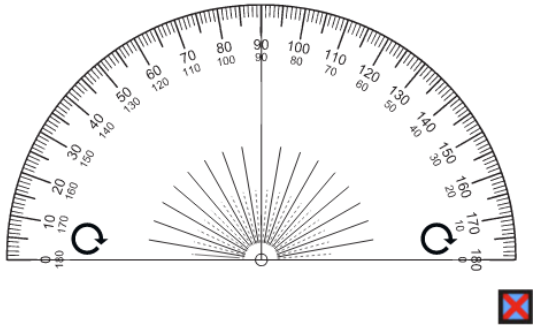
Grade 6 ruler and protractor provided on the LEAP paper-based mathematics assessment (not actual size):





Grade 6 rulers and protractor provided on the LEAP computer-based mathematics assessment (not actual size):





To ensure accurate measurement, the size of the computer-based ruler, along with the object being measured, varies depending on the computer monitor's resolution. To practice with the computer-based ruler and protractor, please visit the Online Tools Training.

Calculators

The LEAP mathematics test allows a four-function calculator in grade 6 during Sessions 2 and 3. Calculators are **not** allowed during Session 1 of the test. Four-function calculators may have square root, percent, memory, and +/- keys. For students with the approved accommodation, a hand-held four-function calculator is allowed during all test sessions. The student should use the calculator they have used regularly throughout the school year in their classroom and are most familiar with, provided their regular-use calculator is not outside the boundaries of what is allowed. The following table includes calculator information by session for both general testers and testers with approved accommodations for calculator use.

UPDATE: Clarification of Calculator Policy

Test Mode	**PBT**			**CBT**		
Session	Session 1	Session 2	Session 3	Session 1	Session 2	Session 3
Testers	Not allowed	Four-function, hand-held	Four-function, hand-held	Not allowed	Four-function, online available may also have hand-held	Four-function, online available may also have hand-held
Testers with approved accommodation for calculator use	Four-function, hand-held	Four-function, hand-held	Four-function, hand-held	Four-function, hand-held	Four-function, online available may also have hand-held	Four-function, online available may also have hand-held
Additional information for testers with approved accommodations for calculator use: • If a student needs an adaptive calculator (e.g., large key, talking), the student may bring his or her own or the school may provide one, as long as it is specified in his or her approved IEP or 504 Plan.						

Additionally, schools must adhere to the following guidance regarding calculators:

- Calculators with Computer Algebra System (CAS) features are **not** allowed.
- Tablet, laptop (or PDA), or phone-based calculators are **not** allowed.
- Students are **not** allowed to share calculators within a testing session.
- Test administrators must confirm that memory on all calculators has been cleared before and after the testing sessions.
- Calculators with "QWERTY" keyboards are **not** permitted.
- If schools or districts permit students to bring their own hand-held calculators, test administrators must confirm that the calculators meet all the requirements as defined above.

Reference Sheets

Students in grade 6 will be provided a reference sheet with the information below.

Grade 6 Reference Sheet

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Right Rectangular Prism	$V = Bh$ or $V = lwh$

Requisite Knowledge

Students in grade 6 will be required to know relative sizes of measurement units within one system of units. Therefore, the following requisite knowledge is necessary for the grade 6 assessments and is **not** provided in the reference sheet.

1 meter = 100 centimeters	1 gram = 1000 milligrams	1 day = 24 hours
1 meter = 1000 millimeters	1 liter = 1000 milliliters	1 minute = 60 seconds
1 kilometer = 1000 meters	1 foot = 12 inches	1 hour = 60 minutes
1 kilogram = 1000 grams	1 yard = 3 feet	Area formulas for rectangles

For more information about accessibility and accommodations, please refer to the 2015–2016 LEAP Accessibility Features and Accommodations Overview.

VII. Resources

UPDATE: Links to More Resources

- Grades 6–8 Math Guidebook: offers comprehensive information to support teachers in creating yearly, unit, and daily instructional plans for students
- Grades 6–8 Math Teacher Library: provides links to grade-specific resources, such as the standards, shared teacher resources, and instructional plans
- EAGLE Sample Test Items: provides teachers a bank of questions that can be used for instructional and assessment purposes
- 2014–2015 Grade 6 Practice Test: provides teachers and students with additional tasks that are similar to the tasks on the 2016 test, but should not be administered as a "practice test" because test designs for 2015 and 2016 are not the same
- PARCC's Grade 6 Math Released Items: provides teachers and students with actual test items from the PARCC 2015 test, including rubrics, alignment, and scoring information
- 2015–2016 Grade 6 LEAP Practice Test and Scoring Guide: offers samples of paper-based grade-level practice tests to help prepare students for the spring assessments
- 2015-2016 Grade 6 Online LEAP Practice Test, Scoring Guide, and Answer Key: offers samples of computer-based grade-level practice tests to help prepare students for the spring assessments; the online practice test is accessed through INSIGHT
- Online Tools Training: provides teachers and students examples of interactive, technology-enhanced items so they can become familiar with the computer-based testing format
- 2015–2016 LEAP Accessibility Features and Accommodations Overview: provides an overview of Louisiana's accessibility features and accommodations for grades 3–8 spring 2016 testing, clarifying differences between paper-based and online testing
- 2015-2016 LEAP Mathematics Practice Test Guidance: provides teachers with information about test structure, recommended uses, general cautions, item types, and scoring of the paper-based and computer-based LEAP tests
- Guide to the LEAP Online Equation Builder Grades 6-8: provides teachers with information on using the equation builder within the open-response boxes on the CBT
- Guide to Administering the Online Practice Tests: provides information regarding the administration and scoring process needed for the online practice tests

VIII. Appendix

Assessable Content for Sub-Claim A (Major Content)

Sub-Claim A: Major Content	
6.RP.A	**Understand ratio concepts and use ratio reasoning to solve problems.**
6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*
6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*[1]
6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
6.NS.A	**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**
6.NS.A.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*.
6.NS.C	**Apply and extend previous understandings of numbers to the system of rational numbers.**
6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

[1] Expectations for unit rates in this grade are limited to non-complex fractions.

6.NS.C.7	Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right*. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3 ^{o}C > -7 ^{o}C to express the fact that -3 ^{o}C is warmer than -7 ^{o}C*. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars*. d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars*.
6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
6.EE.A	**Apply and extend previous understandings of arithmetic to algebraic expressions.**
6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 - y*. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2*.
6.EE.A.3	Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y*.
6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*
6.EE.B	**Reason about and solve one-variable equations and inequalities.**
6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
6.EE.C	**Represent and analyze quantitative relationships between dependent and independent variables.**
6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

Assessable Content for Sub-Claim B (Additional and Supporting Content)

Sub-Claim B: Additional and Supporting Content	
6.NS.B	**Compute fluently with multi-digit numbers and find common factors and multiples.**
6.NS.B.2	Fluently divide multi-digit numbers using the standard algorithm.
6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2)*.
6.G.A	**Solve real-world and mathematical problems involving area, surface area, and volume.**
6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
6.SP.A	**Develop understanding of statistical variability.**
6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages*.
6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
6.SP.B	**Summarize and describe distributions.**
6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5	Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Assessable Content for Sub-Claim C (Reasoning Applications)

Sub-Claim C: Reasoning Applications
Base explanations/reasoning on the properties of operations. Content Scope: Knowledge and skills articulated in • 6.EE.A.3, 6.EE.A.4 – Students need not use formal property names.
Base explanations/reasoning on the relationship between addition and subtraction or the relationship between multiplication and division. Content Scope: Knowledge and skills articulated in • 6.NS.A.1
Base arithmetic explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student in her response), connecting the diagrams to a written (symbolic) method. Content Scope: Knowledge and skills articulated in • 6.NS.A.1
Base explanations/reasoning on a number line diagram (whether provided in the prompt or constructed by the student in her response). Content Scope: Knowledge and skills articulated in • 6.NS.C.6, 6.NS.C.7
Base explanations/reasoning on a coordinate plane diagram (whether provided in the prompt or constructed by the student in her response). Content Scope: Knowledge and skills articulated in • 6.NS.C.6, 6.NS.C.8
Given an equation, present the solution steps as a logical argument that concludes with the set of solutions (if any). Content Scope: Knowledge and skills articulated in • 6.EE.B – Tasks do not require students to write an equation or inequality.
Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. Content Scope: Knowledge and skills articulated in • 6.EE.A.4
Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately (for example, rubrics award less than full credit for the presence of nonsense statements such as 1 + 4 = 5 + 7 = 12, even if the final answer is correct), or identify or describe errors in solutions to multi-step problems and present corrected solutions. Content Scope: Knowledge and skills articulated in • 6.RP.A - Ratios are limited to ratios of non-complex fractions. • 6.EE.C.9 - Tasks that involve writing an equation should not go beyond the equation types described in 6.EE.7 ($x+p=q$ and $px=q$ where p, q, and x are all nonnegative rational numbers).
Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed 'student' reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in • 5.NBT, 5.MD.C – Tasks may have scaffolding.[2]

[2] Scaffolding in a task provides the student with an entry point into a pathway for solving a problem. In unscaffolded tasks, the student determines his/her own pathway and process. Both scaffolded and unscaffolded tasks will be included in reasoning and modeling items.

Assessable Content for Sub-Claim D (Modeling Applications)

Sub-Claim D: Modeling Applications
Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 6, requiring application of knowledge and skills articulated in Sub-claim A[3]. Tasks may have scaffolding.[2]
Solve multi-step contextual problems with degree of difficulty appropriate to Grade 6, requiring application of knowledge and skills articulated in 5.NBT.B, 5.NF, 5.MD, and 5.G.A. Tasks may have scaffolding.[2]
Reasoned estimates: Use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity requiring knowledge and skills articulate in Sub-claim A.[3] Tasks may have scaffolding.[2]

[3] Standard 6.EE.A.3 is not assessable in Modeling.