
LEAP Assessment Guide, Mathematics Grade 4

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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 4, 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, 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 <u>major content</u> for grade 4 Sub-Claim B: solve problems involving the <u>additional and supporting content</u> for grade 4	can involve any or all practices
Type II	written arguments/ justifications, critique of reasoning, or precision in mathematical statements	Sub-Claim C: express mathematical <u>reasoning</u> 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 <u>modeling</u> 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 4 contains a total of 62 points. The table below shows the breakdown of task types and point values.

Grade 4 Mathematics Test Design				
Test Session	Type I (points)	Type II (points)	Type III (points)	Total (points)
Session 1: No Calculator	14	4	3	21
Session 2: No Calculator	14	3	3	20
Session 3: No Calculator	12	3	6	21

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 4 (reported in sub-claim A) and additional and supporting content for grade 4 (reported in sub-claim B). Type II tasks are designed to assess student reasoning ability of the major content for grade 4 in applied contexts (reported in sub-claim C). Type III tasks are designed to assess student modeling ability of selected content for grades 3 or 4 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 4		
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: No Calculator	75 minutes
Day 3 April 27	English Language Arts Session 3: Reading Literary and Informational Texts	75 minutes
	Mathematics Session 3: No Calculator	75 minutes
Day 4 April 28	Science Session 1: Multiple-Choice	Suggested time: 60 minutes
	Science Session 2: Short Answer	Suggested time: 30 minutes
	Science Session 3: 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 4		
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: No Calculator	75 minutes
English Language Arts	Session 3: Reading Literary and Informational Texts	75 minutes
Mathematics	Session 3: No Calculator	75 minutes
Computer-Based Test Administration Policies: For the administration of the computer-based tests, schools must follow the policies below.		
<ul style="list-style-type: none"> 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 for grade 4 have three or four options. Students will shade the bubble of the correct answer.

- ☐ (A) Option A
- ☐ (B) Option B
- ☒ (C) Option C
- ☐ (D) Option D

Multiple-Select tasks for grade 4 have five or six options. Students will fill in the number of correct answers identified in the stem of the question. The number of correct answers will vary from task to task. The sample below asks for two correct answers.

- ☒ (A) Option A
- ☐ (B) Option B
- ☒ (C) Option C
- ☐ (D) Option D
- ☐ (E) Option E
- ☐ (F) Option F

Fill-in-the-Blank Grids

For fill-in-the-blank tasks on paper-based tests, students will write the number (whole number or decimal) in the boxes at the top of the grid, starting with the first box on the left. Numbers are entered **without** commas. Students will then shade the bubble in the column that corresponds to the entry (digit) in the top row. Blank spaces within the answer are not allowed.

To answer 632 in a question, fill in the answer grid as shown below.

6	3	2			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0	0	0
1	1	1	1	1	1
2	2	<input checked="" type="radio"/>	2	2	2
3	<input checked="" type="radio"/>	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
<input checked="" type="radio"/>	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

To answer .75 in a question, fill in the answer grid as shown below.

.	7	5			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	<input checked="" type="radio"/>	5	5	5
6	6	6	6	6	6
7	<input checked="" type="radio"/>	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Note: Should a student mistakenly start in a column other than column 1, 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.

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 (whole number 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 ruler and protractor, 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 
- Sticky Note tool 
- Magnifying tool 
- Line Guide 
- 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

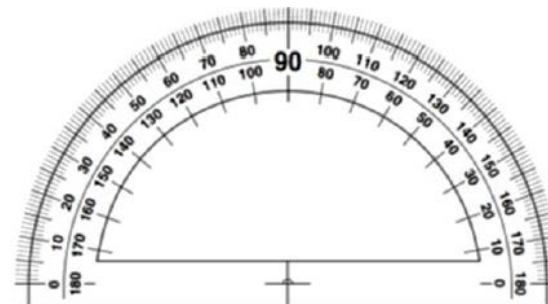
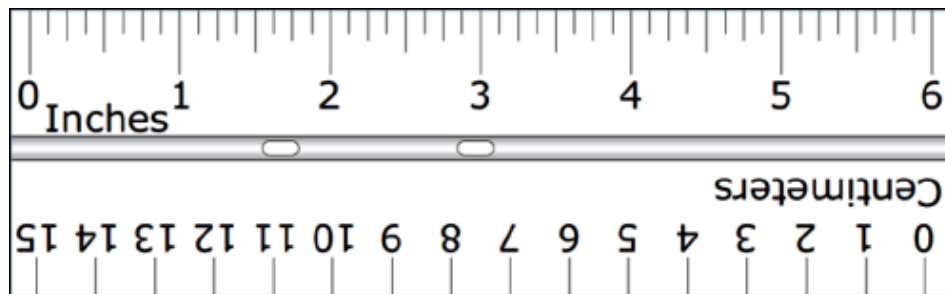
The chart that follows summarizes the tools and resources for the grade 4 mathematics assessment.

ASSESSMENT RESOURCES/TOOLS FOR GRADE 4

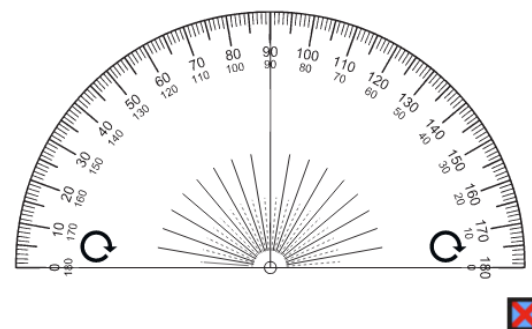
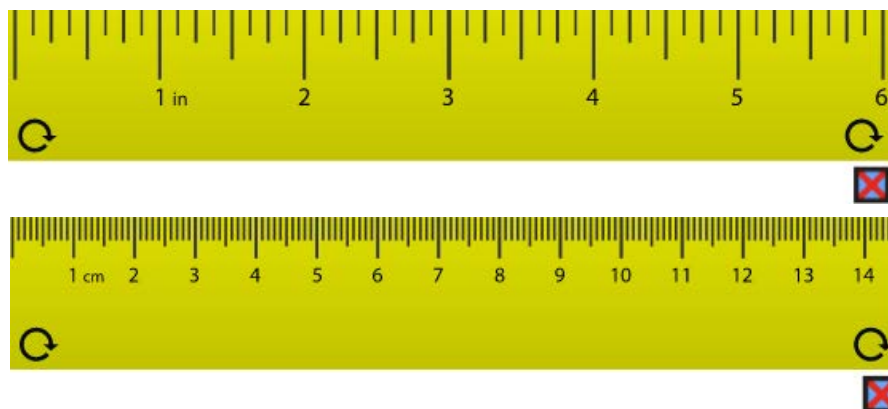
Provided (by vendor or part of online system)	Required (provided by school)	Other Allowable (may be used, not required)
$\frac{1}{8}$ -inch and centimeter ruler and protractor	Scratch paper (lined, graph, or un-lined)	Yellow highlighter

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



Grade 4 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

Students are not allowed to use calculators during the administration of any mathematics test in grade 4.

For students with the approved accommodation, a hand-held four-function calculator is allowed for all sessions.

- Square root, percent, memory, and +/- keys are also allowed but not required.
- A hand-held calculator is necessary for both the PBT and CBT; an online calculator will not be available.
- 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.
- 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, as detailed above.

UPDATE:
Clarification
of Calculator
Policy

Reference Sheets

Students in grade 4 will **not** have a reference sheet because the Louisiana Mathematics Standards for this grade do not require one.

Requisite Knowledge

Students in grade 4 will be required to know relative sizes of measurement units within one system of units. Therefore, the following requisite knowledge is necessary in grade 4 and will **not** be provided in a reference sheet.

1 meter = 100 centimeters

1 kilometer = 1000 meters

1 kilogram = 1000 grams

1 liter = 1000 milliliters

1 foot = 12 inches

1 pound = 16 ounces

1 minute = 60 seconds

1 hour = 60 minutes


Area formula for rectangles

Perimeter formula for rectangles

UPDATE:
Requisite
Knowledge to
Include Customary
Units (4.MD.A.1)

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 3–5 Math Guidebook](#): offers comprehensive information to support teachers in creating yearly, unit, and daily instructional plans for students
- [Fourth Grade 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 4 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 4 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 4 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 4 Online LEAP Practice Test, [Scoring Guide](#), and [Answer Sheet](#): 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 3-5](#): 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	
4.OA.A	Use the four operations with whole numbers to solve problems.
4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
4.OA.A.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. ¹
4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
4.NBT.A	Generalize place value understanding for multi-digit whole numbers.²
4.NBT.A.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>
4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
4.NBT.A.3	Use place value understanding to round multi-digit whole numbers to any place.
4.NBT.B	Use place value understanding and properties of operations to perform multi-digit arithmetic.²
4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.
4.NBT.B.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NBT.B.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NF.A	Extend understanding of fraction equivalence and ordering.³
4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.
4.NF.B	Build fractions from unit fractions.³

¹ See [Louisiana Math Standards](#) Table 2, p. 12.

² Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.

³ Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

4.NF.B.3	<p>Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.</p> <ul style="list-style-type: none"> a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. <i>Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.</i> c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4.NF.B.4	<p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <ul style="list-style-type: none"> a. Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i> b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</i> c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. <i>For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</i>
4.NF.C	Understand decimal notation for fractions, and compare decimal fractions.³
4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. ⁴ <i>For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.</i>
4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>
4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

⁴ Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

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

Sub-Claim B: Additional and Supporting Content	
4.OA.B	Gain familiarity with factors and multiples.
4.OA.B.4	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.
4.OA.C	Generate and analyze patterns.
4.OA.C.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i>
4.MD.A	Solve problems involving measurement and conversion of measurements.
4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. <i>For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...</i>
4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>
4.MD.B	Represent and interpret data.
4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>
4.MD.C	Geometric measurement: understand concepts of angle and measure angles.
4.MD.C.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: <ol style="list-style-type: none"> An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
4.G.A	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
4.G.A.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Assessable Content for Sub-Claim C (Reasoning Applications)

Sub-Claim C: Reasoning Applications
<p>Base explanations/reasoning on the properties of operations. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 4.NBT.B.5 - Students need not use formal property names. Tasks do not have a context. Unneeded parentheses should not be used.⁵ 4.NBT.B.6 - Students need not use formal property names. Tasks do not have a context. Unneeded parentheses should not be used.⁵
<p>Base explanations/reasoning on the relationship between multiplication and division. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 4.NBT.B.6 – Tasks do not have a context.
<p>Reason about the place value system itself. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 4.NBT.A – Tasks have “thin context”⁶ or no context.
<p>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</p> <ul style="list-style-type: none"> 4.NF.A - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. 4.NF.B.3a, 4.NF.B.3b - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. Fractions equal to whole numbers are limited to 0 – 5. 4.NF.B.4a - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. Fractions equal to whole numbers are limited to 0 – 5. 4.NF.B.4b - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. 4.NF.C - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100.
<p>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</p> <ul style="list-style-type: none"> 4.OA.A.3 – Reasoning in these tasks centers on interpretation of remainders. 4.NF.A.1 - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. Fractions equal to whole numbers are limited to 0 – 5. 4.NF.A.2 - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. Fractions equal to whole numbers are limited to 0 – 5. 4.NF.B - Tasks are limited to denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. Results may equal fractions greater than 1 (including fractions equal to whole numbers limited to 0 – 5). 4.NF.C - Tasks have “thin context”⁶ or no context and are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. 3.OA.B, 3.NF, 3.MD.C – Tasks may have scaffolding.⁷

⁵ For example, use $4 + 3 \times 2$ rather than $4 + (3 \times 2)$.

⁶ “Thin context” is a sentence or phrase that establishes a concrete referent for the quantity/quantities in the problem, in such a way as to provide meaningful avenues for mathematical intuition to operate, yet without requiring any sort of further analysis of the context. For example, a task could provide a reason for being given a set of fractional measurements such as, “The fractions represent lengths of ribbon.”

⁷ 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.

Present solutions to multi-step⁸ 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 two-step problems and present corrected solutions. Content Scope: Knowledge and skills articulated in

- 4.OA.A.3 - Tasks may involve interpreting remainders.
- 4.NF.B.3c - Tasks have “thin context”⁶ or no context. Denominators are limited to grade 3 possibilities (2, 3, 4, 6, 8) so as to keep computational difficulty lower.
- 4.NF.B.3d, 4.NF.B.4c - Denominators are limited to grade 3 possibilities (2, 3, 4, 6, 8) so as to keep computational difficulty lower.

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

- 4.NF.A.1 - Fractions equal to whole numbers are limited to 0 – 5.
- 4.NF.A.2 - Fractions equal to whole numbers are limited to 0 – 5.
- 4.NF.B.3a.
- 4.NF.B.4a, 4.NF.B.4b

Assessable Content for Sub-Claim D (Modeling Applications)

Sub-Claim D: Modeling Applications

Solve multi-step⁸ contextual word problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in Sub-claim A. Tasks may have scaffolding.⁷

Solve multi-step⁸ contextual problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in 3.OA.A, 3.OA.D.8, 3.NBT, and/or 3.MD. Tasks may have scaffolding.⁷ Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation. Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown.⁹

⁸ Multi-step problems must have at least 3 steps.

⁹ Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions (see [Louisiana Math Standards](#), Table 1, Common addition and subtraction situations, p. 11; Table 2, Common multiplication and division situations, p. 12; and the University of Arizona Institute for Mathematics and Education document [K-5 Progression on Counting and Cardinality and Operations and Algebraic Thinking](#)).