

This guide includes:

- Purpose
- Assessment Design
- Assessable Content
- Test Administration Policies
- Resources
- Appendix A: Assessable Content
- Appendix B: Answer Key/Rubrics for Sample Items
- Appendix C: Update Log (describes ongoing updates to guide)

UPDATES INCLUDED 3/15/18

❖ Major Content Subcategories

PURPOSE

This document is designed to assist Louisiana educators in understanding the LEAP 2025 mathematics assessment for grade 8, which is administered each spring.

Introduction

All students in grades 3–HS will take the LEAP 2025 mathematics assessments, which provide:

- questions that have been reviewed by Louisiana educators to ensure their alignment to the [Louisiana Student Standards](#) and appropriateness for Louisiana students;
- measurement of the full range of student performance, including the performance of high- and low-performing students;
- information for educators and parents about student readiness in mathematics and whether students are “on track” for college and careers; and
- comparison of Louisiana student performance with the performance of students in other states.

ASSESSMENT DESIGN

Each item on the LEAP 2025 mathematics assessment is referred to as a task and is identified by one of three types: Type I, Type II, or Type III. As shown in the table, each of the three task types is aligned to one of four reporting categories: Major Content, Additional & Supporting Content, Expressing Mathematical Reasoning, or Modeling & Application. Each task type is designed to align with at least one of the Louisiana Student Standards for Mathematical Practice (MP), found on pages 6-8 in the [K-12 Louisiana Student Standards for Mathematics](#).

Task Type	Description	Reporting Category	Mathematical Practice (MP)
Type I	conceptual understanding, fluency, and application	Major Content: solve problems involving the major content for grade 8 Additional & Supporting Content: solve problems involving the additional and supporting content for grade 8	can involve any or all practices
Type II	written arguments/justifications, critique of reasoning, or precision in mathematical statements	Expressing Mathematical Reasoning: 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	Modeling & Application: solve real-world problems engaging particularly in the modeling practice	primarily MP.4, but may also involve any of the other practices

The Major Content reporting category will be divided, based on Achievement Level Descriptors into the following subcategories.

Subcategory	Associated LSSM and LEAP 2025 Evidence Statements	Description
Radicals, Integer Exponents, and Scientific Notation	8.EE.A.1, 8.EE.A.2, 8.EE.A.3, 8.EE.A.4	Students represent, evaluate, and solve expressions, equations, and mathematical problems that include or require integer exponents, square roots, cube roots, and quantities expressed in scientific notation.
Proportional Relationships, Linear Equations, and Functions	8.EE.B.5, 8.EE.B.6, 8.F.A.1, 8.F.A.2, 8.F.A.3	Students understand and apply the concept of proportional relationships and functions to analyze, graph, compare, and solve real-world mathematical problems and relationships.
Solving Linear Equations/Systems of Linear Equations	8.EE.C.7b, 8.EE.C.8	Students solve linear equations in one variable with rational number coefficients. Students analyze and solve pairs of simultaneous linear equations graphically, algebraically, and by inspection.
Congruence and Similarity/Pythagorean Theorem	8.G.A.1, 8.G.A.2, 8.G.A.3, 8.G.A.4, 8.G.B.7, 8.G.B.8	Students perform and describe the effects of transformations on two-dimensional figures, with and without coordinates. Students apply the Pythagorean Theorem to solve mathematical and real-world problems.

These reporting categories 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.

The LEAP 2025 mathematics assessment in grade 8 contains a total of 42 tasks for 66 points. The table below shows the breakdown of the number of tasks and point values by Reporting Category and Session.

Reporting Category	Session 1: No Calculator		Session 2: Calculator		Session 3: Calculator		TOTAL	
	Tasks	Points	Tasks	Points	Tasks	Points	Tasks	Points
Major Content	13-18	18	3-6	6	4-6	6	25-30	30
Additional & Supporting Content	2-4	4	2-3	3	2-3	3	5-10	10
Expressing Mathematical Reasoning	0	0	2	7	2	7	4	14
Modeling & Application	0	0	2	9	1	3	3	12
TOTAL Operational	15-20	22	10-13	25	10-12	19	42	66
Total Embedded Field Test	2-3	N/A	2-3	N/A	1	N/A	5-7	N/A
Session Time	60 minutes		90 minutes		90 minutes		240 minutes	

Note: The test will contain additional field-test tasks. The field-test tasks do **not** count towards a student’s final score on the test; they provide information that will be used to help develop future test forms. Session times changed based on analysis of student completion rates and to account for one field test constructed-response task.

The following table includes information on the total tasks, total points, and percentage of assessment points by task-type point-values.

Task Types	Point-Values	Total Tasks	Total Points	Percentage of Assessment Points	
Type I	1-point tasks	30	30	40	46%
	2-point tasks	5	10		15%
Type II	3-point tasks	2	6	14	9%
	4-point tasks	2	8		12%
Type III	3-point tasks	2	6	12	9%
	6-point tasks	1	6		9%
TOTAL		43	66	100%	

Achievement-Level Definitions

Achievement-level definitions briefly describe the expectations for student performance at each of Louisiana’s five achievement levels, described below:

- **Advanced:** Students performing at this level have **exceeded** college and career readiness expectations, and are well prepared for the next level of studies in this content area.
- **Mastery:** Students performing at this level have **met** college and career readiness expectations, and are prepared for the next level of studies in this content area.
- **Basic:** Students performing at this level have **nearly met** college and career readiness expectations, and may need additional support to be fully prepared for the next level of studies in this content area.
- **Approaching Basic:** Students performing at this level have **partially met** college and career readiness expectations, and will need much support to be prepared for the next level of studies in this content area.
- **Unsatisfactory:** Students performing at this level have **not yet met** the college and career readiness expectations, and will need extensive support to be prepared for the next level of studies in this content area.

ASSESSABLE CONTENT

The tasks on the LEAP 2025 mathematics test are aligned directly to the [Louisiana Student Standards for Mathematics \(LSSM\)](#) for all reporting categories. Type I tasks, designed to assess conceptual understanding, fluency, and application, are aligned to the major, additional, and supporting content for grade 8. Type II tasks are designed to assess student reasoning ability of selected major content for grades 7 or 8 in applied contexts. Type III tasks are designed to assess student modeling ability of selected content for grades 7 or 8 in applied contexts. Type II and III tasks are further aligned to LEAP 2025 evidence statements for the Expressing Mathematical Reasoning and Modeling & Application reporting categories. All tasks are reviewed and vetted by teacher committees to verify direct and full alignment to the LSSM. LEAP 2025 evidence statements for grade 8 are labeled as “LEAP.II.8.#” for Type II tasks and “LEAP.III.8.#” for Type III tasks. See the table in [Appendix A](#) for a listing of assessable content of the LSSM and LEAP 2025 evidence statements.

TEST ADMINISTRATION POLICIES












Administration Schedule

The **computer-based testing window opens April 9, 2018 and runs through May 4, 2018**. The school or district test coordinator will communicate the testing schedule. For more information about scheduling and administration policies, refer to the [CBT Guidance](#) document, found in the LDOE [assessment library](#).

All LEAP 2025 assessments, including the science field test, are **timed**. No additional time is permitted, except for students who have a documented extended time accommodation (e.g., an IEP).

Students 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, use a calculator, take notes, enlarge the task, guide the reading of a task line by line, see the mathematics reference sheet, use a ruler, and use an equation builder for entering special characters. A help tool is also featured to assist students as they use the online system.

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

All students taking the computer-based tests should work through the Online Tools Training (available in INSIGHT or [here](#) using the Chrome browser) to practice using the online tools so they are well prepared to navigate the online testing system. (The OTT will be updated Fall 2017 to include a new item type. See the samples section for more information.)

Sample Test Items

This section includes six Type I tasks, one Type II task, and one Type III task as they would appear on a test. The answer keys for each Type I task and scoring rubrics for each constructed-response task are located in [Appendix B](#). Look for these tasks in the OTT.

Multiple-Choice Task

Which equation has the same solution as $4 - 2(x - 5) = x - 19$?

- (a) $2(x + 5) = -8$
- (b) $3(x - 3) = 9$
- (c) $x + 2 = 2x - 3$
- (d) $3x - 4 = 2x + 7$

Multiple-Select Task

Which numbers are rational?

Select **each** number that is correct.

- (a) $58.\overline{247}$
- (b) $\sqrt{3}$
- (c) $\frac{7}{195}$
- (d) 6π
- (e) $\frac{8}{5}$

TEI: Drag-and-Drop Task

Seven expressions are shown. Indicate whether each expression is equivalent to or not equivalent to $7^8 \times 7^{-4}$.

Drag and drop each expression into the correct box.

Equivalent to $7^8 \times 7^{-4}$ Not Equivalent to $7^8 \times 7^{-4}$

$7^{(8-4)}$ $(7^8)^{-4}$ $\frac{7^8}{7^4}$ $\frac{7^8}{7^{-4}}$ 7^2 7^{-2} 7^{-32}

TEI: Dropdown Menu/Fill-in-the-Blank Type I Task

Part A

Paul wrote the equation $t = 2m + 40$ to represent the temperature, t , in degrees Celsius, after a substance had been heated for m minutes.

Describe the relationship between the temperature of the substance and the time the substance has been heated.

Select from the drop-down menus to correctly complete each statement.

The temperature was initially degree(s) Celsius. The temperature increased by degree(s) Celsius every minute(s) it was heated.

<input type="text"/>
1
2
10
40

<input type="text"/>
1
2
10
40

<input type="text"/>
1
2
10
40

Part B

Based on Paul's equation, how many minutes does the substance have to be heated to reach a temperature of 100 degrees Celsius?

Enter your answer in the box.

<input type="text"/>	minutes
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TEI: Match Interaction Task

Four systems of equations are shown in the table. Indicate whether each system of equations has no solution, one solution, or infinitely many solutions.

Select a cell in each row of the table.


	No Solution	One Solution	Infinitely Many Solutions
$2x + 3y = -6$ $4x + 6y = -12$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$x = 1$ $y = 2$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$x - 2y = 4$ $x - 2y = 5$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$y = 5x + 20$ $3y = 15x + 60$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Keypad Input Task (NEW)¹

Damien has a newspaper delivery route. Every morning it takes him 12 minutes to organize his newspapers before he starts his delivery. Then, he delivers 3 newspapers every 2 minutes.

Write a function to represent the number of minutes, y , it takes Damien each day to deliver x newspapers, including the time it takes him to get organized.

Enter your answer in the box.

											
1	2	3	x	y	+	-	•	÷			
4	5	6			<	≤	=	≥	>		
7	8	9			$\frac{\square}{\square}$	\square^\square	(\square)	\square	$\sqrt{\square}$	$\sqrt[\square]{\square}$	π
0	.	(-)									

¹ The keypad input item type has not been on previous administrations of the LEAP 2025 test. Students may interact with the keypad input on the Spring 2018 administration and can practice with it on the OTT, which will be updated Fall 2017.

Type II Constructed-Response Task

Part A

Cary claimed that the expression $-5 + m$ is negative. Determine whether Cary's claim is always true, sometimes true, or never true. Provide evidence to support your conclusion.

Enter your answer and your explanation in the space provided.

EQ

Part B

Phillip claimed that the expression $-p + 5 + p$ is positive for any value of p . Determine whether Phillip's statement is always true, sometimes true, or never true. Provide evidence to support your conclusion.

Enter your answer and your explanation in the space provided.

EQ

Type III Constructed-Response Task

The owner of a computer store is offering a discount on a computer sold in the store.

Computer Sale!

Original Price: \$598.00
25% off original price
8% tax applied after discount

Part A

The owner offers a payment plan where the total cost of the computer is paid in 6 equal monthly payments.

- Determine the amount of each monthly payment.
- Show your work or explain your answer.

Enter the monthly payment and your work or explanation in the box provided.

EQ

The owner of a computer store is offering a discount on a computer sold in the store.

Computer Sale!

Original Price: \$598.00
25% off original price

8% tax applied after discount

Part B

A different computer is advertised as 40% off of the original price. After the discount, the tax is \$44.64.

- Determine the total price of this computer after the discount and tax are applied.
- Show your work or explain your answer.
- Determine the original price of this computer.
- Show your work or explain your answer.

Enter your answers and your work or explanations in the box provided.

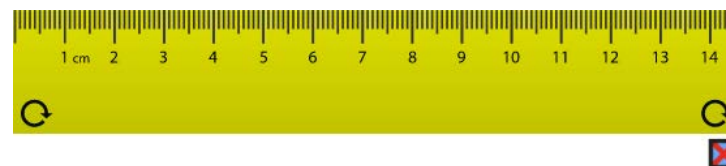
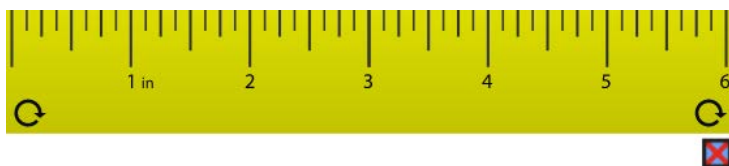
Eq

Permitted Testing Materials

The chart that follows summarizes the tools and resources for the grade 8 mathematics assessment.

Required Tools	Provided	Session 1	Sessions 2 & 3	Guidelines
scratch paper (lined, graph, un-lined), two pencils	by Test Administrator	YES	YES	<ul style="list-style-type: none"> Reference sheets may be printed from <i>eDirect</i> Tools provided by Test Administrator must not be written on See Calculator Policy for calculator specifications
$\frac{1}{8}$ – inch ruler and centimeter ruler	online	YES	YES	
calculator	online and/or by Test Administrator	NO	YES	
Grade 8 Mathematics Reference Sheet	online and/or by Test Administrator	YES	YES	
Allowable Tools	Provided	Session 1	Sessions 2 & 3	Guidelines
protractor, tracing paper, reflection tools, straight edge, and compass	by Test Administrator	YES	YES	<ul style="list-style-type: none"> Schools may permit students to bring their own allowable tools; test administrators must ensure tools are appropriate for testing (e.g., tools do not have any writing on them)

Grade 8 rulers provided on the LEAP 2025 CBT (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, visit the Online Tools Training (available in INSIGHT or [here](#) using the Chrome browser).

Calculator Policy

The LEAP 2025 mathematics test allows a scientific calculator in grade 8 during Sessions 2 and 3. Calculators are **not** allowed during Session 1 of the test. For students with the approved accommodation, a hand-held scientific calculator is allowed during all test sessions. The following table includes calculator information by session for both general testers and testers with approved accommodations for calculator use.

Calculator Policy	Session 1	Sessions 2 & 3
General Testers	Not allowed	Scientific calculator available online, may also have hand-held
Testers with approved accommodation for calculator use	Must be provided hand-held scientific calculator	
Additional information for testers with approved accommodations for calculator use: <ul style="list-style-type: none">• 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.• Students may also use a hand-held four-function calculator in addition to the scientific calculator, provided the accommodation is documented. The four-function calculator may have square root, percent, memory, and +/- keys.		

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

- Scientific calculators **must not** have graphing capabilities
- Calculators with the following features are **not** permitted:
 - Computer Algebra System (CAS) features
 - “QWERTY” keyboards
 - paper tape
 - talk or make noise, unless specified in IEP/IAP
 - tablet, laptop (or PDA), phone-based, or wristwatch
- 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.
- 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.
- 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 Sheet

Students in grade 8 will be provided a reference sheet with the information below. The Grade 8 Mathematics Reference Sheet may be printed from eDirect or found in the [assessment guidance](#) library on page 4 of [LEAP 2025 Grades 5-HS Mathematics Reference Sheets](#).

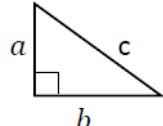
Grade 8 Mathematics Reference Sheet

1 inch = 2.54 centimeters
 1 meter = 39.37 inches
 1 mile = 5280 feet
 1 mile = 1760 yards
 1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
 1 pound = 16 ounces
 1 pound = 0.454 kilogram
 1 kilogram = 2.2 pounds
 1 ton = 2000 pounds

1 cup = 8 fluid ounces
 1 pint = 2 cups
 1 quart = 2 pints
 1 gallon = 4 quarts
 1 gallon = 3.785 liters
 1 liter = 0.264 gallon
 1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$

Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pythagorean Theorem	 $a^2 + b^2 = c^2$

Requisite Knowledge

Students in grade 8 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 8 assessments and is **not** provided in the reference sheet.

1 meter = 100 centimeters
 1 meter = 1000 millimeters
 1 kilometer = 1000 meters
 1 kilogram = 1000 grams

1 gram = 1000 milligrams
 1 liter = 1000 milliliters
 1 foot = 12 inches
 1 yard = 3 feet

1 day = 24 hours
 1 minute = 60 seconds
 1 hour = 60 minutes
 Area formulas for rectangles

RESOURCES

- Online Tools Training: (*Updated Fall to include [keypad input](#)*) provides teachers and students examples of interactive, technology-enhanced items so they can become familiar with the computer-based testing format; available in INSIGHT or [here](#) using the Chrome browser; includes Spanish version
- LEAP 2025 Grade 8 Computer-Based Practice Test and [Answer Key](#): offers a computer-based grade-level practice test to help prepare students for the spring assessments; accessed through INSIGHT; Spanish version also available
- [LEAP 2025 Grades 5-HS Mathematics Reference Sheets](#): includes all the mathematics references sheets provided for LEAP 2025 testing for grades five through eight and high school
- [LEAP 2025 Accessibility and Accommodations Manual](#): provides information about Louisiana’s accessibility features and accommodations for grades 3–8 spring testing
- [LEAP 2025 Math Practice Test Guidance](#): provides teachers with information about test structure, recommended uses, general cautions, item types, and scoring
- [LEAP 2025 Equation Builder for Grades 6-8](#): provides teachers with information on using the equation builder within the open-response boxes on the CBT; [Spanish version](#) also available
- [Practice Test Quick Start Guide](#): provides information regarding the administration and scoring process needed for the online practice tests
- [LEAP 2025 Technology Enhanced Item Types](#): provides a one-page summary chart of technology enhanced items students may encounter in any of the computer-based tests across courses and grade-levels
- [Practice Tests Library](#): includes current and previous years’ practice tests for additional practice with assessment tasks
- [Grades 6–8 Math Teacher Library](#): provides links to grade-specific resources, such as the standards, shared teacher resources, and instructional plans
- [K-12 Louisiana Student Standards for Math](#): explains the development of and lists the math content standards for Louisiana students
- Grade 8 math - Teachers Companion Document [PDF](#) or [word doc](#): contains descriptions of each standard to answer questions about the standard’s meaning and how it applies to student knowledge and performance
- [Grade 8 Remediation Guide](#): reference guide for teachers to help them more quickly identify the specific remedial standards necessary for every standard, includes information on content emphasis
- [Grade 8 Crosswalk](#): shows specifically how the math standards have changed from 2015-2016 to 2016-2017
- [K-12 LSSM Alignment to Rigor](#): provides explanations and a standards-based alignment to assist teachers in providing a rigorous education
- [LEAP 360](#): an optional, free high-quality non-summative assessment system that provides educators with a complete picture of student learning at the beginning, middle, and end of the school year; includes diagnostic and interim assessments
- [EAGLE Sample Test Items](#): a part of the LEAP 360 system, which allows teachers to integrate high-quality questions into day-to-day classroom experiences and curricula through teacher-created tests, premade assessments, and individual items for small group instruction

APPENDIX A

Assessable Content for the Major Content Reporting Category (Type I)

LSSM Content Standards	
8.EE.A	Expressions and equations work with radicals and integer exponents.
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger.</i>
8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
8.EE.B	Understand the connections between proportional relationships, lines, and linear equations.
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .
8.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations.
8.EE.C.7	Solve linear equations in one variable. b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i> c. Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i>
8.F.A	Define, evaluate, and compare functions.
8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in this grade level.)

8.F.A.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i>
8.F.A.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; categorize functions as linear or nonlinear when given equations, graphs, or tables. <i>For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</i>
8.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software.
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.
8.G.A.2	Explain that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. (Rotations are only about the origin and reflections are only over the y -axis and x -axis in Grade 8.)
8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (Rotations are only about the origin, dilations only use the origin as the center of dilation, and reflections are only over the y -axis and x -axis in Grade 8.)
8.G.A.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. (Rotations are only about the origin, dilations only use the origin as the center of dilation, and reflections are only over the y -axis and x -axis in Grade 8.)
8.G.B	Understand and apply the Pythagorean Theorem.
8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Assessable Content for the Additional & Supporting Content Reporting Category (Type I)

LSSM Content Standards	
8.NS.A	Know that there are numbers that are not rational, and approximate them by rational numbers.
8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually. Convert a decimal expansion which repeats eventually into a rational number by analyzing repeating patterns.
8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). <i>For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations to the hundredths place.</i>
8.F.B	Use functions to model relationships between quantities.
8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
8.G.C	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
8.G.C.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
8.SP.A	Investigate patterns of association in bivariate data.
8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
8.SP.A.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>
8.SP.A.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</i>

Assessable Content for the Expressing Mathematical Reasoning Reporting Category (Type II)

LEAP 2025 Evidence Statements	
LEAP.II.8.1	<p>Base reasoning on the principle that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 8.EE.B.6 - Tasks require students to derive the equation $y=mx$ for a line through the origin and the equation $y=mx+b$ for a line intersecting the vertical axis at b. 8.EE.C.8a
LEAP.II.8.2	<p>Given an equation or system of equations, present the solution steps as a logical argument that concludes with the set of solutions (if any). Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 8.EE.C.7a, 8.EE.C.7b, 8.EE.C.8b - Tasks may have three equations, but students are only required to analyze two equations at a time.
LEAP.II.8.3	<p>Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 8.F.A.3 – Tasks require students to justify whether a given function is linear or nonlinear. 8.G.A.2, 8.G.A.4 8.G.A.5 7.RP.A, 7.NS.A, 7.EE.A – Tasks may have scaffolding.²
LEAP.II.8.4	<p>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</p> <ul style="list-style-type: none"> 8.EE.C.8c
LEAP.II.8.5	<p>Apply geometric reasoning in a coordinate setting, and/or use coordinates to draw geometric conclusions. Content Scope: Knowledge and skills articulated in</p> <ul style="list-style-type: none"> 8.EE.B.6 8.G.A.2, 8.G.A.4 8.G.B - Some of tasks require students to use the converse of the Pythagorean Theorem.

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.

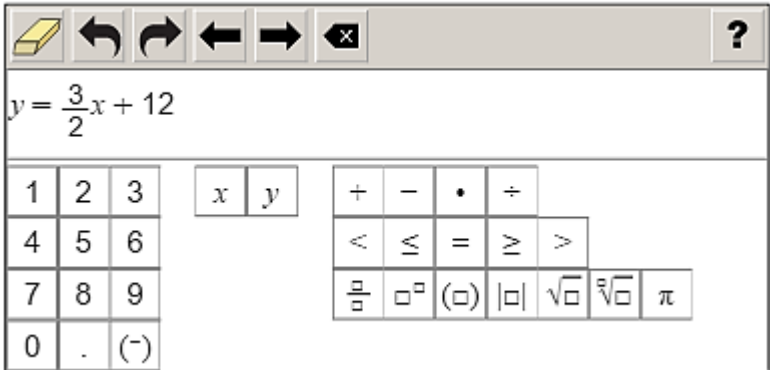
Assessable Content for the Modeling & Applications Reporting Category (Type III)

LEAP 2025 Evidence Statements	
LEAP.III.8.1	Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 8, requiring application of knowledge and skills articulated by the LSSM section of the Major Content Assessable Content table . Tasks may have scaffolding. ²
LEAP.III.8.2	Solve multi-step contextual problems with degree of difficulty appropriate to grade 8, requiring application of knowledge and skills articulated in 7.RP.A, 7.NS.A.3, 7.EE, 7.G, and 7.SP.B. Tasks may have scaffolding. ²
LEAP.III.8.3	Micro-models: Autonomously apply a technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature) requiring knowledge and skills articulated by the LSSM section of the Major Content Assessable Content table . Tasks may have scaffolding. ²
LEAP.III.8.4	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 articulated by the LSSM section of the Major Content Assessable Content table . Tasks may have scaffolding. ²

APPENDIX B

Answer Key/Rubrics for Sample Items

Item Type	Key	Alignment
Multiple-Choice	D	8.EE.C.7
Multiple-Select	A, C, E	8.NS.A.1
TEI: Drag-and-Drop	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 10px; width: 45%;"> <p style="text-align: center;">Equivalent to $7^8 \times 7^{-4}$</p> $7^{(8-4)} \quad \frac{7^8}{7^4}$ </div> <div style="border: 1px solid black; padding: 10px; width: 45%;"> <p style="text-align: center;">Not Equivalent to $7^8 \times 7^{-4}$</p> $(7^8)^{-4} \quad \frac{7^8}{7^{-4}} \quad 7^2$ $7^{-2} \quad 7^{-32}$ </div> </div>	8.EE.A.1
TEI: Dropdown Menu/Fill-in-the-blank Type I Task	<p>Part A:</p> <p><input type="text" value="40"/> degree(s) Celsius. The temperature increased by <input type="text" value="2"/> degree(s) Celsius every <input type="text" value="1"/> minute(s)</p> <p>Part B: 30</p>	8.SP.A.3

Item Type	Key	Alignment																				
TEI: Match Interaction	<table border="1" data-bbox="336 217 1331 571"> <thead> <tr> <th></th> <th>No Solution</th> <th>One Solution</th> <th>Infinitely Many Solutions</th> </tr> </thead> <tbody> <tr> <td>$2x + 3y = -6$ $4x + 6y = -12$</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>$x = 1$ $y = 2$</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>$x - 2y = 4$ $x - 2y = 5$</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>$y = 5x + 20$ $3y = 15x + 60$</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		No Solution	One Solution	Infinitely Many Solutions	$2x + 3y = -6$ $4x + 6y = -12$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	$x = 1$ $y = 2$	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	$x - 2y = 4$ $x - 2y = 5$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	$y = 5x + 20$ $3y = 15x + 60$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8.EE.C.8b
	No Solution	One Solution	Infinitely Many Solutions																			
$2x + 3y = -6$ $4x + 6y = -12$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																			
$x = 1$ $y = 2$	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																			
$x - 2y = 4$ $x - 2y = 5$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																			
$y = 5x + 20$ $3y = 15x + 60$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																			
Keypad Input	 <p>(or equivalent equation)</p>	8.F.B.4																				
Type II Constructed - Response	See Rubric	LEAP.II.8.3																				
Type III Constructed - Response	See Rubric	LEAP.III.8.2																				

Type II Constructed-Response Rubric

PART A	
Score	Description
2	<p>Student response includes the following element.</p> <p>Reasoning component: 2 points</p> <ul style="list-style-type: none"> Determines whether the claim is always true, sometimes true, or never true Correctly reasons that the claim is sometimes true <p>Sample Student Response: Cary's claim is sometimes true. For example, when 4 is substituted for m, $-5 + 4 = -1$. If the value of m is a number that is greater than 5, such as 6 where $-5 + 6 = 1$, then the expression results in a positive number. (Accept alternative valid explanations.)</p>
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.
Part B	
Score	Description
2	<p>Student response includes the following element.</p> <p>Reasoning component: 2 points</p> <ul style="list-style-type: none"> Determines whether the claim is always true, sometimes true, or never true Correctly reasons that the claim is always true <p>Sample Student Response: Phillip's claim is always true because p and $-p$ are opposites. The sum of opposites is always 0. That makes the expression $0 + 5$ which will always be positive 5. The value of p does not matter. $7 + 5 + (-7) = 0 + 5 = 5$ and $-3 + 5 + -(-3) = -3 + 5 + 3 = 0 + 5 = 5$ and $0 + 5 + 0 = 5$ since the opposite of 0 is 0. (Accept alternative valid explanations.)</p>
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Type III Constructed-Response Rubric

PART A	
Score	Description
2	<p>Student response includes each of the following 2 elements.</p> <ul style="list-style-type: none"> • Correct amount of each payment, \$80.73 • Valid work shown or explanation given <p>Sample Student Response:</p> <p>The discounted price is 75% of the original price, so I need to multiply the original price by 0.75. Then, I will multiply that amount by 0.08 to determine the sales tax. Adding the two together will give me the total price of the computer. I then divide the total price of the computer by 6 to determine the six monthly payments.</p> $\$598.00 \times 0.75 = \448.50 $\$448.50 \times 0.08 = \35.88 $\$448.50 + \$35.88 = \$484.38 \text{ total cost}$ $\$484.38 \div 6 = \80.73 per month
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Part B	
Score	Description
4	<p>Student response includes each of the following 4 elements.</p> <ul style="list-style-type: none"> • Correct total price of the different computer, \$602.64 • Valid work shown or explanation given • Correct original price of the different computer, \$930.00 • Valid work shown or explanation given <p>Sample Student Response:</p> <p>The total cost of the different computer is \$602.64 and the original price is \$930.00. The tax is \$44.64, which is 8% of the sale price of the computer, d.</p> $\frac{44.64}{d} = \frac{8}{100}$ $4464 = 8d$ <p>The price of the computer after discount and sales tax is \$602.64. $558.00 + 44.64 = 602.64$</p> <p>The sale price is 60% of the original price, p.</p> $\frac{558.00}{p} = \frac{60}{100}$ $55800 = 60p$ $p = 930.00$
3	Student response includes 3 of the 4 elements.
2	Student response includes 2 of the 4 elements.
1	Student response includes 1 of the 4 elements.
0	Student response is incorrect or irrelevant.

APPENDIX C

Update Log		
Date	Page	Summary of Changes
8/22/17	1	Added Appendix C to list of internal links Added box outlining primary changes and internal links
	2	Row added to bottom of table to include session times
	8, 23	Changed name of TEI (originally "Hot Spot Table") to the same name used in the DRC system, "Match Interaction."
	9, 23	Changed name of TEI (originally "Short Equation Input") to the same name used in the DRC system, "Keypad Input."
	16	Updated links Added resources
3/15/18	2	Added subcategories table to Major Content