Grade 6 Mathematics – Evidence Statements

Overview of the Maryland Comprehensive Assessment Program (MCAP)

The MCAP includes a coherent set of summative mathematics assessments aligned to the Maryland College and Career Ready Standards for Mathematics (MCCRSM). Students are required to take an MCAP mathematics assessment at the end of grades 3 – 8 and at the end of Algebra I. Students may also take an MCAP mathematics assessment at the end of Geometry and Algebra II.

The MCAP mathematics assessment development process is based on Evidence-Centered Design. The ECD process begins by establishing the answer to "What skills and understandings should be assessed?". The MCCRSM describes the skills and understandings that the MCAP mathematics assessments assess. Assessments are then designed to gather evidence that allows inferences to be made. Assessments can be designed to allow inferences of various grain sizes. The MCAP mathematics assessments are summative assessments and are therefore designed to provide evidence that allows only general inferences about a student's mathematical skills and understandings. The MCAP Mathematics Claims Structure describes the grain size of the evidence that the MCAP mathematics assessments will yield. Assessment items are designed to elicit evidence of a student's level of proficiency for each claim.

MCAP MATHEMATICS CLAIMS STRUCTURE

Master Claim

The student is college and career ready or is on track to being college and career ready in mathematics.

Subclaims

Content - The student solves problems related to all content of the grade/course related to the Standards for Mathematical Practice.

Reasoning - The student expresses grade/course level appropriate mathematical reasoning.

Modeling - The student solves real-world problems with a degree of difficulty appropriate to the grade/course.

MCAP MATHEMATICS ASSESSMENT ITEM TYPES

Item Type	Description	Subclaim	Scoring Method	Number of Operational Items per Form
Type I	Type I items will assess conceptual understanding, procedural skills, reasoning, and the ability to use mathematics to solve real-world problems.	• Content • Reasoning • Modeling	Machine scored	**31**
Type II	Type II items assess a student's ability to reason mathematically. Items may require students to provide arguments or justifications, critique the reasoning of others, and to use precision when explaining their thinking related to mathematics.	• Reasoning	Human scored	**2**
Type III	Type III items assess a student's ability to apply their understanding of mathematics when solving real-world contextual problems.	• Modeling	Human scored	**2**
			Total	**35**

Overview of the MCAP Mathematics Evidence Statements

MCAP Mathematics Evidence Statements help teachers, curriculum developers, and administrators understand how the MCCRSM will be assessed. Assessment items are designed to elicit the evidence described in the Evidence Statements.

The MCAP Mathematics Evidence Statements for the Content Sub-Claim are organized using the same structure as the MCCRSM. The Domains, Clusters, and then Standards organize the Grade 6 Evidence Statements.

Evidence Statements

Evidence statements are provided for each standard to describe the type of evidence that a task addressing the standard should elicit. In some cases, the standard clearly describes the type of evidence that an aligned task should elicit. The Evidence Statement for such standards will read “As stated in the standard”. In cases where the wording of a standard does not adequately describe the type of evidence that should be elicited, the Evidence Statement will attempt to better describe the type of evidence items should elicit. In cases where a standard is taught in both Algebra I and Algebra II, the Evidence Statement and/or Item Specification will seek to describe how the items might differ between the two courses.

CODING OF CONTENT EVIDENCE STATEMENTS

Explanation of Coding	Example of the Evidence Statement
Assessing the Entire Standard • The evidence statement code is the same as the MCCRSM. • The exact language and intent of the entire standard is assessed, which includes examples and "e.g." parts of the standard.	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." and "For every vote candidate A received, candidate C received nearly three votes."*
Assessing Portions of a Standard with Multiple Operations • The evidence statement code is the same as the MCCRSM with an addition of a dash and a sequential number, e.g. -1, -2, -3, … • The portion of the standard that is assessed will appear in bold font.	6.NS.B.3-1 **Fluently add,** subtract, multiply, and divide **multi-digit decimals using the standard algorithm for each operation.** 6.NS.B.3-2 Fluently add, subtract, multiply, and divide **multi-digit decimals using the standard algorithm for each operation**.

Explanation of Coding	Example of the Evidence Statement
Assessing Portions of a Standard with Two or More Concepts • The evidence statement code is the same as the MCCRSM with an addition of a dash and a sequential number, e.g. -1, -2, -3, … • The portion of the standard that is being assessed will appear in bold font.	7.G.B.4-1 **Know the formulas for the area and circumference of a circle and use them to solve problems**; give an informal derivation of the relationship between the circumference and area of a circle. 7.G.B.4-2 Know the formulas for the area and circumference of a circle and use them to solve problems; **give an informal derivation of the relationship between the circumference and area of a circle.**

CODING FOR REASONING EVIDENCE STATEMENTS

Explanation of Coding	Example of the Evidence Statement
• The evidence statement code begins with the corresponding grade level. • The letter "R" appears after the grade level in the code to indicate Reasoning. • Following the letter "R," a sequential number appears and refers to a domain of the MCCRSM. • The lower case letter at the end of the evidence statement code refers to a specific reasoning evidence statement.	6.R.1a Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as the equal sign appropriately, or identify or describe errors in solutions to multi-step problems and present corrected solutions.

CODING FOR MODELING EVIDENCE STATEMENTS

Explanation of Coding	Example of the Statement
• The evidence statement code begins with the corresponding grade level. • After the grade level, M.1 with a sequential letter, e.g. a, b, c, … appears to indicate the specific modeling evidence statement.	6.M.1 Choose and produce appropriate mathematics to model quantities and mathematical relationships in order to analyze situations, make predictions, solve multi-step problems, and draw conclusions. 6.M.1a Given a real-world situation, identify the problem that needs to be solved, make necessary assumptions, and identify important information.

Standards for Mathematical Practice

The Standards for Mathematical Practice describe the varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These practice rest on important “processes and proficiencies” with longstanding importance in mathematics education.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Definitions

Defined below are some common terms used in the Evidence Statements.

- **Context:** The situation or setting for a word problem. The situations influence the solution path.
- **Thin Context:** A sentence or phrase that provides meaning for the quantity/quantities in a problem. For example, “The fractions represent lengths of a string.”
- **No context:** The item has no situation or setting. There are only numbers, symbols, and/or visual models in the item.
- **Visual models:** Drawn or pictorial examples that are representations of the mathematics.

Content Subclaim

6.RP Ratios and Proportional Relationships

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." and "For every vote candidate A received, candidate C received nearly three votes."

Evidence Statements/Clarifications:

- Expectations for ratios in this grade are limited to non-complex fractions.
- The initial numerator and denominator should be whole numbers.

Calculator Code: No

6.RP.A.2 Understand the concept of a unit rate $\frac{a}{b}$ 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 $\frac{3}{4}$ cup of flour for each cup of sugar." and "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."

Evidence Statements/Clarifications:

- Expectations for unit rates in this grade are limited to non-complex fractions.
- The initial numerator and denominator should be whole numbers.

Calculator Code: No

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.
3a. 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.

Evidence Statements/Clarifications:

- Expectations for ratios in this grade are limited to non-complex fractions.
- The initial numerator and denominator should be whole numbers.

Calculator Code: Yes

3b. 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?"

Evidence Statements/Clarifications:

- Expectations for unit rates in this grade are limited to non-complex fractions.
- The initial numerator and denominator should be whole numbers.
- Items may involve reasoning with any of the strategies listed in the standard, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Calculator Code: Yes

3c-1. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent.

Evidence Statements/Clarifications:

- Items focus on finding a percent of a quantity as a rate per 100.
- Items may or may not contain context.
- Expectations for ratios in this grade are limited to ratios of non-complex fractions.
- The initial numerator and denominator should be whole numbers.
- Items may involve reasoning with any of the strategies listed in the standard, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Calculator Code: Yes

3c-2. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $\frac{30}{100}$ times the quantity); solve problems involving finding the whole, given a part and the percent.

Evidence Statements/Clarifications:

- Items focus on solving problems involving finding the whole, given a part and the percent.
- Items may or may not contain context.

- Expectations for ratios in this grade are limited to ratios of non-complex fractions.
- The initial numerator and denominator should be whole numbers.
- Items may involve reasoning with any of the strategies listed in the standard, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Calculator Code: Yes

3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Evidence Statements/Clarifications:

- Items may or may not contain context.
- Items require students to multiply and/or divide dimensioned quantities (e.g., money, time, length, etc.).
- Items may require students to correctly express the units of the result.
- Expectations for ratios in this grade are limited to ratios of non-complex fractions.
- The initial numerator and denominator should be whole numbers.
- Items may involve reasoning with any of the strategies listed in the standard, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

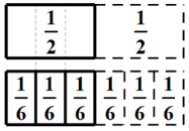
Calculator Code: Yes

6.NS Number System

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* $\frac{2}{3} \div \frac{3}{4}$ *and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain* $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$ *because* $\frac{3}{4}$ *of* $\frac{8}{9}$ *is* $\frac{2}{3}$. *In general,* $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$. *How much chocolate will each person get if 3 people share* $\frac{1}{2}$ *lb of chocolate equally? How many* $\frac{3}{4}$*-cup servings are in* $\frac{2}{3}$ *of a cup of yogurt? How wide is a rectangular strip of land with length* $\frac{3}{4}$ *mi and area* $\frac{1}{2}$ *square mi?*

Evidence Statements/Clarifications:

- Items use visual models and/or algorithmic methods to interpret, compute, and solve word problems. For example, how many pounds of chocolate will each person receive if 3 people share $\frac{1}{2}$ *lb* of chocolate equally?
- 

- Items focus on using division of fractions by fractions to solve word problems.
- Note that the italicized examples correspond to three meanings/uses of division: (1) equal sharing; (2) measurement; (3) unknown factor. These meanings/uses of division are assessed equally.
- Items may involve fractions and mixed numbers but not decimals.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- The given dividend and divisor require an efficient strategy, method or standard algorithm (e.g., 40584 ÷ 76).
- Items do not have a context.
- Only the answer is required.
- Items have a maximum of five-digit dividends and a maximum of two-digit divisors.
- Items may or may not have a remainder. Students understand that remainders can be written as fractions or decimals.

Calculator Code: No

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

3-1. Fluently **add** multi-digit decimals using the standard algorithm for each operation.

Evidence Statements/Clarifications:

- Items do not have a context.
- Only the sum is required.
- Simplification of the expression requires the use of an efficient strategy, method or standard algorithm.
- Items should be rigorous, but not tedious. Assessment items should keep terms within the expression between 0 and 100 with each term extending to no more than three decimal places.

Calculator Code: No

3-2. Fluently **subtract** multi-digit decimals using the standard algorithm for each operation.

Evidence Statements/Clarifications:

- Items do not have a context.
- Only the difference is required.
- Positive differences only.
- Simplification of the expression requires the use of an efficient strategy, method or standard algorithm.
- Items should be rigorous, but not tedious. Assessment items should keep terms within the expression between 0 and 100 with each term extending to no more than three decimal places.

Calculator Code: No

3-3. Fluently **multiply** multi-digit decimals using the standard algorithm for each operation.

Evidence Statements/Clarifications:

- Items do not have a context.
- Only the product is required.
- Simplification of the expression requires the use of an efficient strategy, method or standard algorithm.
- Items should be rigorous, but not tedious. For the purposes of assessment, expressions involve one term of no more than 5 digits multiplied by another term of no more than 2 digits, with each term extending to no more than three decimal places.

Calculator Code: No

3-4. Fluently **divide** multi-digit decimals using the standard algorithm for each operation**.**

Evidence Statements/Clarifications:

- Items do not have a context.
- Only the quotient is required.
- Simplification of the expression requires the use of an efficient strategy, method or standard algorithm.
- Items should be rigorous, but not tedious. For the purposes of assessment, expressions should involve one term of no more than 4 digits divided by a term of no more than 2 digits.
- Every quotient is a whole number or a decimal terminating at the tenths, hundredths, or thousandths place.

Calculator Code: No

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 $4(9+2)$.

4-1. 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.

Evidence Statements/Clarifications:

- Items do not have a context.

Calculator Code: No

4-2. 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 $4(9+2)$.

Evidence Statements/Clarifications:

- Items may have minimal or no context.
- Items require writing or finding the equivalent expression with the greatest common factor.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items do not require students to perform any computations.
- Students may be asked to recognize the meaning of zero in the situation, but will not be asked to explain.

Calculator Code: No

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.

6a. 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.

Evidence Statements/Clarifications:

- Items have minimal or no context.

Calculator Code: No

6b-1. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane

Evidence Statements/Clarifications:

- Items have minimal or no context.
- Students may need to recognize or use traditional notation for quadrants (such as I, II, III, IV).
- Coordinates are not limited to integers.

Calculator Code: No

6b-2. Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

Evidence Statements/Clarifications:

- Items have minimal or no context.
- Students may need to recognize or use traditional notation for quadrants (such as I, II, III, IV).
- Coordinates are not limited to integers.

Calculator Code: No

6c-1. Find and position integers and other rational numbers on a horizontal or vertical number line diagram.

Evidence Statements/Clarifications:

- Items have minimal or no context.
- Coordinates are not limited to integers.

Calculator Code: No

6c-2. Find and position pairs of integers and other rational numbers on a coordinate plane.

Evidence Statements/Clarifications:

- Items have minimal or no context.
- Students may need to recognize or use traditional notation for quadrants (such as *I*, *II*, *III*, *IV*).
- Coordinates are not limited to integers.

Calculator Code: No

6.NS.C.7 Understand ordering and absolute value of rational numbers.

7a. 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.

Evidence Statements/Clarifications:

- Items do not have a context.
- Items are not limited to integers.

Calculator Code: No

7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write* $-3^\circ C \geq -7^\circ C$ *to express the fact that* $-3^\circ C$ *is warmer than* $-7^\circ C$.

Evidence Statements/Clarifications:

- Items are not limited to integers.

Calculator Code: No

7c-1. Understand the absolute value of a rational number as its distance from 0 on the number line.

Evidence Statements/Clarifications:

- Items do not have a context.
- Items are not limited to integers.

Calculator Code: No

7c-2. 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.*

Evidence Statements/Clarifications:

- Items must have a context.
- Items are not limited to integers.

Calculator Code: No

7d. 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.

Evidence Statements/Clarifications:

- Items may or may not contain context.
- Items are not limited to integers.
- Prompts do not present students with a number line diagram, but students may draw a number line diagram as a strategy.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items may or may not contain context.
- Finding distances is limited to points with integer coordinates.

Calculator Code: No

6.EE Expressions and Equations

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.

1-1. Write numerical expressions involving whole-number exponents.

Evidence Statements/Clarifications:

- Items involve expressing b-fold products $a \bullet a \bullet \ldots \bullet a$ in the form a^b, where a and b are non-zero whole numbers.
- Items do not require use of the laws of exponents.

Calculator Code: No

1-2. Evaluate numerical expressions involving whole-number exponents.

Evidence Statements/Clarifications:

- Items may involve simple fractions raised to whole-number powers of 5 or less, e.g. $\left(\frac{1}{2}\right)^3, \left(\frac{2}{3}\right)^2$.
- Items may involve nonnegative decimals raised to whole-number powers, limiting multiplication to the assessment limits clarified in 6.NS.B.3-3.
- Items do not have a context.

Calculator Code: No

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.

2a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as* $5 - y$.

Evidence Statements/Clarifications:

- Items do not have a context.
- Numerical values in these expressions may include whole numbers, fractions, and decimals.

Calculator Code: Yes

2b. 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*.

Evidence Statements/Clarifications:

- Items do not have a context.
- Numerical values in these expressions may include whole numbers, fractions, and decimals.

Calculator Code: Yes

2c-1. 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 $A=6s^2$ to find the volume and surface area of a cube with sides of length $s=\frac{1}{2}$.

Evidence Statements/Clarifications:

- For expressions not connected by authentic formulas, items do not need to have a context.
- Numerical values in these expressions may include whole numbers, fractions, and decimals.
- Items will not require operations on negative numbers.

Calculator Code: Yes

c-2. 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*** $A=6s^2$ ***to find the volume and surface area of a cube with sides of length*** $s=\frac{1}{2}$.

Evidence Statements/Clarifications:

- Items are simple applications of formulas that are provided in the prompt.
- Items do not require the student to manipulate the formula or isolate variables to solve an equation.
- Items have minimal or no context.
- Numerical values in these expressions may include whole numbers, fractions, and decimals.
- Items will not require operations on negative numbers.

Calculator Code: Yes

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 $3y$.

Evidence Statements/Clarifications:

- Items will not require operations on negative numbers.
- Items have minimal or no context.

Calculator Code: Yes

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.

Evidence Statements/Clarifications:

- Items will not require operations on negative numbers.
- Items have minimal or no context.

Calculator Code: Yes

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.

5-1. Understand solving an equation as a process of answering a question: which values from a specified set, if any, make the equation true? Use substitution to determine whether a given number in a specified set makes an equation true.

Evidence Statements/Clarifications:

- Items may involve selecting or identifying values from an infinite set of nonnegative numbers (e.g., even numbers; whole numbers; fractions).
- Items may involve selecting or identifying values from a finite set of nonnegative numbers (e.g., {2, 5, 7, 9}). Limit finite sets to no more than four numbers.

Calculator Code: Yes

5-2. Understand solving an inequality as a process of answering a question: which values from a specified set, if any, make the inequality true? Use substitution to determine whether a given number in a specified set makes an inequality true.

Evidence Statements/Clarifications:

- Items may involve selecting or identifying values from an infinite set of nonnegative numbers (e.g., even numbers; whole numbers; fractions).
- Items may involve selecting or identifying values from a finite set of nonnegative numbers (e.g., {2, 5, 7, 9}). Limit finite sets to no more than four numbers.

Calculator Code: Yes

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.

Evidence Statements/Clarifications:

- Items may require students to write an expression to represent a real-world or mathematical problem. Items do not require students to find a solution.
- Items may require students to interpret a variable as a specific unknown number, or, as a number that could represent any number in a specified set.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items are algebraic, requiring solving for a variable. Items are not simply arithmetic.
- Items involve whole-number, fraction, or decimal values of *p* and *q*; fractions and decimals should not appear together in the same item.
- These items only involve equations with addition and multiplication.
- Items must involve both writing the equation and solving the equation. A valid equation and the correct answer are both required for full credit.

Calculator Code: Yes

6.EE.B.8 Write an inequality of the form $x \geq c$ or $x \leq c$ 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.

Evidence Statements/Clarifications:

- Values of c can be rational, and are therefore not limited to integers.
- Items may involve $\leq$ and $\geq$, as well as $<$ and $>$.

Calculator Code: No

6.EE.C Represent and analyze quantitative relationship 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.*

Evidence Statements/Clarifications:

- Items that involve writing an equation should not go beyond the equation types described in 6.EE.B.7.

Calculator Code: Yes

6.G Geometry

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.

Evidence Statements/Clarifications:

- N/A

Calculator Code: Yes

6.G.A.2-1 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 $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**

Evidence Statements/Clarifications:

- Items do not have a context.
- Items require focusing on the connection between packing the solid figure and computing the volume

Calculator Code: Yes

6.G.A.2-2 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 $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**

Evidence Statements/Clarifications:

- Items focus on using the formulas in problem-solving contexts.
- Items may ask to find the length, width, or height, but equations should not go beyond the equation types described in 6.EE.B.7.

Calculator Code: Yes

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.

Evidence Statements/Clarifications:

- Avoid operations with negative numbers.

Calculator Code: Yes

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.

Evidence Statements/Clarifications:

- N/A

Item Specifications:

- Lateral surface area is not mentioned in the CCRSS. Surface area refers to the total surface area.

Calculator Code: Yes

6.SP Statistics and Probability

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.

Evidence Statements/Clarifications:

- Items do not assess mode and range.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items might present several distributions graphically and ask which two have nearly the same center, nearly the same spread, or nearly the same overall shape.
- Items do not assess mode and range.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items do not assess mode.

Calculator Code: No

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.

Evidence Statements/Clarifications:

- Items ask to identify which display corresponds to a given set of data.
- Items do not assess mode and range.

Calculator Code: Yes

6.SP.B.5 Summarize numerical data sets in relation to their context, such as by:

5a. Reporting the number of observations.

5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

5c. 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.

5d. 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.

Evidence Statements/Clarifications:

- Items have a text-based and a graphics-based overview of a numerical data set.
- Items require students to identify/select from unambiguously true or false statements such as, “About half of the values are greater than the average”; “If this point were deleted from the data set, the median would not change”; etc.
- Items do not assess mode and range.
- Items should go beyond simply counting the number of observations. Reporting should include statistical analysis of the observations.

Calculator Code: Yes

Reasoning Subclaim

All reasoning assessment items connect to both the Grade 6 reasoning evidence statements and the content evidence statements. Students must provide evidence of their ability to reason mathematically by responding to Type I and Type II items.

Type I

- Items are machine scored.
- Items are 1 point per item.
- Items align to the Ratios and Proportional Relationships (RP) domain, the Number Systems (NS) domain, and the Expressions and Equations (EE) domain.
- Calculators are allowed on all reasoning items.
- Four items from this grouping will appear on each assessment.

Type II

- Items are human scored constructed response.
- Items are 3 points or 4 points per item.
- Items align to the Ratios and Proportional Relationships (RP) domain, the Number Systems (NS) domain, and the Expressions and Equations (EE) domain.
- Calculators are allowed on all reasoning items.
- Two items from this grouping will appear on each assessment.

The following pages provide the reasoning evidence statements and specific clarifications.

6.R.1 Reasoning with Ratios and Proportional Relationships

6.R.1a Evidence Statements:

- Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as the equal sign appropriately, or identify or describe errors in solutions to multi-step problems and present corrected solutions.

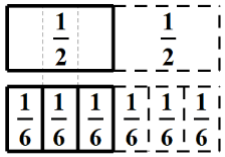
Clarifications:

- Content scope: 6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.
- Expectations for ratios in this grade are limited to ratios of non-complex fractions.
- The initial numerator and denominator should be whole numbers.

6.R.2 Reasoning with Number Systems

6.R.2a Evidence Statements:

- Base arithmetic explanations and reasoning on concrete referents such as diagrams, connecting the diagrams to a written (symbolic) method. For example, how many pounds of chocolate will each person receive if 3 people share $\frac{1}{2}\ lb$ of chocolate equally?



Clarifications:

- Content Scope: 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* $\left(\frac{2}{3}\right)\div\left(\frac{3}{4}\right)$ *and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that* $\left(\frac{2}{3}\right)\div\left(\frac{3}{4}\right)=\frac{8}{9}$ *because* $\frac{3}{4}$ *of* $\frac{8}{9}$ *is* $\frac{2}{3}$. *(In general,* $\left(\frac{a}{b}\right)\div\left(\frac{c}{d}\right)=\frac{ad}{bc}$.*) How much chocolate will each person get if 3 people share* $\frac{1}{2}\ lb$ *of chocolate equally? How many* $\frac{3}{4}$*-cup servings are in* $\frac{2}{3}$ *of a cup of yogurt? How wide is a rectangular strip of land with length* $\frac{3}{4}mi$ *and area* $\frac{1}{2}$ *square* mi *?*

6.R.2b **Evidence Statements:**

- Base explanations and reasoning on the relationship between multiplication and division.

Clarifications:

- Content Scope: 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* $\left(\frac{2}{3}\right) \div \left(\frac{3}{4}\right)$ *and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that* $\left(\frac{2}{3}\right) \div \left(\frac{3}{4}\right) = \frac{8}{9}$ *because* $\frac{3}{4}$ *of* $\frac{8}{9}$ *is* $\frac{2}{3}$. *(In general,* $\left(\frac{a}{b}\right) \div \left(\frac{c}{d}\right) = \frac{ad}{bc}$.*) How much chocolate will each person get if 3 people share* $\frac{1}{2}$ lb *of chocolate equally? How many* $\frac{3}{4}$*-cup servings are in* $\frac{2}{3}$ *of a cup of yogurt? How wide is a rectangular strip of land with length* $\frac{3}{4} mi$ *and area* $\frac{1}{2}$ *square* mi *?*

6.R.2c **Evidence Statements:**

- Base explanations and reasoning on a number line diagram.

Clarifications:

- Content Scope: 6.NS.C.7 Understand ordering and absolute value of rational numbers.
- Connections to 6.NS.C.6 may be made.
- Diagrams can be provided in the prompt or in the response.

6.R.2d **Evidence Statements:**

- Base explanations and reasoning on a coordinate plane diagram.

Clarifications:

- Content Scope: 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.
- Connections to 6.NS.C.6 may be made.
- Diagrams can be provided in the prompt or in the response.

6.R.3 Reasoning with Ratios and Proportional Relationships

6.R.3a Evidence Statements:

- Base explanations and reasoning on the properties of operations.

Clarifications:

- Content Scope: 6.EE.A.3, 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). Apply the properties of operations to generate equivalent expressions. For example, apply properties of operations to y + y + y to produce the equivalent expression and understand that the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for; 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 $6(4x+3y)$. (6.EE.A.3, 6.EE.A.4)
- Items should not require students to identify or name properties.

6.R.3b Evidence Statement:

- Given an equation, present the solution steps as a logical argument that concludes with a solution.

Clarifications:

- Content Scope: 6.EE.B Reason about and solve one-variable equations and inequalities.
- Items do not require students to write an original equation or inequality.
- Items do not require students to solve an inequality. Refer to the Evidence Statements and Clarifications for 6.EE.B.5-2.

6.R.3c Evidence Statement:

- Form chains of reasoning that will justify or refute propositions or conjectures.

Clarifications:

- Content Scope: 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.R.3d **Evidence Statement:**

- Present solutions to multi-step problems in the form of valid chains of reasoning, adhering to precision.
- Identify or describe errors in solutions to multi-step problems and present corrected solutions.

Clarifications:

- Content Scope: 6.EE.C.9 Represent and analyze quantitative relationships between dependent and independent variables.
- Items that involve writing an equation should not go beyond the equation types described in 6.EE.B.7

Modeling Subclaim

All modeling assessment items connect to both the Grade 6 modeling evidence statements and the content evidence statements. Students must provide evidence of their ability to apply one or more steps of the modeling cycle by responding to Type I and Type III items.

Type I

- Items are machine scored.
- Items are 1 point per item.
- Items may be aligned to any of the content standards.
- Calculators are allowed on all modeling items.
- Four items from this grouping will appear on each assessment.

Type III

- Items are human scored constructed response.
- Items are 3 points or 4 points per item.
- Items may be aligned to any of the content standards.
- Calculators are allowed on all modeling items.
- Two items from this grouping will appear on each assessment.

The following pages provide the modeling evidence statements and specific clarifications.

6.M.1 **Evidence Statement:**

- Choose and produce appropriate mathematics to model quantities and mathematical relationships in order to analyze situations, make predictions, solve multi-step problems, and draw conclusions.

Clarifications:

- Items require students to implement the modeling cycle.
- Items require application of knowledge and skills articulated in any/all of the Content Domains.
- Items allow for flexibility in mathematical representations and solution methods.

6.M.1a **Evidence Statement:**

- Given a real-world situation, identify the problem that needs to be solved, make necessary assumptions, and identify important information.

Clarifications:

- Items may require students to identify and describe the problem that needs to be solved in their own words or that could be asked based on the problem situation.
- Items may require students to justify the problem that needs to be solved by identifying information from the problem.
- Items may include charts and/or graphs that could be analyzed for information about the problem.
- Items may prompt students to identify the information that is needed to solve the problem.
- Items may have information that is essential to solving the problem, but is not given, and prompt students to make assumptions.
- Items do not require a solution.

6.M.1b **Evidence Statement:**

- Given a real-world situation, formulate a mathematical representation of the problem.

Clarifications:

- Items allow for students to represent the given problem using mathematical models, e.g. words, equations, functions, geometric figures, statistical models, etc.
- Responses should be mathematically correct and precise.
- Items do not require a solution.

6.M.1c **Evidence Statement:**

- Given a real-world situation, use mathematical models to compute and draw conclusions.

Clarifications:

- Items may prompt the students to identify the mathematics or mathematical model needed to solve the problem.
- Items require the students to use a model to compute a solution and draw conclusions.
- Responses should be mathematically correct and precise.

6.M.1d **Evidence Statement:**

- Given a real-world situation, interpret what a solution means within the context of the situation.

Clarifications:

- Items involve students interpreting and concluding what a particular solution means within the context of a problem.
- Items may require the students to provide the final solution to the problem.

6.M.1e **Evidence Statement:**

- Given a real-world situation, evaluate and/or validate a partial or complete solution.

Clarifications:

- Items require students to analyze a given solution path (partial or complete) to determine if it is a mathematically correct solution path for the given real-world situation, and to consider whether the solution reasonably answers the question.
- Items may ask students to improve or refine a solution path at any point in the modeling cycle.
- Items may require the students to provide the final solution to the problem.