Grade 6 Mathematics Instructional Toolkit

The Grade 6 Mathematics Instructional Toolkit is intended to assist teachers with planning instruction aligned to the Florida Standards. This toolkit is not intended to replace your district's curriculum, but rather it serves to support the teaching and learning of the grade 6 Mathematics Florida Standards. This toolkit includes a breakdown of information related to the Grade 6 Mathematics Florida Standards Assessment (FSA), CPALMS and Florida Students, the Grade 6 Mathematics Florida Standards, and standards aligned resources.

Grade 6 Mathematics Florida Standards Assessment

This section highlights some key information related to the Grade 6 Mathematics FSA that can be found on the FSA Portal. These items include the Test Design Summary and Blueprint, Test Item Specifications and FSA Practice Tests.

Test Design Summary and Blueprint
The grade 6 mathematics standards can be broken down into five major reporting categories as assessed on the Grade 6 Mathematics FSA with a corresponding weight. This information can also be found on page 4 of the Test Design Summary and Blueprint.

- Ratio and Proportional Relationships (15%)
- The Number System (21%)
- Expressions and Equations (30%)
- Geometry (15%)
- Statistics and Probability (19%)

Test Item Specifications

The grade 6 Test Item Specification document indicates the alignment of items with the Florida Standards. Assessment limits are included in the specifications, which define the range of content knowledge in the assessment items for the standard. Sample items for each standard are also included in the specifications document. Each standard in this toolkit lists the corresponding page number in the specifications document along with any assessment limits.

Practice Tests
Practice Tests are available for students to become familiar with the various item types that may be used on the Grade 6 Mathematics FSA. Within the Test Item Specification document, page 40, is a chart aligning standards to each item type and item number on the Paper-Based Practice Test. Each Paper-Based Practice Test is provided with an answer key. It is important to note that students are not permitted to use a calculator of any kind on the Grade 6 Mathematics FSA.

CPALMS: Official Source of Florida Standards

This section features information and tools that are found on CPALMS.

Grade 6 Mathematics Course Description
The Grade 6 Mathematics Course Description provides an overview for the course with standards aligned resources for educators, students, and parents.

Mathematics Formative Assessment System (MFAS)
One resource available on CPALMS that has been designed specifically for mathematics instruction is the Mathematics Formative Assessment System (MFAS). The system includes a task or problem that teachers can implement with their students. It also includes various levels of rubrics that help the teacher interpret students' responses. In addition to using the MFAS tasks as formative assessments for students, these tasks can be used by teachers to plan lessons that are closely aligned to the standards.

Model Eliciting Activity (MEAs)
Model Eliciting Activities (MEAs) are open-ended, interdisciplinary problem-solving activities that are meant to reveal students' thinking about the concepts embedded in these realistic activities. Students will work in teams to apply their knowledge of mathematics and science while considering constraints and tradeoffs. Each MEA is aligned to at least two subject areas, including mathematics, English language arts and/or literacy in the content areas, and science.

Mathematical Practices
The Mathematical Practices are habits of mind that describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. The Mathematical Practices should be infused during the course and will be assessed throughout the Grade 6 Mathematics FSA. More information about each Mathematical Practice can be found by clicking on the links below.

MAFS.K12.MP.1.1 Make sense of problems and persevere in solving them.

MAFS.K12.MP.2.1 Reason abstractly and quantitatively.

MAFS.K12.MP.3.1 Construct viable arguments and critique the reasoning of others.

MAFS.K12.MP.4.1 Model with mathematics.

MAFS.K12.MP.5.1 Use appropriate tools strategically.

MAFS.K12.MP.6.1 Attend to precision.

MAFS.K12.MP.7.1 Look for and make use of structure.
MAFS.K12.MP.8.1 Look for and express regularity in repeated reasoning.

Depth of Knowledge
Florida has adopted Webb's four-level Depth of Knowledge (DOK) model of content complexity as a means of classifying the cognitive demand presented by the Florida standards. It is important to distinguish between the DOK rating for a given standard and the possible DOK ratings for assessment items designed to address the standard. This is particularly important for assessment purposes, since 50% or more of assessment items associated with a given standard should meet or exceed the DOK level of the standard. The DOK Levels are identified for each standard throughout this document. Please visit the CPALMS Content Complexity page for more information about the DOK complexity for standards. For more information about the DOK complexity for mathematics assessments, please visit page 9 of the mathematics Test Design Summary and Blueprint on the FSA Portal.

Florida Students

Resources specifically designed with students in mind are available on Florida Students. Florida Students is an interactive site that provides educational resources and student tutorials aligned to the Florida Standards. This site should not be used as a lesson guide, but rather a tool to help students obtain mastery in various mathematical concepts.

Grade 6 Mathematics Florida Standards

This section includes a breakdown of each standard by domain and cluster. Standards should not be taught in the order below. To do so would strip the coherence of the mathematical ideas and miss opportunity to enhance the major work of the grade with the supporting clusters and/or standards. In addition to the breakdown, each standard has the corresponding DOK Level, example resources, and assessment limits with page number in the Grade 6 Mathematics Item Specification.

Domain: Ratio and Proportion

Cluster 1 (Major): Understand ratio concepts and use ratio reasoning to solve problems.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.RP.1.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 9; Whole numbers should be used for the quantities. Ratios can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert hours/min to seconds).	MFAS: Interpreting Ratios Lesson: "My Favorite Recipe"
MAFS.6.RP.1.2	Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 10; Items using the comparison of a ratio will use whole numbers. Rates can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert hours/min to seconds). Name the amount of either quantity in terms of the other as long as one of the values is one unit.	MFAS: Book Rates Virtual Manipulative: Planet Size Comparison: Ratio
MAFS.6.RP.1.3	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.	Pages 11; Rates can be expressed as fractions, with ":" or with words. Items may involve mixed units within each system (e.g. convert	MFAS: The Meaning of Pi Lesson: Don't Chase a Car!

			Resources
	a) Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b) Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* c) Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d) Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. e) Understand the concept of Pi as the ratio of the circumference of a circle to its diameter. Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	hours/min to seconds). Percent found as a rate per 100. Quadrant I only for MAFS.6.RP.1.3a.	There is a better way…

Domain: The Number System

***Cluster 1** (Major):* Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.NS.1.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2*	Page 12; At least the divisor or dividend needs to be a non-unit fraction. Dividing a unit fraction by a whole number or vice versa (e.g., $\frac{1}{a} \div q$ or $q \div \frac{1}{a}$, where a is a whole number) is below grade level.	MFAS: Juicing Fractions Lesson: Dividing by Fractions Discovery

	square mi? Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		

Cluster 2 *(Additional):* Compute fluently with multi-digit numbers and find common factors and multiples.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.NS.2.2	Fluently divide multi-digit numbers using the standard algorithm. Content Complexity: DOK Level 1: Recall	Page 13; Items may only have 5-digit dividends divided by 2-digit divisors or 4-digit dividends divided by 2- or 3-digit divisors. Numbers in items are limited to non-decimal rational numbers.	MFAS: Long Division-2 Lesson: Cracking the Code: A Division Challenge
MAFS.6.NS.2.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. Content Complexity: DOK Level 1: Recall	Page 14; Items may include values to the thousandths place. Items may be set up in standard algorithm form.	MFAS: Multiplying Multi-digit Decimals Lesson: Where Will We Stay?
MAFS.6.NS.2.4	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).* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 15; Whole numbers less than or equal to 100. Least common multiple of two whole numbers less than or equal to 12.	MFAS: Using the Distributive Property Lesson: Factoring out the Greatest

Cluster 3 *(Major):* Apply and extend previous understandings of numbers to the system of rational numbers.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.NS.3.5	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.	Page 16; Items should not require the student to perform an operation.	MFAS: Relative Integers Lesson: Positive or Negative, It's All About

	Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		
MAFS.6.NS.3.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a) Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. b) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Pages 17; Plotting of points in the coordinate plane should include some negative values (not just first quadrant). Do not exceed a 10 × 10 coordinate grid, though scales can vary.	MFAS: Point Locations Lesson: Modern Math Warfare
MAFS.6.NS.3.7	Understand ordering and absolute value of rational numbers. a) Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.* b) Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3 °C > -7 °C to express the fact that -3 °C is warmer than -7 °C.* c) Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the*	Page 18; N/A	MFAS: Absolute Altitudes Problem-Solving Task: Above and Below Sea Level

	size of the debt in dollars. d) Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		
MAFS.6.NS.3.8	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. Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 17; Plotting of points in the coordinate plane should include some negative values (not just first quadrant). Numbers in MAFS.6.NS.3.8 must be positive or negative rational numbers. Do not use polygons/vertices for MAFS.6.NS.3.8. Do not exceed a 10 × 10 coordinate grid, though scales can vary.	MFAS: Garden Coordinates MEA: Dig It!

Domain: Expressions and Equations

Cluster 1 *(Major):* Apply and extend previous understandings of arithmetic to algebraic expressions.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.EE.1.1	Write and evaluate numerical expressions involving whole-number exponents. Content Complexity: DOK Level 1: Recall	Page 19; Whole number bases. Whole number exponents.	MFAS: Paul's Pennies Lesson: It's Hip 2b^2 eXponent^s
MAFS.6.EE.1.2	Write, read, and evaluate expressions in which letters stand for numbers. a) Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.* b) Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.* c) Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world	Page 20; N/A	MFAS: Writing Expressions Lesson: Feel the Heat!

	problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and A $= 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		
MAFS.6.EE.1.3	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.* Content Complexity: Level 1: Recall	Page 21; Positive rational numbers, values may include exponents. Variables must be included in the expression. For items using distribution, coefficients may be fractions before distribution but must be integer values after simplification.	MFAS: Equal Sides, Equivalent Expressions Lesson: Collectively Collecting
MAFS.6.EE.1.4	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.* Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 22; Numbers in items must be nonnegative rational numbers. Variables must be included in the expression.	MFAS: Identifying Equivalent Expressions Lesson: Have You Met Your Match?

Cluster 2 *(Major):* Reason about and solve one-variable equations and inequalities.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.EE.2.5	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. Content Complexity: Level 2: Basic Application of Skills & Concepts	Pages 23 & 24; Numbers in items must be nonnegative rational numbers. One-variable linear equations and inequalities. An equation or inequality should be given if a context is included. Inequalities are restricted to < or >. Lists of numbers should not use set notation	MFAS: Finding Solutions of Equations Lesson: How Much was Lunch?
MAFS.6.EE.2.6	Use variables to represent numbers and write expressions when solving a real-world or	Page 25; Numbers in items should not require students	MFAS: Writing Real-World

	mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. Content Complexity: Level 3: Strategic Thinking & Complex Reasoning	to perform operations with negative rational numbers or result in answers with negative rational numbers. Expressions must contain at least one variable.	Expressions Lesson: Decoding Word Phrases
MAFS.6.EE.2.7	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 non-negative rational numbers. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 26; Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Items must be one-step linear equations with one variable.	MFAS: University Parking Lesson: Bake Sale
MAFS.6.EE.2.8	Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 27; Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Context in real-world items should be continuous or close to continuous. Inequalities are limited to < or >.	MFAS: Transportation Number Lines Lesson: Writing Inequalities to Represent Situations

Cluster 3 *(Major):* Represent and analyze quantitative relationships between dependent and independent variables.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.EE.3.9	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.* Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 29; Items must involve relationships and/or equations of the form $y = px$ or $y = x + p$. Numbers in items should not require students to perform operations with negative rational numbers or result in answers with negative rational numbers. Variables need to be defined.	MFAS: Bicycling Equations Lesson: The Speeding Ticket (Part 1)

Domain: Geometry

Cluster 1 (Supporting): Solve real-world and mathematical problems involving area, surface area, and volume.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.G.1.1	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. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 29; Numbers in items must be nonnegative rational numbers. Limit shapes to those that can be decomposed or composed into rectangles and/or right triangles.	MFAS: Lost Key Lesson: Breaking Up is Hard to Do
MAFS.6.G.1.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = B\,h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 30; Prisms in items must be right rectangular prisms. Unit fractional edge lengths for the unit cubes used for packing must have a numerator of 1	MFAS: Clay Blocks Lesson: How much can it hold?
MAFS.6.G.1.3	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. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 31; Items may use all four quadrants. When finding side length, limit polygons to traditional orientation (side lengths perpendicular to axes).	MFAS: Patio Area Lesson: The Mystery of Crop Circles
MAFS.6.G.1.4	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. Content Complexity: Level 2: Basic Application of Skills & Concepts	Pages 32-33; Numbers in items must be positive rational numbers. Three-dimensional figures are limited to rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids	MFAS: Skateboard Ramp Lesson: Box it Up, Wrap it Up

Domain: Statistics & Probability

Cluster 1 (Additional): Develop understanding of statistical variability.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.SP.1.1	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.* Content Complexity: Level 1: Recall	page 34; N/A	MFAS: TV Statistics Lesson: Statistical Questions
MAFS.6.SP.1.2	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. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 35; Circle graphs and line graphs may not be used. Items should include a distribution.	MFAS: Math Test Shape Lesson: Comparing and Contrasting Data Sets Using Measures of Center and Spread
MAFS.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all if its values with a single number, while a measure of variation describes how its values vary with a single number. Content Complexity: Level 1: Recall	Page 36; Data sets in items must be numerical data sets.	MFAS: Compare Measures of Center and Variability Lesson: Universal GPA

Cluster 2 (Additional): Summarize and describe distributions.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.SP.2.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots. Content Complexity Rating: Level 2: Basic Application of Skills & Concepts	Page 37; All plots must be displayed on a number line or coordinate grid.	MFAS: Shark Attack Lesson: What's Your Favorite?

MAFS.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by: a) Reporting the number of observations. b) Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. Content Complexity Rating: Level 3: Strategic Thinking & Complex Reasoning	Pages 38-39; Displays should include only dot/line plots, box plots, or histograms.	MFAS: Analyzing Physical Activity Lesson: Fun with Surveys

Grade 6 Mathematics Resources

Course Descriptions, Standards, and Resources
- Grade 6 Mathematics Course Description
- Grade 6 Mathematics Advanced Course Description
- Grade 6 Math Student Resources
- Text Complexity Resources
- Florida Assessments for Instruction in Mathematics (FAIM)
- Student Support Resources

Florida Standards Assessment Assistance
- FSA Portal
- Test Item Specifications
- Test Design Summary and Blueprint
- FSA Fact Sheet
- Calculator and Reference Sheet Policy
- Reference Sheet
- Understanding FSA Reports