Grade 7 Mathematics Instructional Toolkit

The Grade 7 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 7 Mathematics Florida Standards. This toolkit includes a breakdown of information related to the Grade 7 Mathematics Florida Standards Assessment (FSA), CPALMS and Florida Students, the Grade 7 Mathematics Florida Standards, and standards aligned resources.

Grade 7 Mathematics Florida Standards Assessment

This section highlights some key information related to the Grade 7 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 7 mathematics standards can be broken down into five major reporting categories as assessed on the Grade 7 Mathematics FSA with a corresponding weight. This information can also be found on page 5 of the Test Design Summary and Blueprint.

- Ratio and Proportional Relationships (25%)
- The Number System (15%)
- Expressions and Equations (21%)
- Geometry (23%)
- Statistics and Probability (16%)

Test Item Specifications

The grade 7 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. In addition to limits, each item specification identifies whether or not that item could appear in the calculator allowed test session or no calculator allowed test session. 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 and allowable calculator use.

Practice Tests

Practice Tests are available for students to become familiar with the various item types that may be used on the Grade 7 Mathematics FSA. Within the Test Item Specification document, page 40, is a chart aligning standards to each item type and item number on the Computer-Based Practice Test. Each Computer-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 Session 1 of the Grade 7 Mathematics FSA. Students will be permitted a scientific calculator on all other sessions. For information regarding usage of calculators, please see the Calculator and Reference Sheet Policy page on the FSA portal.

CPALMS: Official Source of Florida Standards

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

Grade 7 Mathematics Course Description
The Grade 7 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 7 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 7 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, and assessment limits with page number in the Grade 7 Mathematics Item Specification.

Domain: Ratio and Proportion

Cluster 1 *(Major): Analyze proportional relationships and use them to solve real-world and mathematical problems.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.RP.1.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 10; The item stem must include at least one fraction. Ratios may be expressed as fractions, with ":" or with words. Units may be the same or different across the two quantities.	MFAS: Computing Unit Rates Lesson: For Students by Students
MAFS.7.RP.1.2	Recognize and represent proportional relationships between quantities. *a)* Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *b)* Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *c)* Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*	Page 11-13; Ratios should be expressed as fractions, with ":" or with words. Units may be the same or different across the two quantities.	MFAS: Finding Constant of Proportionality Lesson: Are Corresponding Leaf Veins Proportional to Leaf Height?

	d) Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		
MAFS.7.RP.1.3	Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 14; Units may be the same or different across the two quantities.	MFAS: Finding Fees Lesson: Invest in Your Education

Domain: The Number System

Cluster 1 *(Major): Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.NS.1.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. *a)* Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* *b)* Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. *c)* Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. *d)* Apply properties of operations as strategies to add and subtract rational numbers.	Page 15-17; N/A	MFAS: Rational Water Management Lesson: Discovering How to Subtract Rational Numbers

	Content Complexity: DOK Level 2: Basic Application of Skills & Concepts		
MAFS.7.NS.1.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. *a)* Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. *b)* Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts. *c)* Apply properties of operations as strategies to multiply and divide rational numbers. *d)* Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 18-19; 7.NS.1.2a, 2b, and 2c require the incorporation of a negative value.	MFAS: Negative Times Original Tutorial: Why Does a Negative Times a Negative Equal a Positive?
MAFS.7.NS.1.3	Solve real-world and mathematical problems involving the four operations with rational numbers. Content Complexity Rating: DOK Level 2: Basic Application of Skills & Concepts	Page 20; Numbers in items must be rational numbers. Complex fractions may be used, but should contain fractions with single-digit numerators and denominators. Item assessed with and/or without calculator.	MFAS: Monitoring Water Temperatures Lesson: Cool Uniforms

Domain: Expressions and Equations

Cluster 1 *(Major): Use properties of operations to generate equivalent expressions.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.6.EE.1.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Content Complexity: DOK Level 1: Recall	Page 21; Expressions must be linear and contain a variable. Item assessed with calculator.	MFAS: Equivalent Rational Expressions Lesson: Total Recall
MAFS.6.EE.1.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by1.05".* Content Complexity: DOK Level 2: Basic Application of Skills & Concepts	Page 22; Expressions must be linear Item assessed with and/or without calculator.	MFAS: Explain Equivalent Expressions Original Tutorial: Math Soup

Cluster 2 *(Major): Solve real-life and mathematical problems using numerical and algebraic expressions and equations.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.EE.2.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.* Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 23; Items should not use variables. Items should require two or more steps. Item assessed with calculator.	MFAS: Gas Station Equations Lesson: Math in Mishaps
MAFS.7.EE.2.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	Page 24; Inequalities must have context. Inequalities may use ≤ or ≥. Inequalities may	MFAS: Recycled Inequalities Lesson: Inequal-

	a) Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* *b)* Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.* Content Complexity: Level 2: Basic Application of Skills & Concepts	not be compound inequalities. Item assessed with calculator.	tiles-ies

Domain: Geometry

Cluster 1 *(Additional): Draw, construct, and describe geometrical figures and describe the relationships between them.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.G.1.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 25-26; Geometric figures must be two-dimensional polygons. Item assessed with calculator.	MFAS: Flying Scale Lesson: Designing Geo-World
MAFS.7.G.1.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 27; Given conditions should not focus on similarity or congruence or that the sum of angles in a triangle is 180 degrees. Be aware of the scoring capabilities for the GRID tool when designing these items.	MFAS: Sides of Triangles Lesson: Triangle Inequality Investigation

		To distinguish from other grades, conditions should include factors other than parallel or perpendicular lines and angle measure, such as symmetry and side length. Item assessed with and/or without calculator.	
MAFS.7.G.1.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 28; Spheres, cones, and cylinders are allowed. Slicing is limited to horizontal or vertical slices. Bases of prisms and pyramids can be a triangle (any type); a square; a rectangle; or a regular pentagon or hexagon. Items should not use composite figures. Item assessed with and/or without calculator.	MFAS: Cone Slices Lesson: Can You Cut It?

Cluster 2 *(Additional): Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.*

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.G.2.4	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 the area of a circle. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 29; Circles are limited to whole circles and semicircles. Item assessed with calculator.	MFAS: Center Circle Area Original Tutorial: Swimming in Circles
MAFS.7.G.2.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 30; Items should use angles measured in degrees only. Item assessed with calculator.	MFAS: What Is Your Angle? Lesson: Angles, angles, everywhere!

MAFS.7.G.2.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 31; Three-dimensional shapes may include right prisms and right pyramids. When the base of a figure has more than four sides, the area of the base must be given. Item assessed with calculator.	MFAS: Chilling Volumes Lesson: Aquarium Splash

Domain: Statistics & Probability

Cluster 1 *(Supporting):* Use random sampling to draw inferences about a population.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.SP.1.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 32-33; Numbers in item must be rational numbers. Context must be grade appropriate. Item assessed with and/or without calculator.	MFAS: Favorite Sport Survey Lesson: Populations and Samples
MAFS.7.SP.1.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.* Content Complexity: Level 3: Strategic Thinking & Complex Reasoning	Page 32-33; Context must be grade appropriate. Item assessed with and/or without calculator.	MFAS: Prediction Predicament Lesson: Pick Me! Pick Me!

Cluster 2 *(Additional):* Draw informal comparative inferences about two populations.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.SP.2.3	Informally assess the degree of visual overlap of two numerical data distributions with similar	Page 34; N/A	MFAS: TV Ages - 1

	variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.* Content Complexity: Level 2: Basic Application of Skills & Concepts	Item assessed with and/or without calculator.	Lesson: Who's Taller?
MAFS.7.SP.2.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.* Content Complexity Rating: Level 2: Basic Application of Skills & Concepts	Page 34; N/A Item assessed with and/or without calculator.	MFAS: Overlapping Trees Lesson: Brr! How Cold is the Antarctic?

Cluster 3 *(Supporting):* Investigate chance processes and develop, use, and evaluate probability models.

Standard Code	Standard	Assessment Limit(s)	Resources
MAFS.7.SP.3.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. Content Complexity: Level 1: Recall	Page 35; N/A Item assessed with and/or without calculator.	MFAS: Likelihood of an Event Original Tutorial: Introduction to Probability
MAFS.7.SP.3.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.* Content Complexity: Level 2: Basic Application of Skills & Concepts	Page 36; Long-run frequency should be greater than or equal to 300. Item assessed with and/or without calculator.	MFAS: Hen Eggs Virtual Manipulative: Spinners

MAFS.7.SP.3.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. *a)* Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* *b)* Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?* Content Complexity: Level 3: Strategic Thinking & Complex Reasoning	Page 37-39; N/A Item assessed with and/or without calculator.	MFAS: Errand Runner Lesson: M&M Candy: I Want Green
MAFS.7.SP.3.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. *a)* Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. *b)* Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. *c)* Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood* Content Complexity: Level 2: Basic Application	Page 37-39; N/A Item assessed with and/or without calculator.	MFAS: Automotive Probabilities Lesson: Chancy Candy

	of Skills & Concepts		

Grade 7 Mathematics Resources

Course Descriptions, Standards, and Resources

- Grade 7 Mathematics Course Description
- Grade 7 Advanced Mathematics Course Description
- Grade 7 Math Student Resources
- Text Complexity Resources
- Florida Assessments for Instruction in Mathematics (FAIM)
- Student Support Resources

Florida Standards Assessment Assistance

- Test Item Specifications
- Test Design Summary and Blueprint
- FSA Fact Sheet
- Calculator and Reference Sheet Policy
- Reference Sheet
- Understanding FSA Reports