ACAP

Alabama Comprehensive Assessment Program

ALTERNATE

Alabama Comprehensive Assessment Program (ACAP) *Alternate*

Item Specifications

Mathematics

Grade 8

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Mathematics

The *Alabama Comprehensive Assessment Program (ACAP) Alternate* item specifications are based on the development of alternate assessments that measure the 2019 *Alabama Alternate Achievement Standards*: *Math*. The item specifications define the purpose of the *ACAP Alternate* and provide important information regarding the content to be measured. The item specifications also serve as a road map to guide Alabama educators in the development and subsequent review of items that best measure the 2019 *Alabama Alternate Achievement Standards*: *Math* for a given grade and subject area. Each item specification is aligned to the given Alabama content area, cluster, and standard and includes the following key information:

- Course of Study Standard
- Alternate Achievement Standard
- Content limits/constraints
- Recommended depth of knowledge (DOK) or cognitive levels
- Sample item stem information

The appendix to this document includes sample test items, along with information about the item, including item type, page reference, alignment, depth of knowledge, and answer key. These sample items are provided to be an additional resource for educators to help guide instruction and assessment-building in the classroom. Teachers can use the sample items as models when leading classroom discussion as well as creating items for classroom tests or quizzes. In each sample item, the level of rigor need ed in the item in order to align with the content standard is evident.

Definitions

Course of Study Standards: The Course of Study Standards are a set of content curriculum statements that define what general education students should know and be able to do at a given grade level.

Alternate Achievement Standards: The 2019 *Alabama Alternate Achievement Standards*: *Math* are directly aligned to the 2019 Alabama Course of Study Standards. The 2019 *Alabama Alternate Achievement Standards*: *Math* define what students with the most significant support needs should understand (know) and be able to do at the conclusion of a course or grade.

Alabama Content Areas: Alabama content areas are large groups of related clusters and content standards. Because mathematics is a connected subject, standards from different Alabama content areas may sometimes be closely related.

Standards: Standards define what students should understand (know) and be able to do at the conclusion of a course or grade.

Assessment Limits/Content Constraints: Assessment limits and/or content constraints define the range of content knowledge and the degree of difficulty allowable when items are written to measure a given standard.

Depth of Knowledge (DOK): Depth of knowledge involves the cognitive complexity or the nature of thinking required for a given item. Depth of knowledge levels are used in the development of items for cognitive demand. Therefore, when developing items for depth of knowledge, the item should be as demanding cognitively as what the actual standard expects. The depth of knowledge includes three levels, from the lowest (basic recall) to the highest (strategic thinking). The *ACAP Alternate* assessment items are written to one of three cognitive levels of complexity:

- Level 1: Recall
- Level 2: Application of a Skill/Concept
- Level 3: Strategic Thinking

Item Types: The *ACAP Alternate* assessments are composed of various item types. These item types are described in the following section.

Context: Context provides information regarding the types of stimulus materials that can be used in the items. If a context is allowable, it means that the item may have context. If context is required, then the item measuring the given standard must have context. If no context is noted, then the items measuring the given standard should not have context.

Sample Stem Information: This statement explains what students are expected to do when they respond to a given item.

Item Types

The *Alabama Comprehensive Assessment Program* (ACAP) *Alternate* assessments are composed of various item types. These item types are described below.

Multiple-Choice (MC) Items: MC items have three answer choices, including two distractors and one correct answer. Distractors for mathematics represent common misconceptions, incorrect logic, incorrect application of an algorithm, computational errors, etc. A correct response to an MC item is worth one score point in the mathematics *ACAP Alternate.*

Performance Task Items:

Multiple-Select (MS) Items: MS items are similar in structure to MC items. However, unlike an MC item, an MS item has four options and more than one correct answer. In other words, multiple responses are required for a given item. A correct response to an MS item is worth two score points in the mathematics *ACAP Alternate*.

Two-Part Multiple-Choice Items: Two-Part Multiple-Choice Items have two questions. The questions may require the student to identify the sides and then angles of a shape, perform computations, identify information of a graph or chart, etc. A correct response to a Two-Part MC item is worth two score points in the mathematics *ACAP Alternate* when both parts are correct.

Item Specifications

Item specifications are one of the key requirements for a high-quality, legally defensible, standards-based assessment. Item specifications help define important characteristics of the items (i.e., test questions) developed for each Alternate Achievement Standard. These item specifications provide guidelines to help clarify the focus of what is to be assessed, what items may include, and what items may not include (i.e., assessment limits). Item specifications are used by item writers, item editors, and item reviewers as a common reference throughout the item-development process, from initial writing to final approval. These mathematics item specifications are based on the 2019 *Alabama Alternate Achievement Standards*: *Math*.

Grade	**8**
Content Area	**Number Systems and Operations**
Cluster	**Understand that the real number system is composed of rational and irrational numbers.**
Standard	**Define the real number system as composed of rational and irrational numbers.** **a. Explain that every number has a decimal expansion; for rational numbers, the decimal expansion repeats or terminates.** **b. Convert a decimal expansion that repeats into a rational number.**
Alternate Achievement Standard	**M.AAS.8.1: Add and subtract fractions with like denominators (e.g., halves, thirds, fourths, tenths).** **M.AAS.8.1a: Add and subtract decimals to the hundredths place.** **M.AAS.8.1b: Convert a fraction with a denominator of 100 to a decimal.**
Assessment Limits/Content Constraints	M.AAS.8.1: Limit to proper fractions. Avoid improper fractions. M.AAS.8.1a: Addition problems may include regrouping. Limit to subtraction problems not requiring regrouping. M.AAS.8.1b: Limit to fractions with four-digit numerators or less.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Here is an addition problem: two-thirds plus two-thirds. What is the sum of two-thirds plus two-thirds?

Grade	**8**
Content Area	**Number Systems and Operations**
Cluster	**Understand that the real number system is composed of rational and irrational numbers.**
Standard	**Locate rational approximations of irrational numbers on a number line, compare their sizes, and estimate the values of the irrational numbers.**
Alternate Achievement Standard	**M.AAS.8.2: Compare quantities represented as decimals in real-world examples to the hundredths place.**
Assessment Limits/Content Constraints	Limit to numbers less than 1,000 with a decimal of tenths or hundredths.
DOK(s)	1 or 2
Item Type(s)	MC, MS
Sample Item Stem(s)	James has one hundred twelve dollars and forty-seven cents. Sabrina has one hundred twelve dollars and thirty-eight cents. Who has more money?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Apply concepts of integer exponents and radicals.**
Standard	**Use square root and cube root symbols to represent solutions to equations.** **a. Evaluate square roots of perfect squares (less than or equal to 225) and cube roots of perfect cubes (less than or equal to 1000).** **b. Explain that the square root of a non-perfect square is irrational.**
Alternate Achievement Standard	**M.AAS.8.4: Calculate the square of numbers 1 through 10.**
Assessment Limits/Content Constraints	Limit to raising numbers to the second power of values 1 – 10.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is an expression: two squared. What is the value of two squared?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Apply concepts of integer exponents and radicals.**
Standard	**Use square root and cube root symbols to represent solutions to equations.** **a. Evaluate square roots of perfect squares (less than or equal to 225) and cube roots of perfect cubes (less than or equal to 1000).** **b. Explain that the square root of a non-perfect square is irrational.**
Alternate Achievement Standard	**M.AAS.8.5: Find the square root of the perfect squares up to 100.**
Assessment Limits/Content Constraints	Limit to perfect squares up to 100.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is the square root of forty-nine. What is the value of the square root of forty-nine?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Apply concepts of integer exponents and radicals.**
Standard	**Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.** **a. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.** **b. Interpret scientific notation that has been generated by technology.**
Alternate Achievement Standard	**M.AAS.8.6: Identify irrational numbers as non-perfect squares (e.g., discriminate between perfect and non-perfect squares).**
Assessment Limits/Content Constraints	Limit to square roots of numbers less than or equal to 100.
DOK(s)	1 or 2
Item Type(s)	MC, MS
Sample Item Stem(s)	Here are three square roots. Which square root is an irrational number?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Analyze the relationship between proportional and non-proportional situations.**
Standard	**Graph proportional relationships.** **a. Interpret the unit rate of a proportional relationship, describing the constant of proportionality as the slope of the graph which goes through the origin and has the equation y = mx where m is the slope.**
Alternate Achievement Standard	**M.AAS.8.8: Using a real-world scenario, match a table with its graph. Identify proportional or nonproportional relationships.**
Assessment Limits/Content Constraints	Limit to graphs on the first quadrant. Include real-world context.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here are three graphs. Which graph represents a proportional relationship?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Analyze and solve linear equations and systems of two linear equations.**
Standard	**Solve systems of two linear equations in two variables by graphing and substitution.** **a. Explain that the solution(s) of systems of two linear equations in two variables corresponds to points of intersection on their graphs because points of intersection satisfy both equations simultaneously.** **b. Interpret and justify the results of systems of two linear equations in two variables (one solution, no solution, or infinitely many solutions) when applied to real-world and mathematical problems.**
Alternate Achievement Standard	**M.AAS.8.12: Solve two-step linear equations where coefficients are less than 10 and answers are integers.**
Assessment Limits/Content Constraints	Limit to one-digit coefficients and two-digit constants.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Here is an equation: two *x* plus five equals thirty. What is the value of *x*?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Analyze and solve linear equations and systems of two linear equations.**
Standard	**Determine whether a relation is a function, defining a function as a rule that assigns to each input (independent value) exactly one output (dependent value), and given a graph, table, mapping, or set of ordered pairs.**
Alternate Achievement Standard	**M.AAS.8.13: Determine whether a relation is a function given a graph or a table.**
Assessment Limits/Content Constraints	Limit to five entries when using a table.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here are three graphs. Which graph represents a function?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Explain, evaluate, and compare functions.**
Standard	**Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.** **a. Distinguish between linear and nonlinear functions.**
Alternate Achievement Standard	**M.AAS.8.15: Identify linear and nonlinear functions graphically.**
Assessment Limits/Content Constraints	Avoid horizontal linear functions.
DOK(s)	1 or 2
Item Type(s)	MC, MS
Sample Item Stem(s)	Here are three graphs. Which graph represents a linear function?

Grade	**8**
Content Area	**Algebra and Functions**
Cluster	**Use functions to model relationships between quantities.**
Standard	**Analyze the relationship (increasing or decreasing, linear or nonlinear) between two quantities represented in a graph.**
Alternate Achievement Standard	**M.AAS.8.17: Given a simple scatter plot of points in a straight line, describe the relationship between the two quantities.**
Assessment Limits/Content Constraints	Limit to points on the first quadrant of a ten-by-ten or smaller grid.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Here is a scatter plot showing the price of tomatoes. Which statement is true about the price of the tomatoes?

Grade	**8**
Content Area	**Data Analysis, Statistics, and Probability**
Cluster	**Investigate patterns of association in bivariate data.**
Standard	**Verify experimentally the properties of rigid motions (rotations, reflections, and translations): lines are taken to lines, and line segments are taken to line segments of the same length; angles are taken to angles of the same measure; and parallel lines are taken to parallel lines.** **a. Given a pair of two-dimensional figures, determine if a series of rigid motions maps one figure onto the other, recognizing that if such a sequence exists the figures are congruent; describe the transformation sequence that verifies a congruence relationship.**
Alternate Achievement Standard	**M.AAS.8.22: Identify 3 different transformations (e.g., reflection, rotation, translation).**
Assessment Limits/Content Constraints	
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is rectangle ABCD. Here is rectangle A prime B prime C prime D prime. Which transformation was done to rectangle ABCD to create rectangle A prime B prime C prime D prime?

Grade	**8**
Content Area	**Geometry and Measurement**
Cluster	**Understand congruence and similarity using physical models or technology.**
Standard	**Use coordinates to describe the effect of transformations (dilations, translations, rotations, and reflections) on two-dimensional figures.**
Alternate Achievement Standard	**M.AAS.8.23: Recognize the reflection (across the x- or y-axis) and translation (across quadrants) of a two-dimensional figure on a coordinate plane (limited to non-equilateral rectangles and triangles).**
Assessment Limits/Content Constraints	Limit to reflections across the *x*- and *y*-axes.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is triangle ABC. Here is triangle A prime B prime C prime. Which graph shows a reflection across the *y*-axis?

Grade	**8**
Content Area	**Geometry and Measurement**
Cluster	**Understand congruence and similarity using physical models or technology.**
Standard	**Analyze and apply properties of parallel lines cut by a transversal to determine missing angle measures.** **a. Use informal arguments to establish that the sum of the interior angles of a triangle is 180 degrees.**
Alternate Achievement Standard	**M.AAS.8.25: Compare any angle to a right angle using greater than, less than, or congruent to the right angle.**
Assessment Limits/Content Constraints	Always mark the angle with an arc or square when marking a right angle. Mark acute, obtuse and straight angles with an arc and right angles with a square.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here is angle P. Which statement about angle P is correct?

Grade	**8**
Content Area	**Geometry and Measurement**
Cluster	**Analyze parallel lines cut by a transversal.**
Standard	**Informally justify the Pythagorean Theorem and its converse.**
Alternate Achievement Standard	**M.AAS.8.26: Identify vertical angles given two parallel lines cut by a transversal.**
Assessment Limits/Content Constraints	Limit to numbering or naming angles. Angle measures are not necessary.
DOK(s)	1 or 2
Item Type(s)	MC
Sample Item Stem(s)	Here are two parallel lines cut by a transversal. Here is angle one. Which angle is vertical to angle one?

Grade	**8**
Content Area	**Geometry and Measurement**
Cluster	**Understand and apply the Pythagorean Theorem.**
Standard	**Apply the Pythagorean Theorem to determine unknown side lengths of right triangles, including real-world applications.**
Alternate Achievement Standard	**M.AAS.8.27: Use the Pythagorean theorem to find the hypotenuse when given the measures of two legs in a real-world context. Limit to Pythagorean triples.**
Assessment Limits/Content Constraints	Limit to Pythagorean triples less than or equal to 13.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Federico nails a rope to the top of a pole that is eight meters tall. The rope is nailed to the ground six meters away from the base of the pole. How long is the rope?

Grade	**8**
Content Area	**Geometry and Measurement**
Cluster	**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**
Standard	**Use formulas to calculate the volumes of three-dimensional figures (cylinders, cones, and spheres) to solve real-world problems.**
Alternate Achievement Standard	**M.AAS.8.30: Use the formulas for perimeter, area, and volume to solve real-world and mathematical problems (where volume problems are limited to finding the volume of cylinders and rectangular prisms).**
Assessment Limits/Content Constraints	Limit to one-digit dimensions. Limit shapes to polygons for perimeter and area. Limit shapes to cylinders and rectangular prisms for volume.
DOK(s)	2 or 3
Item Type(s)	MC
Sample Item Stem(s)	Here is a fish tank that needs to be filled with water. What is the volume of the fish tank?