AzMERIT | Arizona's Statewide Achievement Assessment for English Language Arts and Mathematics

Math Item Specifications

GRADE 5

Arizona Department of Education with American Institutes for Research - 2016

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Introduction

The Arizona Statewide Achievement Assessment for English Language Arts and Mathematics (AzMERIT) is Arizona's statewide achievement test. AzMERIT assesses the Arizona College and Career Ready Standards (AzCCRS) adopted by the Arizona State Board of Education in 2010. AzMERIT will inform students, teachers, and parents about preparedness for college and careers upon graduating from high school. AzMERIT tests are computer-based, meaning that they can better assess students' critical thinking skills and provide them with opportunities to demonstrate a deeper understanding of the materials. Computer-based testing also allows for the use of a variety of innovative items types.

During the item-development process, all AzMERIT items are written in accordance with the Item Specifications and are reviewed and approved by a committee of Arizona educators to confirm alignment and appropriateness for inclusion in the test. AzMERIT items are generally representative of Arizona's geographic regions and culturally diverse population. Items are reviewed for the following kinds of bias: gender, racial, ethnic, linguistic, religious, geographic, and socioeconomic. Item reviews also include consideration of issues related to individuals with disabilities. Arizona community members also have an opportunity to review items for issues of potential concern to members of the community at large. Reviewers are asked to consider the variety of cultural, regional, philosophical, political, and religious backgrounds throughout Arizona, and then to determine whether the subject matter will be acceptable to Arizona students, families, and other members of Arizona communities.

This *AzMERIT Item Specifications* is a resource document that defines the content and format of the test and test items for item writers and reviewers. Each *Item Specifications* document indicates the alignment of items with the AzCCRS. It also serves to provide all stakeholders with information about the scope and function of assessment items. This document can also serve to assist educators to understand how assessment items are developed in alignment with the standards for English language arts and math. These item specifications for AzMERIT are intended to provide information regarding standards, item formats and response types. The descriptions of math practices, blueprints, and depth of knowledge in this document are meant to provide an overview of the test. Item specifications are meant for the purposes of assessment, not instruction. They are not intended to be tools for instruction or the basis for curricula. AzMERIT has a test blueprint that was developed by Arizona and is different from any other state or consortium test blueprint.

For the math portion of AzMERIT, all of the test questions are aligned to the mathematic content standards for these subject areas. Similarly, each item assesses a single domain and aligns to one or more of the eight Math Practices. Any item specifications that are absent for standards listed in this document may be under development. This document does not endorse the exclusion of the instruction of any grade-level content standards. The test will ask questions that check a student's conceptual understanding of math as well as their procedural skills. These items have been written to be free from bias and sensitivity, and widely vary in their degree of difficulty.

Item Development Process

AzMERIT items go through a rigorous review before they are operational. When an item is "operational" it means it is used to determine a student's score on the assessment. This is a description of the process every item must go through before it is operational on AzMERIT.

Sample tests are available online for the math portion of AzMERIT. For more information view the Guide to the Sample Tests at http://azmeritportal.org/.

Test Construction Guidelines

The construction of the AzMERIT assessment is guided by the depth and rigor of the Arizona College and Career Ready Standards. Items are created to address key components of the standards and assess a range of important skills. The AzMERIT Blueprint provides an overview of the distribution of items on the AzMERIT according to the standards. The standards for Math Practices are embedded within all AzMERIT items. Further, the AzMERIT blueprint outlines the Depth of Knowledge distribution of items.

Math Practices

The standards for Mathematical Practice highlight the knowledge, skills and abilities that should be developed in students at all grades. The Mathematical Practices are a part of each course description for Grades 3 through 8, Algebra I, Geometry, and Algebra 2. These practices are a vital part of the curriculum. These skills are often difficult to measure, and as a result, every item created for AzMERIT aligns to one or more of the following eight Mathematical Practices.

Math Practice (MP)	Description
Math Practice 1	**Make sense of problems and persevere in solving them.** Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

Math Practice (MP)	Description
Math Practice 2	**Reason abstractly and quantitatively**. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
Math Practice 3	**Construct viable arguments and critique the reasoning of others.** Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Math Practice (MP)	Description
Math Practice 4	**Model with mathematics.** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
Math Practice 5	**Use appropriate tools strategically.** Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

Math Practice (MP)	Description
Math Practice 6	**Attend to precision.** Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.
Math Practice 7	**Look for and make use of structure.** Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 – 3(x – y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
Math Practice 8	**Look for and express regularity in repeated reasoning.** Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Blueprint

The AzMERIT blueprints detail specific information in regard to the domains tested at each grade level. The blueprint outlines the percentage of points aligned to each domain.

Grade 5		
Domain	**Minimum**	**Maximum**
Measurement and Data & Geometry	24%	28%
Number and Operations - Fractions	31%	35%
Operations and Algebraic Thinking & Numbers in Base Ten	38%	42%

Approximately 70% of the assessment for Grade 5 will be on major content.

Depth of Knowledge (DOK)

DOK refers to the level of rigor or sophistication of the task in a given item, designed to reflect the complexity of the AzCCRS. Items at DOK level 1 focus on the recall of information, such as definitions, terms, and simple procedures. Items at DOK 2 require students to make decisions, solve problems, or recognize patterns; in general, they require a greater degree of engagement and cognitive processing than items at DOK 1. Items at DOK 3 feature higher-order cognitive tasks that assess students' capacities to approach abstract or complex problems.

Percentage of Points by Depth of Knowledge (DOK) Level			
Grade 5	DOK Level 1	DOK Level 2	DOK Level 3
	10% - 20%	60% - 70%	12% - 30%

For more information on DOK go to www.azed.gov/AzMERIT.

Calculators

No calculators are permitted for either the paper-based or computer-based assessment for Math Grade 5.

Item Formats

The AzMERIT Assessments are composed of item formats that include traditional multiple-choice response items and technology-enhanced response items (TEI). TEIs are computer-delivered response items that require students to interact with test content to select, construct, and/or support their responses. TEIs are better able to assess a deeper level of understanding.

Currently, there are nine types of TEIs that may appear on the Math Grade 5 computer based assessment for AzMERIT:

- Editing Tasks (ET)
- Editing Task Choice (ETC)
- Equation Editor (EQ)
- Graphic Response Item Display (GRID)
- Hot Text (HT)
    - Selectable Hot Text
    - Drag-and-Drop Hot Text
- Matching Item (MI)
- Multi-Select (MS)
- Open Response
- Table Item (TI)

For paper based assessments (including those for students with an IEP or 504 plan that specifies a paper based accommodation), TEIs will be modified so that they can be scanned and scored electronically or hand-scored.

See the table below for a description of each TEI. In addition, for examples of each response item format described, see the AzMERIT Training Tests at http://azmeritportal.org/.

Item Format	Description
Editing Task (ET)	The student clicks on a highlighted word or phrase that may be incorrect, which reveals a text box. The directions in the text box direct the student to replace the highlighted word or phrase with the correct word or phrase. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
Editing Task Choice (ETC)	The student clicks a highlighted word or phrase, which reveals a drop-down menu containing options for correcting an error as well as the highlighted word or phrase as it is shown in the sentence to indicate that no correction is needed. The student then selects the correct word or phrase from the drop-down menu. For paper-based assessments, the item is modified so that it can be scanned and scored electronically. The student fills in a circle to indicate the correct word or phrase.

Item Format	Description
Equation Editor (EQ)	The student is presented with a toolbar that includes a variety of mathematical symbols that can be used to create a response. Responses may be in the form of a number, variable, expression, or equation, as appropriate to the test item. For paper-based assessments, this item type may be replaced with a modified version of the item that can be scanned and scored electronically or replaced with another item type that assesses the same standard and can be scanned and scored electronically.
Graphic Response Item Display (GRID)	The student selects numbers, words, phrases, or images and uses the drag-and-drop feature to place them into a graphic. This item type may also require the student to use the point, line, or arrow tools to create a response on a graph. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
Hot Text (HT)	**Selectable Hot Text -** Excerpted sentences from the text are presented in this item type. When the student hovers over certain words, phrases, or sentences, the options highlight. This indicates that the text is selectable ("hot"). The student can then click on an option to select it. For paper- based assessments, a "selectable" hot text item is modified so that it can be scanned and scored electronically. In this version, the student fills in a circle to indicate a selection.
	Drag-and-Drop Hot Text - Certain numbers, words, phrases, or sentences may be designated "draggable" in this item type. When the student hovers over these areas, the text highlights. The student can then click on the option, hold down the mouse button, and drag it to a graphic or other format. For paper-based assessments, drag-and-drop hot text items will be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
Matching Item (MI)	The student checks a box to indicate if information from a column header matches information from a row. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.
Multi-Select (MS)	The student is directed to select all of the correct answers from among a number of options. These items are different from multiple-choice items, which allow the student to select only one correct answer. These items appear in the online and paper-based assessments.
Open Response	The student uses the keyboard to enter a response into a text field. These items can usually be answered in a sentence or two. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.

Item Format	Description
Table Item (TI)	The student types numeric values into a given table. The student may complete the entire table or portions of the table depending on what is being asked. For paper-based assessments, this item type may be replaced with another item type that assesses the same standard and can be scanned and scored electronically.

Arizona's College and Career Ready Standards (AzCCRS)

Geometry (G)

5.G.A – Graph points on the coordinate plane to solve real-world and mathematical problems.

5.G.B – Classify two-dimensional figures into categories based on their properties.

Measurement and Data (MD)

5.MD.A – Convert like measurement units within a given measurement system..

5.MD.B – Represent and interpret data.

5.MD.C – Geometric measurement: understand concepts of volume.

Numbers in Base Ten (NBT)

5.NBT.A – Use the place system.

5.NBT.B – Perform operations with multi-digit whole numbers and with decimals to hundredths.

Numbers and Operations – Fractions (NF)

5.NF.A – Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.B – Apply and extend previous understandings of multiplication and division.

Operations and Algebraic Thinking (OA)

5.OA.A – Write and interpret numerical expressions.

5.OA.B – Analyze patterns and relationships.

Grade 5 Math Item Specifications

Measurement and Data & Geometry

Content Standards	AzCCRS.Math.Content.5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).		
Explanations	None		
Content Limits	Whole numbers Use only points located in the first quadrant of the coordinate plane. Plotting points given the ordered pair is aligned to 5.G.2		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	4, 6, 7
Sample Task Demands		**Common Item Formats**	**Recommended Math Practices**
Students will be required to find the coordinates of a point based on its distance from the origin in the direction of the axes.		• Graphic Response • Multiple Choice Response • Multi-Select Response	4, 6, 7
Students will be required to plot a point based on its distance from the origin in the direction of the axes.			4, 6, 7

Content Standards	AzCCRS.Math.Content.5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.		
Explanations	None		
Content Limits	Whole numbers Use only points located in the first quadrant of the coordinate plane. Mathematical and real-world problems must have axes scaled to whole numbers (not letters).		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	1, 2, 4, 5, 6, 7

Sample Task Demands	Common Item Formats	Recommended Math Practices
Students will be required to find the coordinates of a point based on a graphed point in a coordinate plane.	• Graphic Response • Multiple Choice Response • Matching Item Response • Multi-Select Response	1, 5, 6, 7
Students will be required to plot points based on given coordinates.		1, 4, 5, 6, 7
Students will be required to plot points based on the relationship between their locations on the coordinate plane.		1, 2, 4, 5, 6, 7
Students will be required to identify how many units and which direction one point is from another point.		1, 2, 6, 7
Students will be required to interpret meaning of coordinate values within a context (axes indicate specific units).		2, 6, 7

Content Standards	AzCCRS.Math.Content.5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. AzCCRS.Math.Content.5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.		
Explanations	Geometric properties include properties of sides (parallel, perpendicular, congruent), properties of angles (type, measurement, congruent), and properties of symmetry (point and line). Properties of figure may include: Properties of sides - parallel, perpendicular, congruent, number of sides - or properties of angles - types of angles, congruent		
Content Limits	Focus should be on quadrilaterals, although other polygons can be included as well. There are two competing definitions for trapezoids - one that requires exactly one pair or parallel sides, and another that requires at least one pair of parallel sides (using this definition, parallelograms are trapezoids). Some students are taught one definition, others, the other. Thus, items that require the student to choose a definition in order to arrive at the correct answer should be avoided. Do not use Venn diagrams to represent hierarchy.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 3, 5, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to select shapes based on the attributes of a specific category.	• Graphic Response • Multiple Choice Response • Matching Item Response • Multi-Select Response	2, 6, 7
Students will be required to select attributes that categories share.		2, 6, 7
Students will be required to select shapes that can be treated the same way as shapes in an upper category.		2, 6, 7
Students will be required to show a hierarchy of shapes categorized by their attributes.		2, 5, 6, 7
Students will be required to select the categories a shape belongs to.		2, 5, 6, 7
Students will be required to select shapes belonging to a particular subcategory.		2, 5, 6, 7
Students will be required to support/refute statements about categorizing shapes.		2, 3, 6, 7

Content Standards	AzCCRS.Math.Content.5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.		
Explanations	In fifth grade, students build on their prior knowledge of related measurement units to determine equivalent measurements. Prior to making actual conversions, they examine the units to be converted, determine if the converted amount will be more or less units than the original unit, and explain their reasoning. They use several strategies to convert measurements. When converting metric measurement, students apply their understanding of place value and decimals.		
Content Limits	Measurement values can be whole, decimal, and/or fractional values. Conversion is within the same system. Units of measurement include: kilometer, meter, centimeter, millimeter, liter, milliliter, kilogram, gram, milligram, mile, yard, foot, inch, gallon, quart, pint, cup, ton, pound, and ounce.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	1, 2, 5, 6

Sample Task Demands	Common Item Formats	Recommended Math Practices
Students will be required to calculate a measurement conversion within a problem with no context.	• Equation Response • Multiple Choice Response • Multi-Select Response • Table Response	1, 2, 5, 6
Students will be required to solve a real world problem involving measurement conversions.		1, 2, 5, 6

Content Standards	AzCCRS.Math.Content.5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.		
Explanations	Students apply their understanding of operations with fractions. They use either addition and/or multiplication to determine the total number of liters in the beakers. Then the sum of the liters is shared evenly among the ten beakers.		
Content Limits	Measurement units are limited to halves, quarters, and eighths. Division is limited to a whole number divided by a unit fraction or a unit fraction divided by a whole number.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	1, 2, 4, 5, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to construct a line plot based on given data comprised of fractions.	• Equation Response • Graphic Response • Multiple Choice Response • Table Response	4, 5, 6, 7
Students will be required to interpret data in a line plot to solve problems involving addition, subtraction, multiplication, and division of fractions.		1, 2, 5, 6, 7
Students will be required to interpret data in a line plot to solve problems involving addition, subtraction, multiplication, and division of unit fractions, where information is not fully provided.		1, 2, 5, 6, 7

Content Standards	AzCCRS.Math.Content.5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. AzCCRS.Math.Content.5.MD.C.3a A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. AzCCRS.Math.Content.5.MD.C.3b A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. AzCCRS.Math.Content.5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
Explanations	Students' prior experiences with volume were restricted to liquid volume. As students develop their understanding volume they understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. This cube has a length of 1 unit, a width of 1 unit and a height of 1 unit and is called a cubic unit. This cubic unit is written with an exponent of 3 (e.g., in3, m3). Students connect this notation to their understanding of powers of 10 in our place value system. Models of cubic inches, centimeters, cubic feet, etc., are helpful in developing an image of a cubic unit. Student's estimate how many cubic yards would be needed to fill the classroom or how many cubic centimeters would be needed to fill a pencil box. Students understand that same sized cubic units are used to measure volume. They select appropriate units to measure volume. For example, they make a distinction between which units are more appropriate for measuring the volume of a gym and the volume of a box of books. They can also improvise a cubic unit using any unit as a length (e.g., the length of their pencil). Students can apply these ideas by filling containers with cubic units (wooden cubes) to find the volume. They may also use drawings or interactive computer software to simulate the same filling process.
Content Limits	Right rectangular prisms with whole-number side lengths Graphics include unit cube Labels can include cubic units (i.e. cubic centimeters, cubic feet, etc) or exponential units (i.e. cm3, ft3, etc.)
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.

Context	Context is allowed.	**Math Practices**	2, 4, 5, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to recognize volume as an attribute of solid figures. (3a, 3b)	• Equation Response • Multiple Choice Response • Matching Item Response • Multi-Select Response	2, 7
Students will be required to identify a unit cube as 1 cubic unit of volume. (3a)		2, 6, 7
Students will be required to recognize the use of n unit cubes packed in a solid figure to find the volume of that figure in n cubic units. (3b)		2, 4, 5, 6, 7

Students will be required to identify the volume of a rectangular prism by counting unit cubes, and compare volumes of multiple prisms. (4)		2, 4, 5, 6, 7

Content Standards	AzCCRS.Math.Content.5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. AzCCRS.Math.Content.5.MD.C.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. AzCCRS.Math.Content.5.MD.C.5b Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. AzCCRS.Math.Content.5.MD.C.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
Explanations	Students need multiple opportunities to measure volume by filling rectangular prisms with cubes and looking at the relationship between the total volume and the area of the base. They derive the volume formula (volume equals the area of the base times the height) and explore how this idea would apply to other prisms. Students use the associative property of multiplication and decomposition of numbers using factors to investigate rectangular prisms with a given number of cubic units.
Content Limits	Whole number side lengths Right rectangular prisms No more than two non-overlapping prisms - non-overlapping means that two prisms may share a face, but they do not share the same volume
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.

Context	Context is allowed.	**Math Practices**	1, 2, 3, 4, 5, 6, 7, 8

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to calculate the volume of a right rectangular prism when given the formula.	• Equation Response • Graphic Response • Multiple Choice Response • Matching Item Response • Multi-Select Response	1, 5, 6, 7
Students will be required to determine the volume of a right rectangular prism without the formula given.		1, 2, 5, 6, 7, 8
Students will be required to determine the dimensions of a right rectangular prism given the volume.		1, 2, 5, 6, 7, 8
Students will be required to compare volumes of rectangular prisms using the formula for volume.		1, 2, 4, 7, 8

Students will be required to show how to determine the volume of a solid composed of 2 non-overlapping rectangular prisms (e.g. by writing an expression with an unknown.)		2, 4, 7, 8
Students will be required to calculate the volume of a solid figure that is composed of 2 non-overlapping rectangular prisms.		1, 2, 6, 7
Students will be required to identify an additional volume needed to complete a larger volume.		1, 2, 3, 5, 6, 7

Numbers and Operations – Fractions

Content Standards	AzCCRS.Math.Content.5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.		
Explanations	Students should apply their understanding of equivalent fractions developed in fourth grade and their ability to rewrite fractions in an equivalent form to find common denominators. They should know that multiplying the denominators will always give a common denominator but may not result in the smallest denominator.		
Content Limits	Improper fractions and mixed numbers included. Least common denominator is not necessary to calculate sums of fractions. Do not use the terms "simplify" or "lowest terms". Denominators should be one-digit or two-digit.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 4, 7
Sample Task Demands		**Common Item Formats**	**Recommended Math Practices**
Students will be required to calculate the sum or difference of two or more fractions with unlike denominators.		• Equation Response • Multiple Choice Response	2, 4, 7

Content Standards	AzCCRS.Math.Content.5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.		
Explanations	Estimation skills include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of situations using various estimation strategies. Estimation strategies for calculations with fractions extend from students' work with whole number operations and can be supported through the use of physical models.		
Content Limits	Improper fractions and mixed numbers included. Least common denominator is not necessary to calculate sums of fractions. Do not use the terms "simplify" or "lowest terms".		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is required.	**Math Practices**	1, 2, 3, 4, 5, 6, 7, 8

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to calculate the sum or difference of two or more fractions with like and/or unlike denominators in a given word problem.	• Equation Response • Multiple Choice Response	1, 2, 5, 6, 7
Students will be required to determine a missing numerator or denominator in the addend, subtrahend, or minuend of an addition or subtraction problem with fractions in a given word problem.		1, 2, 5, 7, 8
Students will be required to use benchmark fractions to explain why an assertion is or is not reasonable.		2, 3, 4, 7, 8

Content Standards	AzCCRS.Math.Content.5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.		
Explanations	Students are expected to demonstrate their understanding using concrete materials, drawing models, and explaining their thinking when working with fractions in multiple contexts. They read 3/5 as "three fifths" and after many experiences with sharing problems, learn that 3/5 can also be interpreted as "3 divided by 5."		
Content Limits	Quotients in division problems should not be equivalent to a whole number. Only use whole numbers for the divisor and dividend of a fraction.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is required.	**Math Practices**	1, 2, 3, 4, 5, 7

Sample Task Demands	Common Item Formats	Recommended Math Practices
Students will be required to express a given division problem as a fraction.	• Equation Response • Multiple Choice Response • Table Response	1, 2, 4, 7
Students will be required to identify a given fraction as a division problem.		1, 2, 4, 7
Students will be required to find the solution to a division word problem and express the quotient as a fraction.		1, 2, 4, 5, 7
Students will be required to with or without context, determine the two consecutive whole numbers between which the answer lies in a given division problem.		1, 2, 4, 5, 7
Students will be required to identify an area model or number line model that shows the solution to a division word problem.		1, 2, 3, 4, 5, 7

Content Standards	AzCCRS.Math.Content.5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. AzCCRS.Math.Content.5.NF.B.4a Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. AzCCRS.Math.Content.5.NF.B.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths
Explanations	Students are expected to multiply fractions including proper fractions, improper fractions, and mixed numbers. They multiply fractions efficiently and accurately as well as solve problems in both contextual and non-contextual situations.
Content Limits	Multiply whole numbers by fractions or fractions by fractions Visual models Part a - any appropriate fraction model. (e.g. circles, tape, polygons, etc…) Part b - rectangle models only, tile with unit squares For tiling, the dimensions of the tile should be unit fractions with the same denominator as the given rectangular shape (see p. 13 of the progression document for demonstration) Problems do not require simplifying or lowest form.
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.

Context	Context is allowed.	**Math Practices**	1, 2, 3, 4, 5, 6, 7, 8

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to multiply a fraction by a whole number or a fraction.	• Equation Response • Graphic Response • Multiple Choice Response • Multi-Select Response	1, 5, 6, 7
Students will be required to relate a scenario that describes “a parts of a partition of q into b equal parts” to an expression of the form (a/b) x q and/or a x q ÷ b.		1, 2, 4, 5, 7, 8
Students will be required to tile a rectangular shape to find the area, either given the dimensions of the tile, or the dimensions of the shape.		1, 2, 4, 5, 6, 7
Students will be required to multiply length and width to find the area of a rectangular shape with fractional side lengths.		1, 2, 5, 6, 7
Students will be required to identify rectangular shape(s) with a given area, where the shapes have given side lengths or are tiled with tiles of given dimensions.		2, 3, 5, 7, 8

Content Standards	AzCCRS.Math.Content.5.NF.B.5 Interpret multiplication as scaling (resizing), by: AzCCRS.Math.Content.5.NF.B.5a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. AzCCRS.Math.Content.5.NF.B.5b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n ×a)/(n × b) to the effect of multiplying a/b by 1.		
Explanations	None		
Content Limits	Fractions greater than or equal to 0 Base numbers should be large and unwieldy to discourage students from calculating products Scaling is explored or demonstrated only in terms of quantity. Scaling geometric figures should not be assessed at this standard. Scaling quantities of any kind in 2 dimensions is strictly beyond the scope of this standard.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	2, 4, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to identify a statement comparing the value of a given multiplication expression to one of its factors.	• Multiple Choice Response • Multi-Select Response	2, 4, 6, 7
Students will be required to identify an expression that represents a given statement comparing a product to one of its factors.		2, 4, 6, 7
Students will be required to identify expressions that have a value less than or greater than a given number, where the expressions are that number multiplied by another number.		2, 4, 6, 7
Students will be required to identify a possible factor of a given expression, given one factor and a comparison of the value of the product to that factor.		2, 4, 6, 7
Students will be required to identify an expression that is equivalent to multiplying a given number by 1.		2, 4, 6, 7

<table>
<tr><td>Content Standards</td><td colspan="3">AzCCRS.Math.Content.5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.</td></tr>
<tr><td>Explanations</td><td colspan="3">None</td></tr>
<tr><td>Content Limits</td><td colspan="3">Items should require student to interpret the context to determine operations.</td></tr>
<tr><td>Common Item Formats</td><td colspan="3">The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.</td></tr>
<tr><td>Context</td><td>Context is required.</td><td>Math Practices</td><td>1, 2, 3, 4, 5, 6, 7, 8</td></tr>
<tr><td colspan="2">Sample Task Demands</td><td>Common Item Formats</td><td>Recommended Math Practices</td></tr>
<tr><td colspan="2">Students will be required to solve simple word problems involving multiplication of fractions .(i.e., multiplying two given values)</td><td rowspan="2">• Equation Response
• Multiple Choice Response</td><td>1, 2, 4, 5, 6, 7, 8</td></tr>
<tr><td colspan="2">Students will be required to solve complex word problems involving multiplication of fractions (e.g., multiplying three numbers, involving other operations, finding an unknown. (numerator, denominator, etc.)</td><td>1, 2, 3, 4, 5, 6, 7, 8</td></tr>
</table>

Content Standards	AzCCRS.Math.Content.5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. AzCCRS.Math.Content.5.NF.B.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. AzCCRS.Math.Content.5.NF.B.7b Interpret division of a whole number by a unit fraction, and compute such quotients. AzCCRS.Math.Content.5.NF.B.7c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.
Explanations	In fifth grade, students experience division problems with whole number divisors and unit fraction dividends (fractions with a numerator of 1) or with unit fraction divisors and whole number dividends. Students extend their understanding of the meaning of fractions, how many unit fractions are in a whole, and their understanding of multiplication and division as involving equal groups or shares and the number of objects in each group/share. In sixth grade, they will use this foundational understanding to divide into and by more complex fractions and develop abstract methods of dividing by fractions.
Content Limits	All problems should have either: A) Division of unit fractions by a non-zero whole number, or B) Division of a non-zero whole number by a unit fraction
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.

Context	Context is required.	**Math Practices**	1, 2, 3, 4, 5, 6, 7, 8

Sample Task Demands	Common Item Formats	Recommended Math Practices
Students will be required to divide a fraction by a whole number.	• Equation Response • Graphic Response • Multiple Choice Response	1, 2, 4, 5, 6, 7
Students will be required to divide a whole number by a fraction.		1, 2, 4, 5, 6, 7
Students will be required to select a division expression that represents the scenario of a given division problem.		1, 2, 4, 5, 7, 8
Students will be required to select an equivalent multiplication equation for a given division equation.		1, 2, 4, 5, 7, 8
Students will be required to solve a simple word problem that involves division, a whole number, and a fraction.		1, 2, 5, 6, 7, 8
Students will be required to solve a simple word problem that involves division, and justify the solution using an equation or number line.		1, 2, 3, 5, 6, 7, 8

Operations and Algebraic Thinking & Numbers in Base Ten

Content Standards	AzCCRS.Math.Content.5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.		
Explanations	In fourth grade, students examined the relationships of the digits in numbers for whole numbers only. This standard extends this understanding to the relationship of decimal fractions. Students use base ten blocks, pictures of base ten blocks, and interactive images of base ten blocks to manipulate and investigate the place value relationships. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons. Before considering the relationship of decimal fractions, students express their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left.		
Content Limits	Whole numbers to any place value and decimals to thousandths		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to identify the factor by which one number is greater or less than another.	• Equation Response • Multiple Choice Response	2, 6, 7
Students will be required to compare the value of a digit in different place values of two given numbers and identify the power of 10 by which one number is greater than another.		2, 6, 7

Content Standards	AzCCRS.Math.Content.5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.		
Explanations	None		
Content Limits	Whole number exponents with a base of 10. Decimals to thousandths.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to calculate a power of 10.	• Equation Response • Multiple Choice Response • Multi-Select Response	2, 6, 7
Students will be required to multiply or divide a decimal by a power of ten.		2, 6, 7
Students will be required to find a missing exponent when multiplying or dividing a decimal by a power of ten.		2, 6, 7
Students will be required to identify patterns when multiplying or dividing by a power of 10.		2, 6, 7

Content Standards	AzCCRS.Math.Content.5.NBT.A.3 Read, write, and compare decimals to thousandths. AzCCRS.Math.Content.5.NBT.A.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 +7 x 1 +3 x (1/10) + 9 x (1/100) +2 (1/1000). AzCCRS.Math.Content.5.NBT.A.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.		
Explanations	Students build on the understanding they developed in fourth grade to read, write, and compare decimals to thousandths. They connect their prior experiences with using decimal notation for fractions and addition of fractions with denominators of 10 and 100. They use concrete models and number lines to extend this understanding to decimals to the thousandths. Models may include base ten blocks, place value charts, grids, pictures, drawings, manipulatives, technology-based, etc. They read decimals using fractional language and write decimals in fractional form, as well as in expanded notation as show in the standard 3a. This investigation leads them to understanding equivalence of decimals (0.8 = 0.80 = 0.800). Students need to understand the size of decimal numbers and relate them to common benchmarks such as 0, 0.5 (0.50 and 0.500), and 1. Comparing tenths to tenths, hundredths to hundredths, and thousandths to thousandths is simplified if students use their understanding of fractions to compare decimals.		
Content Limits	Decimals to thousandths		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	2, 4, 5, 6, 7

Sample Task Demands	Common Item Formats	Recommended Math Practices
Students will be required to write a number with a given name in numeric form.	• Equation Response • Graphic Response • Multiple Choice Response • Matching Item Response • Multi-Select Response	2, 7
Students will be required to identify the name of a given number.		2, 7
Students will be required to write a number given in traditional expanded form in numeric form or vice versa.		2, 4, 5, 7
Students will be required to compare two decimals.		2, 4, 5, 6, 7
Students will be required to order more than two decimals in numeric form.		2, 4, 5, 6, 7
Students will be required to identify numbers in non-traditional expanded form (e.g., 47.389 = 9 × (1/1000) + 7 × 1 + 3 × (1/10) + 4 × 10 + 8 x (1/100)).		2, 4, 5, 6, 7

Content Standards	AzCCRS.Math.Content.5.NBT.A.4 Use place value understanding to round decimals to any place.		
Explanations	When rounding a decimal to a given place, students may identify the two possible answers, and use their understanding of place value to compare the given number to the possible answers.		
Content Limits	Decimals to thousandths		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 6, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to identify the value of a decimal number rounded to a place value.	• Equation Response • Multiple Choice Response • Matching Item Response • Multi-Select Response • Table Response	2, 6, 7
Students will be required to identify the decimal numbers that round to a given value.		2, 6, 7
Students will be required to distinguish between different rounding procedures used in order to create a number that fits certain parameters.		2, 6, 7

<table>
<tr><td>Content Standards</td><td colspan="3">AzCCRS.Math.Content.5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.</td></tr>
<tr><td>Explanations</td><td colspan="3">In prior grades, students used various strategies to multiply. Students can continue to use these different strategies as long as they are efficient, but must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value.</td></tr>
<tr><td>Content Limits</td><td colspan="3">Multiplication should not exceed 5 digits by 2 digits</td></tr>
<tr><td>Common Item Formats</td><td colspan="3">The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.</td></tr>
<tr><td>Context</td><td>Context is not allowed.</td><td>Math Practices</td><td>2, 6, 7, 8</td></tr>
<tr><td colspan="2">Sample Task Demands</td><td>Common Item Formats</td><td>Recommended Math Practices</td></tr>
<tr><td colspan="2">Students will be required to calculate the product of two numbers.</td><td rowspan="2">• Equation Response</td><td>2, 6, 7</td></tr>
<tr><td colspan="2">Students will be required to identify a missing factor or digit in a multiplication problem.</td><td>2, 7, 8</td></tr>
</table>

Content Standards	AzCCRS.Math.Content.5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.		
Explanations	In fourth grade, students' experiences with division were limited to dividing by one-digit divisors. This standard extends students' prior experiences with strategies, illustrations, and explanations. When the two-digit divisor is a "familiar" number, a student might decompose the dividend using place value.		
Content Limits	Only 3-digit or 4-digit dividend and 2-digit divisor		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	2, 3, 4, 5, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to calculate the quotient of 2 numbers.	• Equation Response • Graphic Response • Multiple Choice Response • Multi-Select Response	2, 6, 7
Students will be required to select expressions that are equivalent to a given quotient.		2, 7, 8
Students will be required to illustrate and explain quotients of 2 numbers using equations, rectangular arrays, or area models.		2, 7, 8

<table>
<tr><td>Content Standards</td><td colspan="3">AzCCRS.Math.Content.5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.</td></tr>
<tr><td>Explanations</td><td colspan="3">This standard requires students to extend the models and strategies they developed for whole numbers in grades 1-4 to decimal values. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers.

Students should be able to express that when they add decimals they add tenths to tenths and hundredths to hundredths. So, when they are adding in a vertical format (numbers beneath each other), it is important that they write numbers with the same place value beneath each other. This understanding can be reinforced by connecting addition of decimals to their understanding of addition of fractions. Adding fractions with denominators of 10 and 100 is a standard in fourth grade.</td></tr>
<tr><td>Content Limits</td><td colspan="3">Decimals within hundredths place in all numbers involved (divisors, dividends, quotients and likewise for other operations)</td></tr>
<tr><td>Common Item Formats</td><td colspan="3">The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.</td></tr>
<tr><td>Context</td><td>Context is allowed.</td><td>Math Practices</td><td>2, 3, 4, 5, 7</td></tr>
<tr><td colspan="2">Sample Task Demands</td><td>Common Item Formats</td><td>Recommended Math Practices</td></tr>
<tr><td colspan="2">Students will be required to perform a calculation involving decimals.</td><td rowspan="2">• Equation Response
• Multi-Select Response</td><td>2, 5, 7</td></tr>
<tr><td colspan="2">Students will be required to solve a problem involving decimals and the four operations given a scenario.</td><td>2, 3, 4, 5, 7</td></tr>
</table>

Content Standards	AzCCRS.Math.Content.5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.		
Explanations	This standard builds on the expectations of third grade where students are expected to start learning the conventional order. Students need experiences with multiple expressions that use grouping symbols throughout the year to develop understanding of when and how to use parentheses, brackets, and braces. First, students use these symbols with whole numbers. Then the symbols can be used as students add, subtract, multiply and divide decimals and fractions. To further develop students' understanding of grouping symbols and facility with operations, students place grouping symbols in equations to make the equations true or they compare expressions that are grouped differently.		
Content Limits	Whole numbers & simple fraction expressions (single digit denominators, fraction multiplied by a whole number) Do not use nested grouping symbols (based on the progressions document for K-5 operations and algebraic thinking) Expressions should not be more complex than those used in associative or distributive property situations.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is not allowed.	**Math Practices**	1, 5, 8

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to evaluate a numerical expression with parentheses.	• Equation Response • Graphic Response • Multiple Choice Response • Multi-Select Response	1, 5, 8
Students will be required to rewrite a given numerical expression with parentheses, brackets and/or braces (by inserting these grouping symbols) such that the expression evaluates to a given answer.		1, 5, 8
Students will be required to identify a calculation error when evaluating a numerical expression.		1, 5, 8

<table>
<tr><td>Content Standards</td><td colspan="3">AzCCRS.Math.Content.5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td></tr>
<tr><td>Explanations</td><td colspan="3">Students use their understanding of operations and grouping symbols to write expressions and interpret the meaning of a numerical expression.</td></tr>
<tr><td>Content Limits</td><td colspan="3">Whole numbers
Simple fraction expressions
Do not use nested parentheses
Use numeric expressions only.
Multiplication cross symbol is the only acceptable symbol for multiplication. Do not use the c-dot.
When grouping symbols are part of the expression, the associative property or distributive property should be found in that expression.</td></tr>
<tr><td>Common Item Formats</td><td colspan="3">The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.</td></tr>
<tr><td>Context</td><td>Context is not allowed.</td><td>Math Practices</td><td>1, 2, 7, 8</td></tr>
<tr><td colspan="2">Sample Task Demands</td><td>Common Item Formats</td><td>Recommended Math Practices</td></tr>
<tr><td colspan="2">Students will be required to construct a numeric expression given a written statement of numerical values.</td><td rowspan="2">• Equation Response
• Multiple Choice Response
• Proposition Response</td><td>1, 2, 7, 8</td></tr>
<tr><td colspan="2">Students will be required to interpret the meaning of a written numerical statement without evaluating it.</td><td>2, 7, 8</td></tr>
</table>

Content Standards	AzCCRS.Math.Content.5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.		
Explanations	None		
Content Limits	Whole numbers & fractions with denominators less than 10 Quadrant I on coordinate plane Acceptable operations: addition, subtraction, multiplication, and division The rule should be no more complex than one finds in an application of the associative or distributive property. Examples should not contain nested grouping symbols.		
Common Item Formats	The Item Formats section on pages 10 through 12 provides a list of item formats that may be used to assess this standard. The common item formats include but are not limited to those shown with the sample task demands.		
Context	Context is allowed.	**Math Practices**	2, 7

Sample Task Demands	**Common Item Formats**	**Recommended Math Practices**
Students will be required to find terms of two numerical patterns given rules, including forming ordered pairs determined by the pattern.	• Equation Response • Graphic Response • Multiple Choice Response • Multi-Select Response • Table Response	2, 7
Students will be required to identify specific relationships between terms of two numerical patterns (term when the sequences are equal, where one is twice the other, etc.)		2, 7
Students will be required to graph ordered pairs corresponding to terms in two numerical patterns in a coordinate plane.		2, 7
Students will be required to identify relationships between two numerical patterns		2, 7