Grade 5 – Mathematics Standards and Guidance

5.OA - Algebraic Reasoning: Operations

CLUSTER: 5.OA.A - Write and interpret numerical expressions.

STANDARD: 5.OA.A.1

Standards Statement (JUNE 2021):

Write and evaluate simple numerical expressions that include parentheses.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- The expressions should be no more complex than the expressions one finds in a simple application of the associative and distributive properties.
- Simple expressions should only include two operations.
- Grouping symbols used in expressions may include parentheses, brackets, or braces.

Teaching Strategies

- Use of nested parentheses should be used in favor of brackets or braces in numerical expressions.
- Students should begin with concrete models. Concrete models may include color tiles or base ten blocks for constructing area models and rods for representing numerical values.

Example

- Express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7).
- If this expression were tripled, then it could represented as 3 x (2 × (8 + 7)), where the number of open parentheses is the same as the number of closed parentheses.
- Karl brought 3 ten-packs of juice boxes to the class party. Joshua brought 4 six-packs of soda to the party. How many drinks did they bring altogether?
    - (3 × 10) + (4 × 6)

STANDARD: 5.OA.A.2

Standards Statement (JUNE 2021):

Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- The expressions should be no more complex than the expressions one finds in a simple application of the associative and distributive properties.
- Simple expressions should only include two operations.
- Grouping symbols used in expressions may include parentheses, brackets, or braces.
- Nested grouping symbols (more than one grouping symbol used within another grouping symbol in an expression) could also be used within expressions at this grade level.

Teaching Strategies

- Expressions included should contain numbers, operations, and grouping symbols.
- Students should begin with concrete models. Concrete models may include color tiles or base ten blocks for constructing area models and rods for representing numerical values.

Example

- Recognize that 3 × (18,932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
- Karl brought 3 ten-packs of juice boxes to the class party. Joshua brought 4 six-packs of soda to the party. How many drinks did they bring altogether?
    - (3 × 10) + (4 × 6)
- Express the calculation “Add 8 and 7, then multiply by 2” as 2×(8+7). Recognize that 12×(7+91) is twelve times as large as 7+91, without having to calculate the indicated sum or product.

CLUSTER: 5.OA.B - Analyze patterns and relationships.

STANDARD: 5.OA.B.3

Standards Statement (JUNE 2021):

Generate two numerical patterns using two given rules. Identify and analyze relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns and graph them on a coordinate plane.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- This standard extends the work from fourth grade, where students generate numerical patterns when they are given one rule. In Fifth Grade, students are given two rules and generate two numerical patterns.

Boundaries

- Generating numerical patterns is a fourth grade standard, therefore is also an expectation for 5th grade.
- This learning objective is limited to patterns involving whole numbers.

Example

- Given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences.
    - Identify and explain why the terms in one sequence are twice the value of the terms in the corresponding sequence.
- Sam and Terri live by a lake and enjoy going fishing together every day for five days. Sam catches 2 fish every day, and Terri catches 4 fish every day. Make a chart (table) to represent the number of fish that Sam and Terri catch.

5.NBT - Numeric Reasoning: Base Ten Arithmetic

CLUSTER: 5.NBT.A - Understand the place value system.

STANDARD: 5.NBT.A.1

Standards Statement (JUNE 2021):

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.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should identify the value of a digit up 100 times greater or 11000 of the value of a digit.
- Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Examples

- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
    - For example, 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
    - 700 is 10 times as much as 70, and 70 is 1/10 of 700.
- Mara has a digital scale. He placed one playing card on the scale and it read 1.3 grams. How much would you expect 10 playing cards to weigh?
- Chris took the cards off the scale and then placed 10 pennies on the scale and the scale read 24 grams. How much would you expect one penny to weigh.

STANDARD: 5.NBT.A.2

Standards Statement (JUNE 2021):

Use whole number exponents to denote powers of 10 and explain the patterns in placement of digits that occur when multiplying and/or dividing whole numbers and decimals by powers of 10.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should explain what happens to the value of a digit as it shifts to the left or right and discover the decimal point remains between the ones and tenths place as the digits shift.
- Use whole-number exponents to denote powers of 10, up to 10^3.

Content Boundaries

- Work with exponents at this grade is limited to powers of 10.

Example

- Observe and explain the patterns in the number of zeros of a product when multiplying a whole number by a power of 10, and the placement of the decimal point when a decimal is multiplied or divided by a power of 10.

STANDARD: 5.NBT.A.3

Standards Statement (JUNE 2021):

Read, write, and compare decimals to thousandths.

DRAFT Standards Guidance (JUNE 2021):

Clarification

- Read and write decimals to thousandths using standard form, expanded form, and word from.
- Compare two decimals to thousandths based on meanings of the digits in each place, and record the results of the comparisons using >,=, and <.

Boundaries

- Students should be provided opportunities to simultaneously compare decimals and fractions, including equivalent fractions and decimals, on both single and double number lines.
- Base-ten numerals should range between millions and thousandths.
- Students are not expected to write decimal numbers in word form.
- Exponents and decimal numbers should not be included in expanded form notation.
- The decimal fractions used in Grade 5 should be limited to those for which the equivalent fraction can be written as a fraction where the denominator is a power of ten.

Teaching Strategies

- Students should be presented with decimal number comparisons from contextual, mathematical situations.
- Students should have opportunities to determine and explain comparisons using a variety of tools such as concrete materials, drawings, number lines, other visual representations, and strategies.

Example

- Use >, =, and < symbols to record comparisons of two decimals. For example:
    - 347.392 =
    - = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
    - =three hundred forty-seven and three hundred ninety-two thousandths
- 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (110) + 9 × (1100) + 2 × (11000)
- Which is greater 0.13 or 0.031? Explain. Use a visual representation to illustrate your explanation.
    - I think 0.13 is greater because it fills up more of the whole square than 0.031 does.

STANDARD: 5.NBT.A.4

Standards Statement (JUNE 2021):

Use place value understanding to round decimals to any place.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- Work with decimals at this grade is limited to decimals up to the thousandths.

Teaching Strategies

- Students should round decimal numbers to the hundredths place in contextual, mathematical problems using visual aids, such as a number line.

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

STANDARD: 5.NBT.B.5

Standards Statement (JUNE 2021):

Fluently multiply multi-digit whole numbers using accurate, efficient, and flexible strategies and algorithms based on place value and properties of operations.

DRAFT Standards Guidance (JUNE 2021):

Terminology

- The National Council of Teachers of Mathematics provides the following definition of procedural fluency:
    - "Procedural fluency is the ability to apply procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate to apply than another.

Boundaries

- Students may use but are not limited to partial products (area model).
- Students may also use a standard algorithm by making connections from previous part-whole strategies.
- Students should choose a strategy that makes sense to them based on the context of the problem. The focus should always be on efficiency.

Teaching Strategies

- Students should be presented with contextual, real-life situations involving multiplication of multi-digit whole numbers.
- Students should fluently (flexibly, accurately, and efficiently) multiply to solve contextual, mathematical problems using efficient strategies that are based on knowledge of place value and properties of operations.
- Examples of different strategies and representations can be found within the Computational Strategies for Whole Numbers document found in the appendices.

STANDARD: 5.NBT.B.6

Standards Statement (JUNE 2021):

Use a variety of representations and strategies to find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.

DRAFT Standards Guidance (JUNE 2021):

Clarification

- Use 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

Boundaries

- Students should divide multi-digit whole numbers up to 4- digit dividends and 2-digit divisors no greater than 25.
- Students may use but are not limited to partial quotients (area model).
- Students should choose a strategy that makes sense to them based on the context of the problem. The focus should always be on efficiency.

Teaching Strategies

- Students should be presented with contextual, real-life situations involving the division of multi-digit whole numbers.
- Students should fluently (flexibly, accurately, and efficiently) divide, to solve contextual, mathematical problems using an efficient algorithm and flexible strategies, based on knowledge of place value and properties of operations.
- Examples of different strategies and representations can be found within the Computational Strategies for Whole Numbers document found in the appendices.

STANDARD: 5.NBT.B.7

Standards Statement (JUNE 2021):

Use a variety of representations and strategies to add, subtract, multiply, and divide decimals to hundredths. Relate the strategy to a written method and explain the reasoning used.

DRAFT Standards Guidance (JUNE 2021):

Clarification

- As part of this standard, students must be able to use concrete models, visual drawings and strategies based on place value, properties of operations, and the relationship between addition and subtraction.

Boundaries

- Fluency with operations with decimals is part of the 6th grade standards.
- Students should be given the choice of which strategy they can use.

Teaching Strategies

- Students should be presented with a variety of contextual, real-life situations involving addition and subtraction of decimal numbers to the hundredths place.
- Students should add and subtract decimal numbers to hundredths, using concrete models, drawings, strategies based on place value, properties of operations, and the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

5.NF - Numeric Reasoning: Fractions

CLUSTER: 5.NF.A - Use equivalent fractions as a strategy to add and subtract fractions.

STANDARD: 5.NF.A.1

Standards Statement (JUNE 2021):

Add and subtract fractions with unlike denominators, including common fractions larger than one and mixed numbers.

DRAFT Standards Guidance (JUNE 2021):

Terminology

- A common fraction is a fraction in which numerator and denominator are both integers, as opposed to fractions. Fractions such as 4/3, or 14/5 should be thought of as common fractions greater than one, which could also be written using mixed numbers as 1-1/3 and 2-4/5 respectively.
- Use of the term "improper fraction" should be avoided.

Boundaries

- Work with fractions at grade 5 should focus on fractions with denominators 2-10, 12, 16, 20, 25, 50, 100 and 1000.

Example

- Include replacing given fractions with equivalent fractions to produce an equivalent sum or difference.
    - 2/3 + 5/4 = 8/12 + 15/12 = 23/12 or 1 11/12.

STANDARD: 5.NF.A.2

Standards Statement (JUNE 2021):

Solve problems in authentic contexts involving addition and subtraction of fractions with unlike denominators, including common fractions larger than one and mixed numbers.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Use visual fraction models or equations to represent the problem.
- Use benchmark fractions and number sense of fractions to estimate and assess the reasonableness of answers.
- Students should use benchmark fractions and number sense of fractions to estimate and assess the reasonableness of answers as an introduction to addition and subtraction.

Boundaries

- Work with fractions at grade 5 should focus on fractions with denominators 2-10, 12, 16, 25, 100 and 1000.

Teaching Strategies

- Students should use numerical reasoning to add and subtract fractions and mixed numbers with unlike denominators in contextual, mathematical problems by finding a common denominator and equivalent fractions to produce like denominators using a variety of tools and strategies.

Example

- Tom is baking a cake. He added 12 teaspoon of vanilla extract to the cake mix. He tasted the batter and determined he needed more, so he added another 34 teaspoon of vanilla extract. How much total vanilla extract did he add to the cake mix?
- Possible student response: A student may decompose one of the fractions to a make a benchmark number (12):
    - 1/2 + 3/4
    - = 1/2 + (2/4 + 1/4)
    - = (1/2 + 2/4) + 1/4
    - = 1 ¼

CLUSTER: 5.NF.B - Apply and extend previous understandings of multiplication and division.

STANDARD: 5.NF.B.3

Standards Statement (JUNE 2021):

Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve problems in authentic contexts involving division of whole numbers that result in answers that are common fractions or mixed numbers.

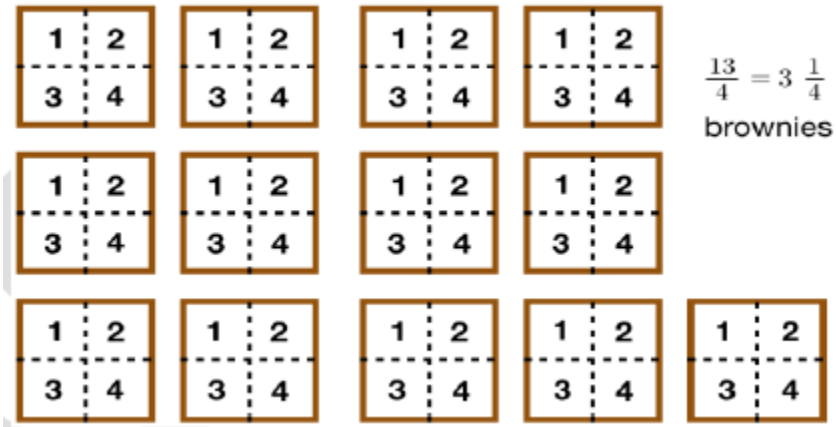
DRAFT Standards Guidance (JUNE 2021):

Boundaries

- As part of this standard, students should have opportunities to use visual models or equations to represent and solve problems.

Example

- If 3 cookies are shared equally among 4 people each person receives ¾ of a cookie.
    - Sample Tasks:
    - If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get?
    - Between what two whole numbers does your answer lie?
- Four children want to share 13 brownies so each child gets the same amount. How many does each child get? Possible solution:



STANDARD: 5.NF.B.4

Standards Statement (JUNE 2021):

Apply and extend previous understanding and strategies of multiplication to multiply a fraction or whole number by a fraction. Multiply fractional side lengths to find areas of rectangles, and represent fractional products as rectangular areas.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- Students should explain the meaning of a fraction ab as a multiple of $1b$.
- Students should be exposed to fractions less than 1, equal to 1, and greater than 1.

Teaching Strategies

- Interpret the product of the fraction a/b and a whole number (q) as
    - partitioning the whole number into b parts and counting a parts
    - Repeating the fraction a/b q number of times.
- 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
- Students should be presented with a variety of real-life, mathematical problems involving multiplication of a fraction and a whole number.
- Students should use their understanding of equivalency to flexibly reason with equivalent fractions based on the context of the problem. Simplifying fractions is not an expectation of this grade level.

Examples

- Understand that ⅔ x 4 can be seen as partitioning 4 into 3 equal parts as well as counting 2 of the 3 (4/3 x 2) parts or as iterating ⅔ four times [(2 x 4)/3]. In general, a/b x q = q/b x a = (a x q)/b.
- Use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15.
- Each cupcake takes 14 cup of frosting. If Betty wants to make 20 cupcakes for a party, how much frosting will she need?
- Mr. Rogers need to make peanut butter and jelly sandwiches for 12 children. He wants to make 34 of a sandwich for each child. How many sandwiches does he need to make?

STANDARD: 5.NF.B.5

Standards Statement (JUNE 2021):

Apply and extend previous understandings of multiplication and division to represent and calculate multiplication and division of fractions. Interpret multiplication as scaling (resizing) by comparing the size of products of two factors.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- As part of this standard, students must be able to
    - 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.
    - Explain that multiplying a given number by a fraction greater than 1 results in a product greater than the given number.
    - Explain that multiplying a given number by a fraction equivalent to 1 (such as 4/4) results in the same product as multiplying by 1.
    - Explain that multiplying a given number by a fraction less than 1 results in a product smaller than the given number.

Teaching Strategies

- Students should be presented with a variety of real-life, mathematical situations involving multiplication as scaling (resizing) that include fractions and whole numbers.

Example

- Mrs. Cole needs to make lunch for 12 children at a day care. Each child gets 1/2 of a sandwich. How many whole sandwiches does Mrs. Cole need to make? NOTE: The student should be able to recognize that the solution to 12 x 1/2 will be less than 12 because each child only gets half of a sandwich.

STANDARD: 5.NF.B.6

Standards Statement (JUNE 2021):

Solve problems in authentic contexts involving multiplication of common fractions and mixed numbers.

DRAFT Standards Guidance (JUNE 2021):

Teaching Strategies

- Students should be given opportunities to use both visual fraction models and equations to represent and solve problems.
- Students should be given opportunities to use both visual fraction models and equations to represent and solve problems.

Connections

- Solve applied problems involving multiplication of fractions and mixed numbers by using visual fraction models and/or equations to represent the problem.

STANDARD: 5.NF.B.7

Standards Statement (JAN 2021):

Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions, including solving problems in authentic contexts.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- Division of a fraction by a fraction is not a requirement at this grade. However, students who are able to multiply fractions can develop strategies to divide a fraction by a fraction by reasoning about the relationship between multiplication and division.

Teaching Strategies

- Students should be given opportunities to use both visual fraction models and equations to represent and solve problems.
- Students should begin with modeling for deeper understanding.
- Students should be presented with a variety of contextual, real-life problems involving division of a whole number by a unit fraction and division of a unit fraction by a whole number.

Example

- Create a story context for (1/3) ÷ 4 and use a visual fraction model to show the quotient.
- Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.
- Create a story context for 4 ÷ (1/5) and use a visual fraction model to show the quotient.
- Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.
- How much chocolate will each person get if 3 people share ½ lb of chocolate equally?
- How many ⅓-cup servings are in 2 cups of raisins?
- Knowing the number of groups/shares and finding how many/much in each group/share Four students sitting at a table were given 1/3 of a pan of brownies to share. How much of a pan will each student get if they share the pan of brownies equally? The diagram shows the 1/3 pan divided into 4 equal shares with each share equaling 1/12 of the pan.

5.GM - Geometric Reasoning and Measurement

CLUSTER: 5.GM.A. - Graph points on the coordinate plane to solve real-world and mathematical problems.

STANDARD: 5.GM.A.1

Standards Statement (JUNE 2021):

Graph and name coordinate points in the first quadrant using the standard x, y notation. Understand the coordinate points values represent the distance traveled along the horizontal x-axis and vertical y-axis.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- This is students first formalized introduction to the conventions of coordinate graphing:
    - The first number indicates the distance from the origin on the x-axis.
    - The second number indicates the distance from the origin on the y-axis.
    - The names of the two axes and coordinates (or ordered pairs) correspond (x-axis and x-coordinate, y-axis and y-coordinate).
- In addition to whole numbers, ordered pairs should include the decimal and fractional values of halves and fourths.

Boundaries

- Graphing beyond the first quadrant is not a requirement at this grade.
- All four quadrants of the coordinate plane can be displayed, but students will only plot and label within the first quadrant.

Teaching Strategies

- Students should be provided with a variety of real-life, mathematical problems involving graphing points in the first quadrant.
- Students should interpret coordinate values of points in the context of the problem or situation.

STANDARD: 5.GM.A.2

Standards Statement (JUNE 2021):

Represent authentic contexts and mathematical problems by graphing points in the first quadrant of the coordinate plane. Interpret the meaning of the coordinate values based on the context of a given situation.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should be given ample experience with organizing, representing, and analyzing data from real-life contexts.
- Data should not be limited to numerical data collected from linear measurements.
- Students should continue to create dot plots (line plots)
- 1 1 1
- with measurements in fractions of a unit (, ,).
- 2 4 8

Terminology

- Distribution refers to how the data is spread across the graph.
- Dot plots and line plots can be used interchangeably.
- Dot plots should be used for numerical data representation on a number line.
- Numerical data is data that expressed in numbers rather than natural language. An example of numerical data that could be collected is the number of people who attended the movie theater over the course of a month.
- Categorical data is a type of data that is used to group information with similar characteristics. Examples of categorical data that could be collected might be marital status, favorite sport, or favorite type of movie.

Examples

- The coordinate (1,1.5) or (1,1½) means that in the first year, a person grew 1.5 or 1 ½ inches.
- Numerical variable(s): number of pets; categorical variable(s): type of pets, (e.g., cats, dogs, hamsters)"

CLUSTER: 5.GM.B. - Classify two-dimensional figures into categories based on their properties.

STANDARD: 5.GM.B.3

Standards Statement (JUNE 2021):

Classify two-dimensional figures within a hierarchy based on their geometrical properties, and explain the relationship across and within different categories of these figures.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should explore, compare, and contrast polygons based on properties.
- Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

Boundaries

- This objective does not require students to create a hierarchy.
- In Georgia resources and assessments, the inclusive definitions for the classification of shapes are used.

Teaching Strategies

- Polygons should include triangles, quadrilaterals including kites and trapezoids (rectangles, squares, rhombuses, and other parallelograms), pentagons, hexagons, and octagons.
- Properties may include angles, side lengths, symmetry, congruence, and the presence or absence of parallel or perpendicular lines.

Example

- Explain that since all rectangles have four right angles, and squares are rectangles, then all squares have four right angles. Explain that parallelograms and trapezoids are both quadrilaterals, and both have at least one set of parallel sides, but that they differ in that trapezoids have exactly one set and parallelograms have exactly two sets.
- All rectangles have four right angles and squares are rectangles, so all squares have four right angles.

CLUSTER: 5.GM.C - Convert like measurement units within a given measurement system.

STANDARD: 5.GM.C.4

Standards Statement (JUNE 2021):

Convert between different-sized standard measurement units within a given measurement system. Use these conversions in solving multi-step problems in authentic contexts.

DRAFT Standards Guidance (JUNE 2021):

Boundaries

- Fifth grade is the first time students are expected to convert between different units within the same measurement system.
- Conversion chart should be provided.
- Students should be presented with contextual problems involving distance, weight, volume, and time that are practical and relevant to their everyday lives.
- Students should have opportunities to solve problems involving conversions within both metric and customary systems
    - Customary measurement units include weight (oz., lbs., tons) capacity (fl. oz, cups, pints, quarts, gallons), distance (in., ft., yds., miles).
    - Common metric units include weight (grams), capacity (liters), distance (meters)
        - Common metric conversions include Kilo- (1000), centi- (1/100), & milli- (1/1000)
- Students do not need to convert between customary and metric systems.

Example

- Convert 5 cm to 0.05 m
- Convert 1 gallon = 4 quarts = 8 pints = 16 cups.

CLUSTER: 5.GM.D - Geometric measurement: understand concepts of volume.

STANDARD: 5.GM.D.5

Standards Statement (JUNE 2021):

Recognize that volume is a measurable attribute of solid figures.

DRAFT Standards Guidance (JUNE 2021):

Teaching Strategies

- 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.
- A solid figure that can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

STANDARD: 5.GM.D.6

Standards Statement (JUNE 2021):

Measure the volume of a rectangular prism by counting unit cubes using standard and nonstandard units.

DRAFT Standards Guidance (JUNE 2021):

Teaching Strategies

- Students should have opportunities to use metric, customary and improvised units.

STANDARD: 5.GM.D.7

Standards Statement (JUNE 2021):

Relate volume of rectangular prisms to the operations of multiplication and addition. Solve problems in authentic contexts involving volume using a variety of strategies.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should recognize volume as an attribute of solid figures.
- Students should explore the dimensions of all possible rectangular prisms given a total number of cubic units.

Terminology

- Total volume is defined as the total number of units that fill the space.
    - A solid figure packed with n unit cubes is said to have a volume of n cubic units.
- The dimensions of a rectangular prism can be referred to as length, width, and height.
- 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 (e.g., cubic cm, cubic m, cubic in, cubic ft).

Boundaries

- Work with volume at fifth grade is limited to whole number edge lengths.
- If students are provided with an image of a right rectangular prism, the unit cubes should be visible.

Teaching Strategies

- Students should be provided opportunities to use a variety of strategies including counting cubes, addition and multiplication, and applying the formula.
- Students should investigate real-life problems involving volume to make sense of this concept.
- Students should explore the volume of solid figures from real-life contexts by packing them with unit cubes with no gaps or overlaps.

Examples

- Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes.
  Show that the volume is the same as would be found by multiplying the edge lengths or by multiplying the height by the area of the base.
- Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping rectangular prisms by adding the volumes of the non-overlapping parts.
- Given the volume and 2 side lengths, determine the missing side length.

5.DR – Data Reasoning

CLUSTER: 5.DR.A - Pose investigative questions and collect/consider data.

STANDARD: 5.DR.A.1

Standards Statement (JUNE 2021):

Generate questions to investigate situations within the classroom, school or community. Determine strategies for collecting or considering data involving operations with fractions for this grade that can naturally answer questions by using information presented in line plots.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students can generate questions about things they notice and wonder from a real-life situation.
- Based on the posed question, create a plan that determines the appropriate population to survey and how to collect that data.

Terminology

- A statistical investigative question is one that requires data that will vary.

Boundaries

- Expectations in this domain should be taught throughout the year and applied contextually to the current expectation and real-life events.

Teaching Strategies

- Students should be provided with learning experiences to collect and analyze both numerical data and categorical data.
- Developing strategies for collecting data include students collaborating to determine ways to collect data.
- Data can be gathered from a variety of sources to answer the statistical investigative question posed.

Example

- Survey question: “How many pets do you have at home?” and “What grade are you in?” to make sure that the sample included only 5th grade students.

CLUSTER: 5.DR.B – Analyze, represent, and interpret data.

STANDARD: 5.DR.B.2

Standards Statement (JUNE 2021):

Analyze graphical representations and describe the distribution of the numerical data through line plots or categorical data through bar graphs. Interpret information presented to answer investigative questions.

DRAFT Standards Guidance (JUNE 2021):

Clarifications

- Students should be given ample experience with organizing, representing, and analyzing data from real-life contexts.
- Data should not be limited to numerical data collected from linear measurements.
- Students should continue to create dot plots (line plots) with measurements in fractions of a unit (1/2, 1/4, 1/8).

Terminology

- Distribution refers to how the data is spread across the graph.
- Dot plots and line plots can be used interchangeably.
- Dot plots should be used for numerical data representation on a number line.
- Numerical data is data that expressed in numbers rather than natural language. An example of numerical data that could be collected is the number of people who attended the movie theater over the course of a month.
- Categorical data is a type of data that is used to group information with similar characteristics. Examples of categorical data that could be collected might be marital status, favorite sport, or favorite type of movie.

Boundaries

- The mean formula is not an expectation in 5th grade. This concept should be explored visually and conceptually.
- This is the beginning of the progression of the concept of measures of center and will continue to be developed in 6th grade.

Teaching Strategies

- Students should be provided opportunities to read and interpret information presented in line plots.
- Students should be given the opportunity to use manipulatives such as: snap cubes, tiles, etc...to model equal share value.

Example

- Numerical variable(s): number of pets; categorical variable(s): type of pets, (e.g., cats, dogs, hamsters)
- Given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.
- “If we combined all of the 5th grade students’ candies and shared them equally with each student so everyone has the same number of candies.” (This is the mean or equal share value.)