

Fifth Grade Math Units of Instruction 2019-2020



Grade 5 Math



Priority Standards and Instructional Unit 1

**5th Grade Math
Unit 1:**

****This unit is designed to around these practice standards:** Students compare the value of the digits based on where they are in a number (MP.7). They reason 10 tens equal 100, 70 tens equal 700 and this can be illustrated with base 10 blocks or other visuals (MP.2). Students look across series of problems to notice a pattern when multiplying by 10, 100 or 1000 (MP.8) and justify why patterns exist (why $36 \times 100 = 3600$), rather than superficially noting 'you add zeros,' they explain or show there are actually 36 hundreds, so 3600 (MP.3). Students use similar reasoning to compare decimal values, explaining tenths are larger than hundredths and therefore, they look to first see which values have more tenths before looking at how many hundredths it has (MP.2, MP.7). Students use tools such as number lines and base 10 blocks to see place value relationships with decimals in order to compare and to round (MP.5).

****Priority Standards will be summatively assessed throughout Quarter 1. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Number and Operation in Base Ten

5.NBT.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.
MP.2, MP.7

Priority Standard

5.NBT.3-Read, write and compare decimals to thousandths.
a. Read and write decimals to thousandths using base-ten numerals, number names and expanded form.

Priority Standard

<p>b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.</p> <p>MP.2, MP.5, MP.7</p>	
<p>5.NBT.2-Multiply and divide by powers of 10.-</p> <ul style="list-style-type: none"> ○ Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 ○ 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. 	Supporting Standard
<p>5.NBT.4-Use place value understanding to round decimals to any place.</p>	Supporting Standard

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Priority Standards and Instructional Unit 2

5th Grade Math Unit 2:

****This unit is designed to around these practice standards:** Students understand when given a multiplication problem, they have a choice in how they solve it and select a way that makes sense for the values in the problem. For example, for 1234×12 , they see the small numbers lend to a break apart strategy and solve the problem this way:

$$1234 \times 10 = 12340$$

$$1234 \times 2 = 2468$$

Then add the partial products to equal 14,808 (MP.7). Other students may stack the two values and use an algorithm. Students recognize a rectangle is an effective model for ensuring all partial products are calculated, for both whole numbers and decimals (MP.4). As students explore problems with decimal values, they reason about the problem, rather than following rules devoid of meaning (count the number of decimal places). For example, when multiplying 4×1.5 , they use a break apart strategy, as they have for whole numbers, noticing $4 \times 1 = 4$ and $4 \times 0.5 = 2$, so therefore, $4 \times 1.5 = 6$ (MP.2). They explain why this works and when they use this strategy (MP.3).

****Priority Standards will be summatively assessed throughout Quarter 1. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Number and Operation in Base Ten

5.NBT.5-Fluently multiply multi-digit whole numbers (not to exceed four-digit by two-digit multiplication) using an algorithm.

MP.7, MP.8

Priority Standard

5.NBT.6-Divide up to four-digit dividends by two-digit divisors

Priority Standard

<p>a. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using...</p> <ul style="list-style-type: none"> ○ strategies based on place value ○ the properties of operations ○ the relationship between multiplication and division <p>b. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.</p> <p>MP.2, MP.3, MP.4</p>	
<p>5.NBT.7-Operations with decimals to hundredths.</p> <p>a. Add, subtract, multiply and divide decimals to hundredths using...</p> <ul style="list-style-type: none"> ● concrete models or drawings ● strategies based on place value ● properties of operations ● ● the relationship between addition and subtraction <p>b. Relate the strategy to a written method and explain the reasoning used.</p> <p>MP.2, MP.3, MP.5</p>	Priority Standard
<p>5.NBT.4-Use place value understanding to round decimals to any place.</p>	Supporting Standard

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Priority Standards and Instructional Unit 3

5th Grade Math
Unit : 3

****This unit is designed to around these practice standards:** Students notice when they apply a rule, like add 3, several patterns emerge. The explicit pattern is the new value is 3 more than the original value. But, as they explore they notice if they pick an input that is 5 more than the last input, then the output is also 5 more. They reason about this contextually, for example thinking of people ages in three years. So, if they have a sibling that is 5 years older now, in three years, they will still be 5 years older (MP.2). They represent these patterns on graphs and use the graphs to make sense of the situation (MP.4)

****Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Operations and Algebraic Thinking

5.OA.2-Write simple expressions with numbers and interpret numerical expressions without evaluating them.
MP.2, MP.7

Priority Standard

5.OA.1-Use parentheses, brackets or braces in numerical expressions and evaluate expressions that include symbols.

Supporting Standard

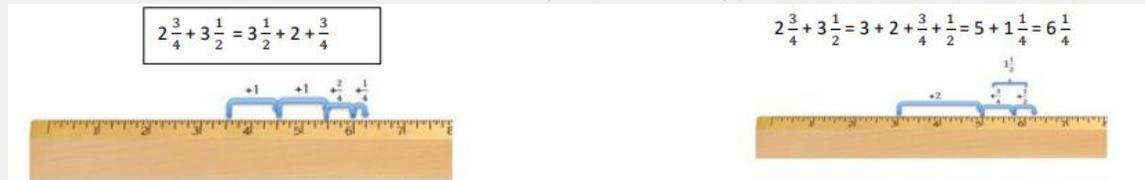
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Priority Standards and Instructional Unit 4

5th Grade Math Unit : 4

****This unit is designed to around these practice standards:** As students add and subtract fractions, they make sense of situations in story problems, selecting and creating representations of the situation such as partitioned rectangles or number lines (MP.1, 4). Students notice if the fractions in the problem can be solved using a reasoning strategy, or if it is more efficient to find common denominators (MP.2). For example, for the problem $2\frac{3}{4} + 3\frac{1}{2}$, students may mentally or physically refer to a ruler and use a counting up strategy:



Or, students use a break apart strategy noticing $\frac{3}{4}$ is $\frac{1}{2} + \frac{1}{4}$ and therefore, reason there are 6 wholes and 1 $\frac{1}{4}$ more, so $6\frac{1}{4}$ is the sum. Other students rewrite the fractions as $2\frac{3}{4} + 3\frac{2}{4}$ and add the whole numbers and fractions separately and then combine them. Students explain their reasoning strategies and students listen to others who solved the problem differently than they solved it and determine if the reasoning makes sense, if it is efficient and if the answer is correct (MP.3).

****Priority Standards will be summatively assessed throughout Quarter 2. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Number and Operations-Fractions

5.NF.1-Efficiently add and subtract fractions with unlike denominators (including mixed numbers) by...

Priority Standard

<ul style="list-style-type: none">● using reasoning strategies, such as counting up on a number line or creating visual fraction models● finding common denominators <p>MP.2, MP.3</p>	
<p>5.NF.2-Solve word problems involving addition and subtraction of fractions.</p> <ul style="list-style-type: none">a. a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.b. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <p>MP.1, MP.4</p>	Priority Standard

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Priority Standards and
Instructional Unit 5

5th Grade Math
Unit : 5

****This unit is designed to around these practice standards:** Students look for repeated reasoning in order to understand the meaning of the operations (MP.8). Rather than memorize rules that do not make sense, students use mathematical representations to consider the relative size of their answers (MP.4). For example, students solve the classic “brownie sharing” problems, wherein brownies are shared equally with children. In considering how 4 children share 5 brownies. They use drawings of rectangles and partition to show each child will get $1 \frac{1}{4}$ brownies. As students continue to explore brownie sharing, they notice patterns. In this case, they see $5 \div 4$ means the same as $\frac{5}{4}$ (MP.4). Students reason quantitatively as they work on scaling problems in context (MP.2). For example, in $\frac{3}{4}$ of 16, students might reason the answer is less than 16. To solve it, they begin by thinking $\frac{1}{4}$ of 16 is 4, then think 3 groups of 4 is 12. As students divide a problem such as $4 \div \frac{1}{8}$, $7 \div \frac{1}{8}$, $10 \div \frac{1}{8}$, they notice how many eighths in one whole and then multiply by how many wholes they have. This pattern leads to an understanding of why it looks like they are multiplying by the denominator (MP.8).

****Priority Standards will be summatively assessed throughout Quarter 3. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Number and Operations-Fractions

5.NF.4-Apply and extend previous understanding of multiplication to multiply a fraction or whole number by a fraction.

- a. Interpret the product $(a \times b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.

Priority Standard

<p>b. Find the area of a rectangle with fractional side lengths by tiling it with 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 to find areas of rectangles and represent fraction products as rectangular areas.</p> <p>MP.1</p>	
<p>5.NF.3-Interpret a fraction as division of the numerator by the denominator ($a \div b = a \times \frac{1}{b}$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem.</p>	Support Standard
<p>5.NF.6-Solve real world problems involving multiplication of fractions and mixed numbers.</p> <p>MP.4, MP.5</p>	Priority Standard
<p>5.NF.5--Interpret multiplication as scaling (resizing), by:</p> <p>a. 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.</p> <p>b. 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 $\frac{a}{c} = \frac{n \times a}{n \times c}$ to the effect of</p>	Support Standard

multiplying $a b$ by 1.	
<p>5.NF.7-Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.</p> <ul style="list-style-type: none">a. Interpret division of a unit fraction by a non-zero whole number and compute such quotients.b. Interpret division of a whole number by a unit fraction and compute such quotients.c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions. <p>MP.1, MP.4, MP.8</p>	Priority Standard

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Priority Standards and
Instructional Unit 6

5th Grade Math
Unit : 6

****This unit is designed to around these practice standards:** After gathering data on a question of interest, students recognize they have many data points and therefore, decide they will do a scaled graph (MP.4). In creating the graph, they decide to do a picture graph and pick a scale of 1 picture = 4 data points (MP.6). In another situation, students recognize they have numerical data and create a dot plot and decide to use a spreadsheet on the computer to create the graph (MP.5). Students compare how dot plots and bar graphs are similar and different, recognizing when to use each (MP.6).

****Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Measurement and Data

5.MD.2 -Identify and gather data for statistical questions focused on both categorical and numerical data. Select an appropriate data display (bar graph, pictograph, dot plot). Make observations from the graph about the questions posed.

MP.4, MP.5, MP.6

Priority Standard

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Priority Standards and Instructional Unit 7

5th Grade Math
Unit : 7

****This unit is designed to around these practice standards:** Students notice a coordinate axis, is in fact, coordinating a horizontal number line with a vertical number line (MP.7). These two lines need a title, scale and a label in order to be understood by a reader (MP.6). Students record data in their graph from exploring a pattern and gain insights about the pattern. For example, students graph data from a two-column table that shows the cost of buying pineapples (one pineapple costs \$2, three pineapples costs \$6) and use the coordinate axis to explain what they notice about the relationship between the number of pineapples and the cost of pineapples (MP.1).

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Geometry

5.G.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.

Priority Standard

5.G.1- Use a pair 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

Supporting Standard

direction of one axis and the second number indicates how far to travel in the direction of the second.	
5.OA.3- Generate numerical patterns for situations. a. Generate a rule for growing patterns, identifying the relationship between corresponding terms (x, y). b. Generate patterns using one or two given rules (x, y). c. Use tables, ordered pairs and graphs to represent the relationship between the quantities.	Supporting Standard

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Priority Standards and Instructional Unit 8

5th Grade Math
Unit : 8

****This unit is designed to around these practice standards:** Students use cubes to cover a bottom layer of a rectangular prism, understanding cube as a unit cube (MP.5). As students place the cubes in layers to fill the rectangular solid, they notice the number of cubes in each layer can be found by multiplying [number of cubes in one row] x [number of rows] and this product (the base) can be multiplied by how many layers to determine how many unit cubes will fill the container (MP.8). Students connect this idea to the formulas for volume and use these formulas to solve problems (MP.4). When a three-dimensional shape is not a single rectangular solid, students analyze the shape and its measurements to determine how to decompose the shape and find the volume of each prism (MP.1)

****Priority Standards will be summatively assessed throughout Quarter 4. All supporting standards are to be formatively assessed, driving reteaching and instructional adjustments to meet the needs of all students.**

Measurement and Data

5.MD.4-Measure volumes by counting unit cubic cm, cubic in, cubic ft. and improvised units.
MP.5, MP.6

Priority Standard

5.MD.1- Convert among different size measurement units (mass, weight, liquid volume, length, time) within one system of units (metric system, U.S. standard system and time).

Supporting Standard

5.MD.3-Recognize volume as an attribute of solid figures and understand

Supporting Standard

concepts of volume measurement.

- a. 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
- b. 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.

5.MD.5-Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

- a. 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.
- b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems
- c. 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.

MP.1, MP.4, MP.8

Priority Standard