| **Unit 1** | **Unit 2** | **Unit 3** | | **Unit 4** | **Unit 5** | **Unit 6** | **Unit 7** | **Unit 8** | | **Unit 9** | **Unit 10** |
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| **Whole number operations** | **Place value with decimals** | **Add and Subtract**  **Decimals** | | **Add and Subtract**  **Fractions** | **Multiply and Divide**  **Decimals** | **Multiplying Fractions** | **Dividing Fractions** | **Volume** | | **Classifying 2-D Figures** | **Coordinate Plane** |
| **30 days** | **15 days** | **10 days** | | **25 days** | **20 days** | **20 days** | **10 days** | **10 days** | | **10 days** | **10 days** |
| 5.NBT.A.1 | 5.NBT.A.1 | 5.NBT.B.7 | | 5.NF.A.1 | 5.NBT.A.2 | 5.NF.B.4 | 5.NF.B.3 | 5.MD.C.3 | | 5.G.B.3 | 5.G.A.1 |
| 5.NBT.B.5 | 5.NBT.A.3 | 5.MD.A.1 | | 5.NF.A.2 | 5.NBT.B.7 | 5.NF.B.5 | 5.NF.B.7 | 5.MD.C.4 | | 5.G.B.4 | 5.G.A.2 |
| 5.NBT.B.6 | 5.NBT.A.4 | 5.OA.A.1 | | 5.MD.A.1 | 5.OA.A.1 | 5.NF.B.6 | MP.1 | 5.MD.C.5 | | MP.3 | 5.OA.B.3 |
| 5.MD.A.1 | 5.MD.A.1 | MP.2 | | 5.MD.B.2 | MP.2 | MP.1 | MP.2 | MP.4 | | MP.7 | MP.4 |
| 5.OA.A.1 | MP.7 | MP.3 | | 5.OA.A.1 | MP.3 | MP.2 | MP.4 | MP.6 | |  | MP.6 |
| 5.OA.A.2 | MP.8 | MP.6 | | MP.1 | MP.6 | MP.4 | MP.6 | MP.7 | |  |  |
| MP.2 |  | MP.7 | | MP.3 | MP.7 | MP.6 |  | MP.8 | |  |  |
| MP.6 |  |  | | MP.4 | MP.8 |  |  |  | |  |  |
| MP.7 |  |  | | MP.6 |  |  |  |  | |  |  |
| **Major Clusters** | | | **Supporting Clusters** | | | **Additional Clusters** | | | **Other** | | |
| **NBT** – Number and Operations in Base Ten (1, 2, 3, 4, 5, 6, 7)  **NF** – Number and Operations – Fractions (1, 2, 3, 4, 5, 6, 7)  **MD** – Measurement and Data  (3, 4, 5) | | | **MD** – Measurement and Data  (1, 2) | | | **OA –** Operations and Algebraic Thinking (1, 2, 3)  **G** – Geometry  (1, 2, 3, 4) | | | **MP** – Standards for Mathematical Practice | | |

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| **Summary of Year for Grade 5 Mathematics** |
| The critical areas of this grade should be focused on three areas:  (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions);  (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and  (3) developing understanding of volume. |
| **Standards Clarification for Grade 5** |
| Some standards are included in multiple units to provide students with multiple opportunities to engage with the content. In the tables that follow, suggested focus areas and possible benchmarks for repeated standards are identified in the column labeled Standards Clarification. |
| **Mathematical Practices Recommendations for Grade 5** |
| Throughout Grade 5, students should continue to develop proficiency with the Common Core’s eight Standards for Mathematical Practice:  **1. Make sense of problems and persevere in solving them. 5. Use appropriate tools strategically.**  **2. Reason abstractly and quantitatively. 6. Attend to precision.**  **3. Construct viable arguments and critique the reasoning of others. 7. Look for and make use of structure.**  **4. Model with mathematics. 8. Look for and express regularity in repeated reasoning.**  These practices should become the natural way in which students come to understand and do mathematics. While, depending on the content to be understood or on the problem to be solved, any practice might be brought to bear, some practices may prove more useful than others. Opportunities for highlighting certain practices are indicated in different units in this document, but this highlighting should not be interpreted to mean that other practices should be neglected in those units. |
| **Fluency Requirements for Grade 5** |
| 5.NBT.B.5  Fluently multiply multi-digit whole numbers using the standard algorithm. |

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| **Unit 1: Whole Number Operations** | | | **Possible time frame**:  30 days |
| Students finalize fluency with multi-digit addition, subtraction, multiplication and division and apply whole number operations to measurement conversion (e.g. convert 12 feet to \_\_yards). Students need experiences with numerical expressions that use grouping symbols to develop understanding of how to use parentheses, brackets, and braces with whole numbers. Students compare like expressions that are grouped differently as well as place grouping symbols in an equation to make it true. Students write simple expressions and interpret the meaning of the numerical expression. In prior grades, students used various strategies to multiply. In Grade 5, students must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value. (5.NBT.A.1) In fourth grade, students’ experiences with division were limited to dividing by one-digit divisors. In Grade 5, students extend their prior experiences to include two-digit divisors. They will demonstrate their ability with whole number division using strategies, illustrations, and explanations. | | | |
| **Major Cluster Standards** | | **Standards Clarification** | |
| **Understand the place value systems.**  **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.  **Perform operations with multi-digit whole numbers and with decimals to hundredths.**  **5.NBT.B.5** Fluently multiply multi-digit whole numbers using the standard algorithm.  **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. | | **5.NBT.A.1** Work should be limited to whole numbers as this standard will be revisited in Unit 2.  **5.NBT.B.5** Fluency should be attained by the end of the year. Following this unit, fluency practice with the standard multiplication algorithm should be ongoing. | |
| **Supporting Cluster Standards** | | **Standards Clarification** | |
| **Convert like measurement units within a given measurement system**  **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. | | **5.MD.A.1** Conversions should be limited to whole numbers. | |
| **Additional Cluster Standards** | | **Standards Clarification** | |
| **Write and interpret numerical expressions.**  **5.OA.A.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.  **5.OA.A.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.* | | Work with these standards should be limited to whole numbers. | |
| **Focus Standards for Mathematical Practice** | | | |
| **MP.2** Reason abstractly and quantitatively. | As students solve problems involving measurement conversions, they will need to be able to reason about whether converting among units will result in a larger or smaller number than they began with and attend to precision as they work to find the answer (**MP.2** and **MP.6**). Students will also make use of structure as they evaluate and write expressions involving grouping symbols (**MP.7**). | | |
| **MP.6** Attend to precision. |
| **MP.7** Look for and make use of structure. |

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| **Unit 2: Place Value with Decimals** | | **Possible time frame**:  15 days |
| Students extend their understanding of the base-ten system to decimals to the thousandths place, building on their grade 4 work with tenths and hundredths. Students use base-ten blocks and pictures of base-ten blocks to investigate the relationship between adjacent places, how numbers compare, and how numbers round to thousandths. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons. 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. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Understand the place value system.**  **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.  **5.NBT.A.3** Read, write, and compare decimals to thousandths.   1. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). 2. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.   **5.NBT.A.4** Use place value understanding to round decimals to any place. | | **5.NBT.A.1** Work should include decimals and whole numbers. |
| **Supporting Cluster Standards** | | **Standards Clarification** |
| **Convert like measurement units within a given measurement system.**  **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. | | Students should use the centimeter and/or meter stick to convert within the same system as it relates to decimals. |
| **Focus Standards for Mathematical Practice** | | |
| **MP.7** Look for and make use of structure. | Students use their understanding of structure of whole numbers to generalize the understanding to decimals (**MP.7**). As students continue to work with measurement conversions, they begin to generalize the procedures used (**MP.8**). | |
| **MP.8** Look for and express regularity in repeated reasoning. |

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| **Unit 3: Add and Subtract Decimals** | | **Possible time frame**:  10 days |
| In this unit students will be adding and subtracting decimals to hundredths. Because of the structure of the base-ten system, students use the same place value understanding for adding and subtracting decimals that they used for adding and subtracting whole numbers. Like base-ten units must be added and subtracted, so students need to attend to aligning the corresponding places correctly (this also aligns the decimal points). Students should begin to estimate the addition and subtraction of decimals based on their understanding of operation and the value of the numbers. Students will use grouping symbols to evaluate expressions containing whole numbers and decimals. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Perform operations with multi-digit whole numbers and with decimals to hundredths.**  **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. | | Students should apply addition and subtraction of decimals as it relates to metric measures and money. |
| **Supporting Cluster Standards** | | **Standards Clarification** |
| **Convert like measurement units within a given measurement system.**  **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. | |  |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Write and interpret numerical expressions.**  **5.OA.A.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. | | Work with grouping symbols should include whole numbers and decimals. |
| **Focus Standards for Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | Instead of just computing answers, students reason about both the relationship between whole number computation and decimal computation and can explain these processes (**MP.2** and **MP.3**). Encourage students to speak about decimal calculations using precise language (**MP.6**). Students will also be able to apply the structure of whole number base-ten calculations to decimal calculations (**MP.7**). | |
| **MP.3** Construct viable arguments and critique the reasoning of others. |
| **MP.6** Attend to precision. |
| **MP.7** Look for and make use of structure. |

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| **Unit 4: Add and Subtract Fractions** | | | **Possible time frame**:  25 days |
| Students apply their understanding of fractions and fraction models from previous grades to represent the addition and subtraction of fractions with unlike denominators. Students will reason about size of fractions to make sense of their answers—e.g. they understand that the sum of 1/2 and 1/3 will be greater than 1. Students will also use grouping symbols to evaluate expressions containing whole numbers, decimals and/or fractions. It is important to note that in some cases it may not be necessary to find a least common denominator to add or subtract fractions with unlike denominators. Students should be encouraged to use their conceptual understanding of fractions rather than just using the algorithm for adding and subtracting fractions. In addition, there is no mathematical reason for students to write fractions in simplest form.[[1]](#footnote-1) | | | |
| **Major Cluster Standards** | | **Standards Clarification** | |
| **Use equivalent fractions as a strategy to add and subtract fractions.**  **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. *For example, 2/3 = 5/4 = 8/12 + 15/12 = 23/12. (in general, a/b + c/d = (ab + bc)/bd.)*  **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. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.* | |  | |
| **Supporting Cluster Standards** | | **Standards Clarification** | |
| **Convert like measurement units within a given measurement system.**  **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.  **Represent and interpret data.**  **5.MD.B.2** Make a line plot to display a data set of measurements in fractions of a unit (½ , ¼, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements or liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.* | | **5.MD.A.1** Conversion problems should include fractions of a unit.  **5.MD.B.2** This standard is not limited to measurements between 0 and 1 unit. To support 5.NF.A.1, measurements should include mixed numbers. | |
| **Additional Cluster Standards** | | **Standards Clarification** | |
| **Write and interpret numerical expressions.**  **5.OA.A.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. | | Work in this standard includes whole numbers, decimals, and fractions. | |
| **Focus Standards for Mathematical Practice** | | | |
| **MP.1** Make sense of problems and persevere in solving them. | Students make sense of the problems by using visual models and equations to solve problems involving the addition and subtraction of fractions (**MP.1** and **MP.4**). Students will attend to precision as they communicate their reasoning in the problem-solving process (**MP.3** and **MP.6**). | | |
| **MP.3** Construct viable arguments and critique the reasoning of others. |
| **MP.4** Model with mathematics. |
| **MP.6** Attend to precision. |

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| **Unit 5: Multiply and Divide Decimals** | | **Possible time frame**:  20 days |
| Students will study the effects of multiplying and dividing by powers of 10 and be able to explain why the product is 10 or 100 times the multiplicand or the quotient is 0.1 or 0.01of the dividend. Students will compute products and quotients of decimals to hundredths efficiently and accurately. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Understand the place value system.**  **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 multiplies or divided by a power of 10. Use whole-number exponents to denote powers of 10.  **Perform operations with multi-digit whole numbers and with decimals to hundredths.**  **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. | | **5.NBT.B.7** Divisors could be less than one. |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Write and interpret numerical expressions.**  **5.OA.A.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. | |  |
| **Focus Standards for Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | As students work with the operations with decimals, they will reason about the relationship between operations with whole numbers and operations with decimals (**MP.2**). Students will explain their reasoning to the method used when performing operations with decimals using precise language (**MP.3** and **MP.6**). Students will use structure as they evaluate expressions with grouping symbols (**MP.7**) and generalize the process for multiplying by powers of 10 (**MP.8**). | |
| **MP.3** Construct viable arguments and critique the reasoning of others. |
| **MP.6** Attend to precision. |
| **MP.7** Look for and make use of structure. |
| **MP.8** Look for and express regularity in repeated reasoning. |

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| **Unit 6: Multiplying Fractions** | **Possible time frame**:  20 days |
| In fourth grade, students began studying the multiplication of fractions by focusing on multiplying a whole number by a fraction. In Grade 5, students use the meaning of fractions and of multiplication to understand and explain why the procedure for multiplying fractions makes sense. Students can reason why it works using visual models, fraction strips, and number line diagrams. For more complicated problems an area model is useful, in which students work with a rectangle that has fractional side lengths, dividing it into rectangles whose side lengths are the corresponding unit fractions. They will apply the concept of multiplying fractions to find the area of a rectangle with fractional side lengths. Students learn to see products such as ½ x 3 as an expression that can be interpreted in terms of a quantity, 3, and a scaling factor, ½. They see ½ x 3 as half the size of 3 without evaluating the product. | |
| **Major Cluster Standards** | **Standards Clarification** |
| **Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**  **5.NF.B.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.   1. 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*. *For example, 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. (In general, (a/b) × (c/d) = ac/bd.)* 2. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and how 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.   **5.NF.B.5** Interpret multiplication as scaling (resizing), by:   1. 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. 2. 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.   **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. |  |

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| **Focus Standards for Mathematical Practice** | |
| **MP.1** Make sense of problems and persevere in solving them. | Representing multiplication of fractions with visual and concrete models is fundamental to this unit in order for student to make sense of multiplying fractions by fractions (**MP.1** and **MP.4**). Students reason abstractly and practice communicating their thinking in real-world situations (**MP.2** and **MP.6**). |
| **MP.2** Reason abstractly and quantitatively. |
| **MP.4** Model with mathematics. |
| **MP.6** Attend to precision. |

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| **Unit 7: Dividing Fractions** | **Possible time frame**:  10 days |
| Students use the relationship between division and multiplication to start working with simple fraction division problems. Having seen that division of a whole number by a whole number, e.g. 5 ÷ 3, is the same as multiplying the number by a unit fraction, 1/3 x 5, they now extend the same reasoning to division of a unit fraction by a whole number. Seeing for example 1/6 ÷ 3 they reason that 1/6 must be divided into 3 equal parts. Since there are 6 portions of 1/6 in 1 whole and each part must be divided into 3 equal parts, there would be a total of 18 parts in the whole; therefore 1/6 ÷ 3 = 1/18. In 3 ÷ 1/6, they reason that since there are 6 portions of 1/6 in 1 whole, there must be 3 x 6 in 3 wholes; therefore 3 ÷ 1/6 = 18. Linear and area models will be useful for student to gain a conceptual understanding of division of fractions before mastering the algorithm. | |
| **Major Cluster Standards** | **Standards Clarification** |
| **Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**  **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. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. 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?*  **5. NF.B.7** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.   1. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For 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.* 2. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, 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.* 3. 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. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?* | **5.NF.B.7** Division of a fraction by a fraction is not a requirement at this grade. |

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| **Focus Standards for Mathematical Practice** | |
| **MP.1** Make sense of problems and persevere in solving them. | In this unit it is critical for students to use concrete objects or pictures to help conceptualize, create, and solve problems (**MP.1** and **MP.2**). Students will model the relationships in real-world problems and use precise language when explaining their reasoning (**MP.4** and **MP.6**). |
| **MP.2** Reason abstractly and quantitatively. |
| **MP.4** Model with mathematics. |
| **MP.6** Attend to precision. |

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| **Unit 8: Volume** | | **Possible time frame**:  10 days |
| Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size cube units required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**  **5.MD.C.3** Recognize volume as an attribute of solid figures and understand concepts of volume measurement.   1. 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. 2. 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.C.4** Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.  **5.MD.C.5** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.   1. 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. 2. 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. 3. 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. | | Students will find the volume of right rectangular prisms with edges whose lengths are whole numbers.  Students learn to determine the volumes of several right rectangular prisms, using cubic centimeters, cubic inches, and cubic feet. With guidance, they learn to increasingly apply multiplicative reasoning to determine volumes, looking for and making use of structure. They understand that multiplying the length times the width of a right rectangular prism can be viewed as determining how many cubes would be in each layer if the prism were packed with or built up from unit cubes. |
| **Focus Standards for Mathematical Practice** | | |
| **MP.4** Model with mathematics. | Students decompose and recompose geometric figures to make sense of the spatial structure of volume (**MP.7**). Students will use cubes to model volume of solid figures and connect the structure to multiplicative reasoning (**MP.4** and **MP.7**). Students will attend to precision as they state the volume of solid figures using the appropriate units (**MP.6**). They solve problems by applying generalized formulas (**MP.8**). | |
| **MP.6** Attend to precision. |
| **MP.7** Look for and make use of structure. |
| **MP.8** Look for and express regularity in repeated reasoning. |

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| **Unit 9: Classifying 2-D Figures** | | **Possible time frame**:  10 days |
| Students learn to analyze and relate categories of two-dimensional figures explicitly based on their properties. They classify two-dimensional figures in hierarchies. For example, they conclude that all rectangles are parallelograms, because they are all quadrilaterals with two pairs of opposite, parallel, equal-length sides. In this way, they relate certain categories of shapes as subclasses of other categories. This leads to students understanding that squares possess all properties of rhombuses and of rectangles. | | |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Classify two-dimensional figures into categories based on their properties.**  **5.G.B.3** 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.*  **5.G.B.4** Classify two-dimensional figures in a hierarchy based on properties. | |  |
| **Focus Standards for Mathematical Practice** | | |
| **MP.3** Construct viable arguments and critique the reasoning of others. | Students make use of structure to build a logical progression of statements and explore hierarchical relationships among 2-dimensional shapes (**MP.3** and **MP.7**). | |
| **MP.7** Look for and make use of structure. |

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| **Unit 10: Coordinate Plane** | | **Possible time frame**:  10 days |
| Students connect ordered pairs of whole-number coordinates to points on the grid, so that these coordinate pairs constitute numerical objects and ultimately can be operated upon as single mathematical entities. Students solve mathematical and real-world problems using coordinates. Students extend their Grade 4 pattern work by working briefly with two numerical patterns that can be related and examining these relationships within sequences of ordered pairs and in the graphs in the first quadrant of the coordinate plane. | | |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Graph points on the coordinate plane to solve real-world and mathematical problems.**  **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).  **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.  **Analyze patterns and relationships.**  **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. *For 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, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.* | | Students will graph points in the first quadrant only. |
| **Focus Standards for Mathematical Practice** | | |
| **MP.4** Model with mathematics. | Students precisely describe the coordinates of points and the relationship of the coordinate plane to the number line (**MP.6**). Students both generate and identify relationships in numerical patterns, using the coordinate plan as a way of representing these relationships and patterns (**MP.4**). | |
| **MP.6** Attend to precision. |

1. For more information about fractions in Grade 5, see pages 10-13 in the [Fractions](http://math.arizona.edu/~ime/progressions/) progression document. [↑](#footnote-ref-1)