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Operations & Algebraic Thinking	
Use the four operations with whole numbers to solve problems. (4.OA.A) **4.OA.A.1:** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. **4.OA.A.2:** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. **4.OA.A.3:** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	▪ I can explain how a multiplication equation (e.g., 35 = 5 × 7) can be interpreted as a comparison (e.g., Johnny has 5 times as many cards as Bill who has 7 cards.). ▪ I can write an equation for a situation involving multiplicative comparison. ▪ I can distinguish between multiplicative (as many times as) and additive (more) comparisons. ▪ I can determine when to multiply or divide in word problems. ▪ I can sole a multiplication or division word problems involving multiplicative comparisons using drawings and equations. ▪ I can write an equation using a variable to represent the unknown. ▪ I can choose the correct operation to perform at each step of a multi-step word problem. ▪ I can interpret remainders in word problems. ▪ I can write equations using a variable to represent the unknown. ▪ I can use mental math or estimation strategies to check if my answer is reasonable.
Gain familiarity with factors and multiples. (4.OA.B) **4.OA.B.4:** Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	▪ I can define factors and multiples. ▪ I can list all of the factor pairs for any whole number in the range 1 – 100. ▪ I can determine multiples of a given whole number (1-100) ▪ I can define prime and composite. ▪ I can determine if a number is prime or composite.

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Generate and analyze patterns. (4.OA.C) **4.OA.C.5:** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	▪ I can generate a pattern that follows a given rule. ▪ I can identify and explain additional patterns or special behaviors in a pattern that go beyond the given rule.
Numbers & Operations in Base Ten	
Generalize place value understanding for multi-digit whole numbers. (4.NBT.A) **4.NBT.A.1:** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* **4.NBT.A.2:** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. **4.NBT.A.3:** Use place value understanding to round multi-digit whole numbers to any place.	▪ I can explain the value of each digit in a multi-digit number as ten times the digit to the right. ▪ I can read and write a multi-digit number in word form, base-ten numerals, and expanded form. ▪ I can compare two multi-digit number using place value and record the comparison using symbols <, >, or =. ▪ I can explain how to use place value and what digits to look for in order to round a multi-digit number. ▪ I can use the value of the digit to the right of the place to be rounded to determine whether to round up or down. ▪ I can write a multi-digit number rounded to any given place.
Use place value understanding and properties of operations to perform multi-digit arithmetic. (4.NBT.B) **4.NBT.B.4:** Fluently add and subtract multi-digit whole numbers using the standard algorithm.	▪ I can add multi-digit whole numbers with ease by using the standard algorithm (e.g., add one column of numbers at a time starting with the ones digits, then the tens digits). ▪ I can subtract multi-digit whole numbers with ease by using the

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4.NBT.B.5: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **4.NBT.B.6:** Find whole-number quotients and remainders with up to four-digit dividends and one-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.	standard algorithm (e.g., subtract one column of numbers at a time starting with the ones digits, then the tens digits). ▪ I can multiply a multi-digit number by a one-digit whole number. ▪ I can demonstrate multiplication of two two-digit numbers using rectangular arrays, place value, and the area model. ▪ I can solve multiplication of two two-digit numbers using properties of operations and equations. ▪ I can explain my chosen strategy. ▪ I can demonstrate division of a multi-digit number by a one-digit number using place value, rectangular arrays, and area model. ▪ I can solve division of a multi-digit number by a one-digit number using properties of operations and equations. ▪ I can explain my chosen strategy.
Number and Operations—Fractions	
Extend understanding of fraction equivalence and ordering. (4.NF.A) **4.NF.A.1:** Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. **4.NF.A.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and	▪ I can explain why fractions are equivalent using models. ▪ I can generate equivalent fractions by multiplying or dividing the numerator and denominator by the same number. ▪ I use visual models to justify why multiplying or dividing the numerator and denominator by the same number generates equivalent fractions. ▪ I can explain that comparing two fractions is valid only when they refer to the same whole. ▪ I can compare two given fractions by generating equivalent fractions with common denominators. ▪ I can compare two given fractions by reasoning about their size or their location on a number line, or comparing them to a benchmark fraction. ▪ I can record the comparison using

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justify the conclusions, e.g., by using a visual fraction model.	symbols (<, >, and =) and justify each comparison.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. (4.NF.B) **4.NF.B.3:** Understand a fraction *a/b* with *a* > 1 as a sum of fractions 1/*b*. **a.** Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. **b.** Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* **c.** Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. **d.** Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. **4.NF.B.4:** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **a.** Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*	▪ I can use visual models to add and subtract fractions within the same whole. ▪ I can use visual models to decompose a fraction in more than one way, including decomposing a fraction into a sum of its unit fraction. ▪ I can record decomposition in an equation. ▪ I can add or subtract a mixed fraction using equivalent fractions, properties of operations, or the relationship between addition and subtraction. ▪ I can solve addition and subtraction word problems using drawings, pictures, and equations. ▪ I can explain why a/b = a × 1/b by using visual models to show how to decompose fractions into unit fractions and represent it as a multiple of unit fractions (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 3 \times \frac{1}{4}$). ▪ I can decompose a fraction (a/b0 into a multiple of unit fractions (a × 1/b) in order to show why multiplying a whole number by a fraction (n × (a/b)) results in (n × a)/b (e.g., 5 × 3/8 = 5 × (3 × 1/8) = (5 × 3) × 1/8 = 15 × 1/8 = 15/8). ▪ I can solve word problems that involve multiplying a whole number and fraction with visual models and equations.

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b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* **c.** Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	
Understand decimal notation for fractions, and compare decimal fractions. (4.NF.C) **4.NF.C.5:** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[1] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.* **4.NF.C.6:** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* **4.NF.C.7:** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons	▪ I can rewrite a fraction with a denominator 10 as an equivalent fraction with denominator 100. ▪ I can add two fractions with denominators 10 and 100. ▪ I can explain the relationship between a fraction and the decimal representation. ▪ I can represent fractions with denominators of 10 and 100 as a decimal. ▪ I can identify the tenths and hundredths place of a decimal. ▪ I can show the placement of a decimal on a number line. ▪ I can explain that comparing two decimals is valid only when they refer to the same whole. ▪ I can justify the comparison by reasoning about the size of the decimal and by using a visual model. ▪ I can compare two decimals to the hundredths place and record the comparison using symbols <, >, or =.

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with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	
Measurement & Data	
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. (4.MD.A) **4.MD.A.1:** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), …* **4.MD.A.2:** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. **4.MD.A.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	▪ I can describe the relative size of measurement units (e.g., km, m, cm; g, kg; lb, oz; l, ml; hr, min, sec) ▪ I can represent a larger unit as a multiple of smaller units within the same system of measurement and record the equivalent measures in a two-column table (e.g., 1 foot = 12 inches, 2 feet = 24 inches, 3 feet = 36 inches). ▪ I can represent measurements using diagrams and correct measurement scale. ▪ I can use the four operations to solve measurement word problems. ▪ I can solve word problems involving various measurements expressed by whole numbers, fractions and decimals. ▪ I can convert a measurement given in a larger unit into an equivalent measurement in smaller units in order to solve a problem. ▪ I can explain the formulas for area and perimeter. ▪ I can use the formulas for area and perimeter to solve real world problems.
Represent and interpret data. (4.MD.B) **4.MD.B.4:** Make a line plot to display a	▪ I can create a line plot with a given

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data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	data set of measurements using fractions as a unit. ▪ I can use the information on the line plot to solve addition and subtraction problems.
Geometric measurement: understand concepts of angle and measure angles. (4.MD.C) **4.MD.C.5:** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: **a.** An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. **b.** An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees. **4.MD.C.6:** Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. **4.MD.C.7:** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	▪ I can identify the parts of an angle (vertex, common endpoint, rays) and define an angle. ▪ I can explain that an angle is measured in degrees related to the 360 degrees in a circle. ▪ I can measure an angle using a protractor in whole-number degrees. ▪ I can sketch angles with a given measurement. ▪ I can use a protractor to create a given angle measurement. ▪ I can explain that the angle measurement of a larger angle is the sum of the angle measure of its decomposed parts. ▪ I can write an equation with an unknown angle measurement. ▪ I can use addition and subtraction to solve for the missing angle measurements. ▪ I can solve word problems involving unknown angles.
Geometry	
Draw and identify lines and angles, and classify shapes by properties of their lines and angles. (4.G.A)	▪ I can draw an example of a point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines and parallel lines.

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4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. **4.G.A.2:** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. **4.G.A.3:** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	▪ I can look for and identify the following in a given two-dimensional figure: point, line, line segment, ray, right angle, acute angle, obtuse angle, perpendicular lines, and parallel lines. ▪ I can classify two-dimensional shapes into the following categories; those with parallel lines, those with perpendicular lines, those with both parallel and perpendicular lines, those with no parallel or perpendicular lines. ▪ I can classify two-dimensional shapes into categories based on the presence of absence of acute, obtuse, or right angles. ▪ I can identify a right triangle. ▪ I can identify line-symmetric figures. ▪ I can define line of symmetry, explain how to identify it in a two-dimensional figure, and explain how folding along the line of symmetry results in matching parts. ▪ I can draw a line on a figure to create two symmetric figures.

The Standards for Mathematical Practice

The standards for mathematical practice are really about teaching students to think and act like mathematicians and problem solvers:

1. Make sense of problems and persevere in solving them.
   What it means: Understand the problem, find a way to attack it, and work until it is done. Basically, you will find practice standard #1 in every math problem, every day. The hardest part is pushing students to solve tough problems by applying what they already know and to monitor themselves when problem-solving.

2. Reason abstractly and quantitatively
   What it means: Get ready for the words *contextualize* and *decontextualize*. If students have a problem, they should be able to break it apart and show it symbolically, with pictures, or in any way other than the standard algorithm. Conversely, if students are working a problem, they should be able to apply the "math work" to the situation.

3. Construct viable arguments and critique the reasoning of others.
   What it means: Be able to talk about math, using mathematical language, to support or oppose the work of others.

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4. Model with mathematics.
   What it means: Use math to solve real-world problems, organize data, and understand the world around you.

5. Use appropriate tools strategically.
   What it means: Students can select the appropriate math tool to use and use it correctly to solve problems. In the real world, no one tells you that it is time to use the meter stick instead of the protractor.

6. Attend to precision
   What it means: Students speak and solve mathematics with exactness and meticulousness.

7. Look for and make use of structure
   What it means: Find patterns and repeated reasoning that can help solve more complex problems. For young students this might be recognizing fact families, inverses, or the distributive property. As students get older, they can break apart problems and numbers into familiar relationships.

8. Look for and express regularity in repeated reasoning.
   What it means: Keep an eye on the big picture while working out the details of the problem. You don't want kids that can solve the one problem you've given them; you want students who can generalize their thinking.

   To hear an explanation of the importance of these standards for mathematical practices, watch this video from the Hunt Institute:
   https://www.youtube.com/watch?v=m1rxkW8ucAI&list=PLD7F4C7DE7CB3D2E6