Utah Core Essential Elements and Range of Complexity Examples for Mathematics

Seventh Grade

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http://schools.utah.gov/sars/Significant-Cognitive-Disabilities.aspx

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COMMON CORE ESSENTIAL ELEMENTS AND COMPLEXITY EXAMPLES FOR SEVENTH GRADE

Seventh Grade Mathematics Standards: Ratios and Proportional Relationships

CCSS Grade-Level Clusters	Common Core Essential Elements	Range of Complexity Examples
Analyze proportional relationships and use them to solve real-world and mathematical problems. **7.RP.1.** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour.* **7.RP.2.** Recognize and represent proportional relationships between quantities. ▪ Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or	**EE7.RP.1-3.** Use a ratio to model or describe a relationship.	**Students will:** **EE7.RP.1-3.** Complete the ratio using numbers to show relationships. Ex. Given one component of a ratio in standard form (1:_) complete the ratio. Ex. Given a family picture, what is the ratio of people wearing hats compared to the total number of people in the picture? Ex. Describe the relationship between miles driven and the time taken by creating a ratio (e.g., Katie knows she can drive one mile in two minutes is 1:2). **Students will:** **EE7.RP.1-3.** Use a ratio to model or describe a relationship. Ex. Given a bag of green and red chips, identify the ratio of green chips compared to red chips. Ex. Use a pictorial representation to show part-whole relationship (e.g., What part of the picture is shaded? Three parts are shaded and one part is not). **Students will:** **EE7.RP.1-3.** Demonstrate a simple ratio relationship. Ex. Using a dry ease board demonstrate a ratio relationship of squares to circles. Ex. When playing a board game, move one space for every dot on the die. Ex. Complete a pattern given a simple ratio. **Students will:** **EE7.RP.1-3.** Identify one item as it relates to another. Ex. When given two baskets with markers, count the number in each basket and compare.

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graphing on a coordinate plane and observing whether the graph is a straight line through the origin. ▪ Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ▪ Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.* ▪ Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where r is the unit rate.		Ex. Given two cards with attendance cards, compare the number here and absent. Ex. Given a half an apple and a whole apple, identify "the whole" apple.

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7.RP.3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.		

Seventh Grade Mathematics Standards: The Number System

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Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. **7.NS.1.** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. ▪ Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* ▪ Understand *p* + *q* as the number located a distance |*q*| from *p*, in the positive or negative direction depending on whether *q* is positive or negative. Show that a number and its opposite have a sum of	**EE7.NS.1.** Add fractions with like denominators (halves, thirds, fourths, and tenths) so the solution is less than or equal to one.	**Students will:** **EE7.NS.1.** Same as below. **Students will:** **EE7.NS.1.** Add fractions with like denominators (halves, thirds fourths, and tenths) so the solution is less than or equal to one. Ex. Use fraction bars or fraction circles to add so that answer is less than or equal to one. Match a numerical representation to the model. Ex. Given tenths, construct the whole and recognize that 10 tenths are needed to make a whole. (Connect to money–10 dimes = one whole dollar). **Students will:** **EE7.NS.1.** Use models to add halves, thirds, and fourths. Ex. Given thirds, construct the whole and add the number of thirds needed to make a whole. Ex. Given fourths, construct the whole and add the number of fourths needed to make a whole. Ex. Given a recipe that calls for a 1/4 cup of sugar, shade a picture of a measuring cup marked into fourths to show how much sugar is needed to double the recipe (1/4 + 1/4 = 2/4 or 1/2). Ex. Demonstrate that a whole can be divided into equal parts, and when reassembled, recreates the whole using a model. **Students will:** **EE7.NS.1.** Use models to identify the whole and find the missing pieces of a whole. Ex. Given three choices, identify which is more, a whole or a half. Ex. Presented with a whole object and the same object with a piece missing, identify the whole. Ex. Given 1/2 a pizza, identify the missing part (concrete model or touch board).

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0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. ▪ Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.		Ex. Shown papers cut in halves, thirds, etc., choose the object cut in halves. Ex. Given boxes with one-third shaded, one-half shaded, and the whole shaded, choose the one with the whole shaded.
Apply properties of operations as strategies to add and subtract rational numbers. **7.NS.2.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. ▪ Understand that multiplication is extended from fractions to rational numbers by requiring	**EE7.NS.2.a.** Solve multiplication problems with products to 100.	**Students will:** **EE7.NS.2.a.** Solve multiplication problems with products to 144. Ex. Given a multiplication problem, solve independently using a variety of methods. Ex. Given the product and three possible multiplication problems, identify the correct multiplication problem for the answer. **Students will:** **EE7.NS.2.a.** Solve multiplication problems with products to 100. Ex. Given the model of a multiplication problem, identify the multiplication problem and the corresponding answer. Ex. Given a multiplication problem (4 x 3) and three answer choices, use a calculator to solve the problem and choose the correct answer. Ex. Given an array of models, show which array depicts a problem (e.g., 5 x 7 = 35). Ex. Solve word problems using multiplication (e.g., I want bring 10 people

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that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.		to my party and I have two party hats for each person. How many party hats do I have?). **Students will:** **EE7.NS.2.a.** Solve multiplication problems using factors 1 – 10. Ex. Use repeated addition to solve multiplication problems. Ex. Using a multiplication chart, identify the answer to multiplication problems. Ex. Create arrays to model multiplication facts. Ex. Use 100s board or touch board to model skip counting (i.e., 2, 4, 6, 8 . . .). Ex. Group items to model multiplication (e.g., 3 x 5 could be modeled by three groups with five in each group). **Students will:** **EE7.NS.2.a.** Skip count by twos and tens. Ex. Model repeated addition. Ex. Use a 100s board or touch board to skip count (i.e., 2, 4, 6, 8, . . .). Ex. Given bundles of pipe cleaners (10 in each bundle), skip count to find the total.
▪ Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world	**EE7.NS.2.b.** Solve division problems with divisors up to five and also with a divisor of 10 without remainders.	**Students will:** **EE7.NS.2.b.** Solve division problems with divisors up to 10 using numbers. Ex. Given a real-world problem, find the solution using division (e.g., "If I have the area of a hall that is 50 feet and one side has a length of 5 feet, how long is the other side?"). Ex. Given a problem involving money, find the solution using division (e.g., "If a friend and I find 20 dollars, how will we split it up so that we each get the same amount?"). Ex. If I have a large bowl with eight cups of beans, how many two-cup servings can I get out of that bowl? Ex. Given a computer program with division problems, find the quotient. Ex. When planting seeds for a science experiment, divide the seeds into 10 equal shares and represent the problem in numerals.

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contexts.		**Students will:** **EE7.NS.2.b.** Solve division problems with divisors up to five and also with a divisor of 10 without remainders. Ex. Use money to solve division problems (e.g., If a friend and I find 10 dollars, how will we split it up so that we each get the same amount? Divide the paper money to find the answer.). Ex. Given 10 manipulatives, divide into two equal groups of five. Show that 10 / 2 = 5. Ex. Divide the classroom into four equal groups for a sports tournament. Ex. Use the number line to show how many times you can subtract five out of 15. Ex. If you give each person two cups of soup and you have 10 cups of soup, how many people could come to your soup party? **Students will:** **EE7.NS.2.b.** Determine how many times a number can be subtracted from an equally divisible number. Ex. Given a number divisible by five or 10, subtract out five or 10, show the number of times this number can be subtracted (e.g., "Show me how many sets of five pipe cleaners you can divide 20 pipe cleaners into"). Ex. Given a number line, demonstrate how many times a number can be subtracted from an equally divisible number (e.g., "Show me how many times can you subtract five from 25 using the number line"). Ex. Given pictures of pairs of shoes, subtract pairs to determine how many people (e.g., "If there are 10 shoes in the room, how many people are there?"). **Students will:** **EE7.NS.2.b.** Associate value with the number one by recognizing the group/set that has more than one. Ex. Given a stack of library books and a single book, identify which set has

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		more than one. Ex. Compose a set with more than one manipulative.
▪ Apply properties of operations as strategies to multiply and divide rational numbers. ▪ Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	**EE7.NS.2.c-d.** Compare fractions to fractions and decimals to decimals using rational numbers less than one.	**Students will:** **EE8.NS.2.c-d.** Compare and order fractions and decimals when all numbers are fractions or when all numbers are decimals or when fractions and decimals are mixed. Ex. Divide a whole pizza into different fractions (1/4 and 1/2). Ex. Order fractions or decimals from least to greatest (1/4, 1/2, and 3/4) on a number line. Ex. Sort fractions and decimals and match monetary amounts (1/4 of a dollar = 25¢, 1/2 of a dollar = $0.50). **Students will:** **EE8.NS.2.c-d.** Compare fractions to fractions and decimals to decimals using rationale numbers less than one. Ex. Compare two fractions and locate them on a number line. Ex. Use pictorial representations to compare fractions to fractions and decimals to decimals. Ex. Point to the measuring cup that shows 1/2. Ex. Given a quarter and a dime, show which has a smaller value. Ex. Given two clocks, one on the hour and one on the half hour, choose which shows a half hour. **Students will:** **EE8.NS.2.c-d.** Identify the location of a fraction or decimal used in the real world and/or on a number line. Ex. Label the location of a fraction or decimal on a number line. Ex. Given a number 2 1/2, point to the number on a number line. Ex. Locate a decimal used in the real world on a number line to tell which is more (e.g., "If an item cost $0.58 and another item cost $0.59 cents, find both amounts on the number line and tell which costs more"). Ex. Locate a fraction used in the real world on a number line to tell which is more (e.g., If I have 3/4 of a pie and you have 1/2 of a pie using the

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		number line, show who has more pie. Find the location of the number 0.5 on a number line). **Students will:** **EE8.NS.2.c-d.** Identify decimals or fractions. Ex. Given a whole number and a decimal, choose the decimal. Ex. Given a ball, a block, and a decimal, point to the decimal. Ex. Select 1/2 of an object when asked to show 1/2 (e.g., 1/2 of an apple).
7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.[18]	**EE7.NS.3.** Demonstrate the value of various money amounts using decimals.	**Students will:** **EE7.NS.3.** Determine the total value of money written as a decimal given real-world situations. Ex. Use a calculator to determine how much money they have total in decimal form. Ex. Count money using decimals/calculator to "shop" for items and determine how much money to pay the cashier when given the total of the purchase. **Students will:** **EE7.NS.3.** Demonstrate the value of various money amounts using decimals. Ex. Given a variety of coins and bills, write the value of the given money using a decimal. Ex. Given a variety of coins, bills, and cards with amounts written with decimals, match the cards to the value of the coins. Ex. Use a calculator to show the value of coins in decimals (e.g., quarters ($0.25), dimes ($0.10) nickels ($0.05), and pennies ($0.01). **Students will:** **EE7.NS.3.** Identify the decimal value of various coins.

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[18] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

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		Ex. Given pictures of coins, identify the value of each coin in cents. Ex. Given cards with different coin amounts written in decimals ($0.05, $0.10, $0.20, etc.), match the amount with the correct coin. Ex. Given more than one of the same coin, identify the total value of the given coins. **Students will:** **EE7.NS.3.** Identify money. Ex. Given a group of coins representing different values, sort coins by like amounts. Ex. Given a picture of a coin, match real coins to the picture. Ex. Differentiate between dollar money and change (coins). Ex. Choose money versus non-money (e.g., colored chips, etc.) to pay for purchases.

Seventh Grade Mathematics Standards: Expressions and Equations

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Use properties of operations to generate equivalent expressions. **7.EE.1.** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **7.EE.2.** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*	**EE7.EE.1-2.** Use the relationship within addition and/or multiplication to illustrate that two expressions are equivalent.	**Students will:** **EE7.EE.1-2.** Apply the commutative property to complete an equation. Ex. Given 12 objects and an equation with three groups on one side of the equals sign and two groups on other side, create a balanced equation by recognizing that the side with three groups will have two objects in each group, and the side with two groups will have three objects in each group. Ex. 5 x 7 = _____ x _____ (7 x 5) Ex. _____ + _____ = 4 + 8 (8 + 4) **Students will:** **EE7.EE.1-2.** Use the relationship within addition and/or multiplication to illustrate that two expressions are equivalent. Ex. 4 + 7 = 7 + _____ Ex. 2 x 4 = _____ x 2 Ex. 3 + _____ = 5 + 3 **Students will:** **EE7.EE.1-2.** Use the relationship within addition to illustrate that two expressions are equivalent. Ex. Given a model showing five objects plus two objects on one side of an equals sign and two objects on the other side, recognize that five objects are needed to get the same amount. Ex. Is 2 + 3 = to 3 + 2? Answer yes/no. Ex. Is 2 + 3 = to 4 + 2? Answer yes/no. **Students will:** **EE7.EE.1-2.** Understand that different displays of the same quantity are equal. Ex. Recognize that three discs and three squares are the same quantity. Ex. Recognize that different arrangements of the same amount are equal (e.g., different arrangements of 4 dots – connection to subitizing).
Solve real-life and	**EE7.EE.3-4.** Use the	**Students will:**

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mathematical problems using numerical and algebraic expressions and equations. **7.EE.3.** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each*	concept of equality with models to solve one-step addition and subtraction equations.	**EE7.EE.3-4.** Solve two-step addition and subtraction equations. Ex. After determining that 5 + 5 = 10, decompose 10 into three and seven. Ex. After determining that 9 - 6 = 3, determine that three is composed of 2 + 1. **Students will:** **EE7.EE.3-4.** Use the concept of equality with models to solve one-step addition and subtraction equations. Ex. If there is a quantity of five on one side of the equation and a quantity of two on the other side, what quantity is added to make it equal? Ex. If I have three balls and I get some more balls – how many did I get if I now have seven? Ex. Given 4 + ___ = 12, identify the missing amount using models. Ex. Given 12 - ___ = 5, identify the missing amount using models. Ex. Given 10 = 2 + ____, identify the missing amount using models. **Students will:** **EE7.EE.3-4.** Identify the amount needed to equal the value on the given side of an equation. Ex. Three objects + two objects will equal five objects. Ex. Given a number from 2 to 10, decompose the number to create a balanced equation (connection to decomposition of numbers). **Students will:** **EE7.EE.3-4.** Recognize equal quantities on both sides of an equation. Ex. Match equal quantities: three triangles is the same quantity as three circles. Ex. Give the digit 5, count out five objects as an equal quantity.

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edge; this estimate can be used as a check on the exact computation. **7.EE.4.** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. ▪ Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* ▪ Solve word problems leading to inequalities		

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of the form *px + q > r* or *px + q < r*, where *p, q,* and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*		

Seventh Grade Mathematics Standards: Geometry

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Draw construct, and describe geometrical figures and describe the relationships between them. **7.G.1.** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. **7.G.2.** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	**EE7.G.1-2.** Draw or classify and recognize basic two-dimensional geometric shapes without a model (circle, triangle, rectangle/square).	Students will: **EE7.G.1-2.** Draw or model two-dimensional shapes including a trapezoid and rhombus without a model. Ex. Draw/create a trapezoid. Ex. Draw/create a rhombus. Ex. Replicate a geometric shape with given dimensions. Ex. Draw a shape that is twice as big in one dimension (length or width) as a given shape (e.g., given a coordinate grid, have the student draw a rectangle that is twice as long and twice as high as the one he/she is given). Students will: **EE7.G.1-3.** Draw or classify and recognize basic two-dimensional geometric shapes without a model (circle, triangle, rectangle/square). Ex. Recognize and group together different types of rectangles and circles Ex. State the name of circle, triangle, rectangle, and square. Ex. Draw a rectangle and circle. Students will: **EE7.G.1-2.** Demonstrate the ability to complete a two-dimensional shape (circle, triangle, rectangle, square). Ex. Compare shapes when given manipulatives/pictures and asked to tell what shapes are the same and what shapes are is different. Ex. Given an arc, complete the drawing of a circle. Ex. Given concrete pieces, complete a specified shape (e.g., four equal length Popsicle sticks to create a square). Students will: **EE7.G.1-2.** Demonstrate the ability to recognize a two-dimensional shape (circle, triangle, rectangle, square) when given a complete shape. Ex. Recognize a shape.

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		Ex. When given a shape, find another shape like the one just given. Ex. Compare shapes when given manipulatives – to say two shapes are the same (congruent) after matching the sides on each. Ex. Use various media for students to form a simple geometric shape (e.g., sand, shaving cream). Ex. Given a sample shape, trace the shape (touch board, raised paper, wiki sticks, etc.).
7.G.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	**EE7.G.3.** Match a two-dimensional shape with a three-dimensional shape that shares an attribute.	**Students will:** **EE7.G.3.** Pair two- and three-dimensional shapes to complete a real-world task. Ex. Given a three-dimensional shape and several different two-dimensional shapes (e.g., cube, cylinders), select the two-dimensional shape that represents one face of the three-dimensional shape (e.g., square, circle). Ex. Given a diagram to show the placement of different shaped objects in a storeroom, use the two-dimensional shape in the diagram to place three-dimensional objects appropriately on the shelf (e.g., square boxes on squares, rectangular boxes on rectangles, and bottles on circles). **Students will:** **EE7.G.3.** Match a two-dimensional shape with a three-dimensional shape that shares an attribute. Ex. Given a circle, find objects that are three-dimensional counterparts (e.g., ball, globe, sphere). Ex. Given a square, find objects that are three-dimensional counterparts (e.g., box, locker). Ex. Given a square, find three-dimensional objects that share one attribute (e.g., square with cube, circle with cylinder). **Students will:** **EE7.G.3.** Identify the attributes of a three-dimensional shape (color, number of sides, faces, size, textures, shape, etc.). Ex. Given a red ball and communication device, identify words that

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		describe the attributes of the ball. Ex. Given a group of shapes, describe common attributes. Ex. Given a class of objects, identify common attributes and choose one to sort by. **Students will:** **EE7.G.3.** Replicate the two-dimensional cross-section of a three-dimensional shape (cube, sphere, cylinder) when given a complete shape. Ex. Given a cube, outline the base to form a square. Ex. Given a soda can, outline the base to form a circle.
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. **7.G.4.** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	**EE7.G.4.** N/A	
7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown	**EE7.G.5.** Find the perimeter of a rectangle given the length and width.	**Students will:** **EE7.G.5.** Solve simple perimeter problems with rectangles. Ex. Given a rectangle with identified dimensions, determine the perimeter. Ex. A bulletin board is 5' by 5'. How much border paper is needed for the perimeter? Ex. When given a picture of a garden with only the length and width identified, solve for perimeter.

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angle in a figure.		3 + 8 + 3 + 8 = 22 yards **Students will:** **EE7.G.5.** Find the perimeter of a rectangle given the length and width. Ex. Determine the perimeter of a rectangle given a visual model and a calculator. Ex. Given a rectangle with tic marks indicating a length of six and a width of four, determine the perimeter by counting (6 + 4 + 6 + 4). Ex. Shown a taped rectangle on the floor with tic marks or floor tiles denoting squares within the rectangle, walk around the rectangle, counting steps/tiles/tic marks, to determine the perimeter. Ex. Measure the length and width of a desk and other rectangular objects in the classroom (e.g., books, picture frames). **Students will:** **EE7.G.5.** Identify the length and width of a rectangle. Ex. Cover a rectangle with squares (i.e., color tiles) and identify the sum of numbers of tiles of the top/bottom and the sides. Ex. Given a circle, measure the distance around the circle (circumference – perimeter of a circle). Ex. Place a string around the perimeter of an object and then measure the length of the string to tell the distance around the object. Ex. Given a gridded rectangle, identify the length of the top/bottom and the sides. **Students will:** **EE7.G.5.** Outline the perimeter of an object.

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		Ex. Use wiki sticks to outline the border of a square/rectangle. Ex. Outline the perimeter of a rectangular pan by tracing the edge with a finger. Ex. Outline the perimeter of a tablet by laying string around the edge. Ex. Count the number of squares around the outside of a gridded rectangle. ![grid with numbers 1-12 around border: top row 1 2 3 4 5; right 6; bottom 7 8 9; 10; left 11; 12]
7.G.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	**EE7.G.6.** Find the area of a rectangle given the length and width using a model.	**Students will:** **EE7.G.6.** Solve simple area problems with rectangles. Ex. A rectangular rug is 4' by 5'. What is the area of the rug? Use a calculator to apply to the given model problem and find the answer. Ex. Given a rectangle with identified length and width dimensions, determine the area. **Students will:** **EE7.G.6.** Find the area of a rectangle given the length and width using a model. Ex. Given rectangles (including squares) with grids, count squares to calculate the area. ![2 by 5 grid of squares] Ex. Partition rectangular figures into rows and columns of the same-size squares without gaps and overlaps and count them to find the area. Ex. Given a picture of a rectangle, have students divide the interior of the figure into equally squared units and determine the number of squared

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		units within the rectangle. **Students will:** **EE7.G.6.** Identify the length and width (dimensions) of a rectangle. Ex. Cover a given rectangle with squares (i.e., color tiles) and identify the numerical value of the total number of square units. Ex. Given a gridded rectangular box place smaller boxes side-by-side (in one layer) to count how many small boxes the large box holds and identify the numerical value (sum) of the grids inside the rectangle. **Students will:** **EE7.G.6.** Duplicate the area of a rectangle (square). Ex. Cover a square pan with pieces of toast, square crackers, etc. in a single layer. Ex. Use squares of colored paper to cover their desk or tray on a wheelchair.

Seventh Grade Mathematics Standards: Statistics and Probability

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Use random sampling to draw inferences about a population. **7.SP.1.** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **7.SP.2.** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a*	**EE7.SP.1-2.** Answer a question related to the collected data from an experiment, given a model of data, or from data collected by the student.	**Students will:** **EE7.SP.1-2.** Answer a question about data collected from an experiment and explain or demonstrate the results. Ex. Poll classmates to determine where to go on a field trip and explain results. Ex. Given data on height of students in two classes, identify which class has the tallest students. **Students will:** **EE7.SP.1-2.** Answer a question related to the collected data from an experiment, given a model of data, or from data collected by the student. Ex. Given data (e.g., a frequency table) of favorite pizza toppings, which type of pizza would be ordered most often. Ex. Asked what their favorite season is, place themselves in one of the four groups and answer a question about the results. (What is the group's favorite season? What is the group's least favorite season?) **Students will:** **EE7.SP.1-2.** Collect data to answer a given question. Ex. Ask fellow classmates what their favorite activity subject is and keep tally marks of the responses. Ex. Use a grid to record the number of tennis shoes in the classroom. **Students will:** **EE7.SP.1-2.** Answer a question for data collection. Ex. Answer a question about what they ate for breakfast. Ex. Answer a question about their favorite candy bar.

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book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.		
Draw informal comparative inferences about two populations. **7.SP.3.** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*	**EE7.SP.3.** Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph.	**Students will:** **EE7.SP.3.** Compare data from two picture graphs, two line plots, or two bar graphs. Ex. Given two bar graphs showing the number of pets students from two different classrooms have, determine which classroom of students has the most pets. Ex. Given two bar graphs, showing the number of boys and the number of girls from two different classrooms, determine which classroom has the least number of girls (or the least number of boys, or the greatest number of boys, or the greatest number of girls). **Students will:** **EE7.SP.3.** Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph. Ex. Compare the change in the number of days of sunlight in summer and winter on a line plot on a given graph. Ex. Given a bar graph, compare the number of red M&Ms to blue M&Ms. **Students will:** **EE7.SP.3.** Summarize data on a graph or table in one way. Ex. When looking at a graph of temperatures from the week, summarize the data in one way (e.g., three days were above 70 degrees). Ex. When looking at a table that contains data about what students like to eat or what students like to do, summarize the data in one way (e.g., "watch movies" has the most).

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7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*		**Students will:** EE7.SP.3. Read data from one given source. Ex. Using a pictograph, identify the number of students who have a dog, are present, eat breakfast, etc. Ex. Using a bar graph, identify which is more or which is less.
Investigate chance processes and develop, use, and evaluate probability models. **7.SP.5.** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	**EE7.SP.5-7.** Describe the probability of events occurring as possible or impossible.	**Students will:** EE7.SP.5-7. Differentiate and describe examples of a situation that is possible, a situation that is likely, and a situation that is impossible. Ex. State a situation that is impossible. Ex. State a situation that is possible. **Students will:** EE7.SP.5-7. Describe the probability of events occurring as possible or impossible. Ex. Answer, "Is it possible that a squirrel attends school with you?" Ex. Answer, "Is it possible that a cow will ever drive a car?" Ex. Answer, "If you only own only three shirts–a red one, a blue one, and a black one–is it possible to pull a white one from your drawer?" **Students will:** EE7.SP.5-7. Identify possible events that could occur in the natural environment. Ex. Given the lunch menu of pizza and hamburgers, identify whether it is possible to get a hamburger for lunch.

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7.SP.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.* **7.SP.7.** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ▪ Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine		Ex. Given a weekly chart of classroom jobs (different jobs every day of the week), answer "What job is possible for Monday?" **Students will:** **EE7.SP.5-7.** Identify outcomes based on a possible event. Ex. Given a picture of a person wearing a heavy coat, scarf, and hat, identify if the clothing is appropriate for a picture of some weather condition. Ex. "We are going on a field trip in town. In which of the following would it be possible to transport the entire class (show pictures of a rocket, bicycle, and a bus)?"

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probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.* ▪ Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*		