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Ratios of Proportional Relationships (RP) **Analyze proportional relationships and use them to solve real-world and mathematical problems**	
2021	**Standard**
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 ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½/¼ 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 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. d. 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. **DG7-S3-C3-DPO4** Compare, identify and write quantities using ratios. **DG7-S3-C3-DPO5** Determine and identify equal ratios as proportions. **DG7-S3-C4-PO1** Analyze change in various linear contextual situations
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. **DG7-S3-C3-DPO6** Solve problems using ratios, proportions and percents.

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The Number System (NS) **Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers**	
2021	**Standard**
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 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. □ Apply properties of operations as strategies to add and subtract rational numbers. **DG7-S1-C1-PO4** Choose the appropriate signed real number to represent a contextual situation. **DG7-S1-C1-PO5** Recognize the absolute value of a number used in contextual situations. **DG7-S1-C2-PO1** Add integers. **DG7-S1-C2-PO2** Subtract integers. **DG7-S1-C2-PO7** Apply grade-level appropriate properties to assist in computation. **DG7-S1-C2-PO8** Apply the symbols + and – to represent positive and negative, and "| |" to represent absolute value.
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 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. □ 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 contexts. □ 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. **DG7-S1-C2-PO5** Multiply integers. **DG7-S1-C2-PO6** Divide integers. **DG7-S1-C2-PO7** Apply grade-level appropriate properties to assist in computation. **DG7-S1-C2-DPO3** Convert ratios, fractions, decimals and percents from one to another. **DG7-S1-C2-DPO6** Identify the properties of addition and multiplication: Commutative, Associative, Distributive, and Identity.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) **DG7-S1-C2-PO3** Select the grade-level appropriate operation to solve word problems. **DG7-S1-C2-PO4** Solve word problems using grade-level appropriate operations and numbers. **DG7-S5-C1-PO2** Analyze algorithms for computing with fractions.

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Expressions and Equations (EE) **Use properties of operations to generate equivalent expressions**	
2021	**Standard**
7.EE.1	Apply properties of operations to as strategies to: □ Add □ Subtract □ Factor □ 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."
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 □ Assess the reasonableness of answers using mental computation and estimation strategies **DG7-S3-C3-PO2** Use variables in contextual situations. **DG7-S3-C3-PO3** Translate a written sentence into a one-step, one-variable algebraic equation. **DG7-S3-C3-DPO1** Translate a written sentence into a two-step, one-variable algebraic equation. **DG7-S3-C3-PO4** Translate a sentence written in context into an algebraic equation involving one operation.
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 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. **DG7-S3-C3-PO2** Use variables in contextual situations. **DG7-S3-C3-PO3** Translate a written sentence into a one-step, one-variable algebraic equation. **DG7-S3-C3-DPO1** Translate a written sentence into a two-step, one-variable algebraic equation. **DG7-S3-C3-PO4** Translate a sentence written in context into an algebraic equation involving one operation. **DG7-S3-C3-DPO3** Express a simple inequality from a contextual situation (e.g. Joe earns more than $5.00 an hour; therefore, x > 5)

Geometry (G) **Draw, construct, and describe geometrical figures and describe the relationship between them**	
2021	**Standard**
7.G.1	Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. **DG7-S4-C4-PO8** Compare estimated to actual lengths based on scale drawings or maps.

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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 □ Notice when the conditions determine a unique triangle □ Notice when the conditions determine more than one triangle, □ Notice when the conditions determine no triangle **DG7-S4-C1-PO1** Draw a geometric figure showing specified properties (e.g., Draw an obtuse triangle.). **DG7-S4-C1-PO5** Draw polygons with appropriate labels.
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.
7.G.4	Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle. **DG7-S4-C4-PO4** Solve problems involving the circumference of a circle. **DG7-S4-C4-PO5** Solve problems involving the area of a circle.
7.G.5	Use the following facts in a multi-step problem to write and solve simple equations for an unknown angle in a figure. □ Supplementary □ Complementary □ Vertical □ Adjacent angles **DG7-S4-C1-PO6** Identify the angles created by two lines and a transversal.
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

	□ Right prisms **DG7-S4-C4-PO6** Solve problems for the areas of parallelograms, triangles, and circles. **(No volume, surface area or 3D)**

Statistics and Probability (SP) **Use random sampling to draw inferences about a population**	
2021	**Standard**
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 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. **DG8-S2-C1-PO7** Formulate reasonable predictions based on a given set of data. **DG8-S2-C1-PO8** Compare trends in data related to the same investigation.
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.

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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.
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 ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. **DG7-S2-C1-PO1** Formulate questions to collect data in contextual situations. **DG8-S2-C2-DPO1** Express probability as a fraction, zero or one.
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. **DG7-S2-C2-PO3** Predict the outcome of a grade-level appropriate probability experiment. **DG7-S2-C2-PO5** Compare the outcome of an experiment to predictions made prior to performing the experiment. **DG7-S2-C2-PO6** Make predictions from the results of student-generated experiments using objects (e.g., coins, spinners, number cubes, cards). **DG7-S2-C2-PO7** Compare the results of two repetitions of the same grade-level appropriate probability experiment.
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 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? **DG7-S2-C2-PO2** Compare probabilities to determine the fairness of a contextual situation (e.g. If John wins when two or greater shows after a six-sided number cube is rolled and Joaquin wins otherwise, is this a fair game?).
7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. □ Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. □ Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. □ Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood? **DG7-S2-C3-PO1** Determine all possible outcomes involving the combination of up to three sets of objects (e.g., How many outfits can be made with 3 pants, 2 tee shirts and 2 pairs of shoes?). **DG7-S2-C3-PO2** Determine all possible arrangements of a given set, using a systematic list, table, tree diagram, or other representation.

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Computation **Students solve problems involving integers, fractions, decimals, ratios and percentages**	
2021	**Standard**
8.C.1	Solve addition, subtraction, multiplication, and division problems that use integers, fractions & decimals.
8.C.2	Calculate the percentage increase and decrease of a quantity.
8.C.3	Solve problems that involve discounts, markups, commissions, taxes and tips
8.C.4	Use estimation to decide whether answers are reasonable in problems involving fractions and decimals
8.C.5	Use mental arithmetic to compute with simple fractions, decimals, and powers.