Ganado Unified School District (Mathematics/7th grade)

PACING Guide SY 2015-2016

Timeline & Resources	AZ College and Career Readiness Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
Quarter 1 Mathematics: Grade 7 *Holt McDougal Textbook* A-Plus program Ati-online.com National Library of Virtual Manipulatives http://nlvm.usu.edu/ kuta.com Math-aids.com www.teacherspayteachers.com	**7.NS.A.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. a. 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.* b. 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. c. 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.	How are numbers classified? How are integers combined using all mathematical operations? Why is absolute value important? How many ways can expressions and equations represented? How can a quantity look as decimal, fraction, and percent? What does a variable represent? How can word problems be solved using expressions and equations?	TSW classify numbers in the real number system. TSW add, subtract, multiply, and divide integers using special conditions. TSW write various representations of an expression. TSW solve one-step equations. TSW write and solve word problems using verbal models. TSW solve word problems using the problem-solving method. TSW finding missing information using proportional relationships.	Numerical Expression Algebraic expression Associative property Commutative property Distributive property Order of operations Term Variable Absolute value Natural number Whole number Integer Rational number Irrational number Ratio Reciprocal

	d. Apply properties of operations as strategies to add and subtract rational numbers. **7.NS.A.2.** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. a. 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. b. 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. c. Apply properties of operations as strategies to multiply and divide rational numbers. d. 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. **7.NS.A.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.)	Why is proportion important?		

	7.EE.A.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **7.EE.A.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.B.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. **7.EE.B.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. *a.* 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?* b. 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.*			
Quarter 2 Mathematics: Grade 7 *Holt McDougal Textbook* A-Plus program Ati-online.com National Library of Virtual Manipulatives http://nlvm.usu.edu/ kuta.com Math-aids.com www.teacherspayteachers.com	**7.RP.A.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.A.2.** Recognize and represent proportional relationships between quantities. a. 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. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. 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.*	Why are ratios important? How can measure units can from one form to another (e.g. how can inches change into centimeters or miles?)? In what other ways can proportional relationships be presented? Why are unit rates important to use in everyday activities?	TSW find the ratio between two different quantities. TSW convert measure units into another unit using ratios. TSW determine proportional relationships within tables, graphs, and equations. TSW write equations from a table and graph. TSW use proportion to solve percent word problems.	Equivalent ratios Proportion Rate Unit rate Scale Scale drawing Interest Percent Percent of change Principal Simple interest

	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. **7.RP.A.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.*			
Quarter 3 Mathematics: Grade 7 *Holt McDougal Textbook* A-Plus program Ati-online.com National Library of Virtual Manipulatives http://nlvm.usu.edu/ kuta.com Math-aids.com	**7.G.A.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. **7.G.A.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. **7.G.A.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.B.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. **7.G.B.5.** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve	Why is proportion important when comparing objects? What are special characteristics of a triangle? How are outside and inside measurements of a circle found? What makes lines and angles unique? How can geometric shapes be replicated without tracing? Why is the area formula for basic geometric shapes important?	TSW produce a small drawing into large drawing using proportions. TSW create geometric shapes using a ruler, protractor, and compass. TSW explore essential conditions that make a triangle. TSW find the area and circumference of a circle. TSW use facts about lines and angles to solve word problems. TSW find the volume and surface of three-dimensional objects.	Corresponding angles Corresponding sides Similar Acute angle Obtuse angle Right angle Straight angle Reflux angle Coordinate plane Ordered pair Origin Quadrant x-axis y-axis Area Perimeter Circumference Surface area

www.teacherspayteachers.com	simple equations for an unknown angle in a figure. **7.G.B.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.			
Quarter 4 Mathematics: Grade 7 *Holt McDougal Textbook* A-Plus program Ati-online.com National Library of Virtual Manipulatives http://nlvm.usu.edu/ kuta.com Math-aids.com www.teacherspayteachers.com	**7.SP.A.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.A.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. **7.SP.B.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. **7.SP.B.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*	Why is probability important? How is probability used in the everyday activities? How can data with probability represented?	TSW perform various experiments to determine probability on specific information. TSW display data in box-and-whiskers format. TSW make predictions of events using experimental probability. TSW make predictions of events using theoretical probability. TSW find various orders of specific items using permutation.	Probability Box-and-whisker plot Mean Median Mode Random sample Experiment Population Sample Combination Event Outcome Dependent event Independent event Experimental probability Theoretical probability

	chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. **7.SP.C.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. **7.SP.C.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. a. 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.* b. 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?*			

	7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. 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. b. 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. c. 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?*			