7th Grade Advanced Academic Scope & Sequence

Days May Vary	Unit	Standard(s)/Outcome(s)	Essential/Guiding Questions
17-19	Unit 1: Rational Number	● 7.NS.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers, and represent addition and subtraction on a horizontal or vertical number line diagram. ● 7.NS.A.1a Describe situations in which opposite quantities combine to make 0. ● 7.NS.A.1b 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. ● 7.NS.A.1c Understand subtraction of rational numbers as adding the	● How are addition and subtraction related to each other as applied to positive and negative numbers? (Subtracting is the same as adding the opposite) ● Can you reverse the order of rational numbers when performing any operation and still get the same answer? ● How do integer operations compare to rational number operations?

		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. ● 7.NS.1d. 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 number. ● 7.NS.2a. 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. ● 7.NS.2b. 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: Interpret quotients of rational numbers by describing real-world contexts. ● 7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.	
12-14	Unit 2: Ratios and Proportional Relationships	● 7. RP.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like and or different units.. For example, if a person walks mile in each hour, compute the unit rate as the complex fraction miles per hour, equivalently 2 miles per hour. ● 7.RP.2a. Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios	● What is the difference between rate and unit rate? ● What is the constant of proportionality in a table, graph, or equation? ● How is a proportional relationship represented on a coordinate plane? ● How can you use proportional reasoning to find missing lengths in a scale drawing?

		in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. ● 7.RP.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships. ● 7.RP.2c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number of 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.* ● 7.RP.2d. 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.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. ● 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.	
10-12	Unit 3: Percentages	● 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; and assess the reasonableness of answers using mental computation and estimation	● How are proportions used to solve percent problems? ● What methods of computation can you use to answer percent problems? ● What is the meaning of an answer in the context of the problem?

		strategies. ● 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.* ●	
		● 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."* ● 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. ● 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. ● 7.EE.4a. 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?* ● 7.EE.4b. 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.* ● 7.EE.B3: 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.	
8-10	Unit 5: Geometric Figures	● 7.G.2: Draw (freehand, with ruler and protractor, and with	● How do angles relate to the polygons they create?

		technology) geometric shapes with given conditions. Focus on constructing (drawing?) 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.5: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	● How can I use angle relationships to solve for an unknown or a missing angle measurement?
17-19	Unit 6:Measurement and Geometry	● 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 use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. ● 7.G.6: Solve real-world and mathematical problems involving area, volume and	● What techniques and tools are appropriate for determining measurements of 2 or 3 dimensional objects? ● What is the relationship between the area of a circle and its circumference?

		surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms	
10-12	Unit 7: Statistics	● 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*	● What makes a sample a good representation of a population? ● How do we know a generalization or inference about a population is "valid"? ● What makes two numerical data distributions similar or different? ● How are measures of center, deviation and variability used to compare two sets of data?

		on randomly sampled survey data. Gauge how far off the estimate or prediction might be. ● 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, mean height of players on the basketball team is. 10 cm greater than 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* ● 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*	
10-12	Unit 8:	● 7.SP.5: Understand that the	● How are probabilities

	Probability	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.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; and if the agreement is not good, explain possible sources of the	expressed? ● What is the difference between experimental and theoretical probability? ● What are ways to represent the number of outcomes? ● How can probability be used to determine the likelihood of future events? ● What type of model can be used to represent a real life situation involving probability?

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