6-8th Grade Learning Progressions
Arkansas Math Standards 2023

Number Concepts & Computations		
Rational Numbers		
6.NCC.1: Explain positive and negative integers as being opposite values or directions and the meaning of 0 in a real-world context.	7.NCC.1: Represent addition and subtraction of rational numbers in real-world contexts using a variety of forms.	
	7.NCC.2: Model and describe additive inverse in real-world situations to show opposite quantities combine to make 0.	
6.NCC.2: Find and plot rational numbers on horizontal and vertical number lines in real-world and mathematical problems.		
6.NCC.3: Compare rational numbers, using inequalities (<,>,≤,≥,≠) and order on a number line.		8.NCC.2: Compare the size of irrational numbers and locate them on a number line by finding the rational approximations.
6.NCC.4: Interpret the absolute value of numbers for positive or negative quantities in a real-world context.	7.NCC.3: Demonstrate in real-world contexts the distance between two rational numbers on the number line as the absolute value of their differences.	
6.NCC.5: Convert between fractions, decimals, and percents in real-world and mathematical problems.	7.NCC.4: Convert a rational number in fraction form to decimal form and recognize that the decimal form of a rational number terminates in 0s or eventually repeats.	
		8.NCC.1: Describe relationships in the real number system (rational and irrational). • Numbers relationships to include: decimal expansion for rational and irrational numbers,

		square roots of nonperfect squares, and cube roots of nonperfect cubes
		8.NCC.3: Know and apply the properties of integer exponents to generate equivalent numerical expressions.
		8.NCC.4: Write very large and very small numbers in scientific notation using positive and negative exponents.
		8.NCC.5: Compare numbers written in scientific notation to determine how many times larger or smaller one number is than the other, using real-world and mathematical problems.
		8.NCC.6: Solve real-world and mathematical problems by performing operations with numbers written in standard and scientific notation.
Rational Number Operations		
6.NCC.6: Interpret and represent quotients of fractions. • Fractions include all forms of fractions.	7.NCC.5: Interpret the products and quotients of rational numbers by describing real-world contexts.	
6.NCC.7: Solve problems involving the division of fractions in real-world and mathematical problems. • Fractions include all forms of fractions.		
	7.NCC.6: Apply properties of operations as strategies to fluently add, subtract, multiply, and divide rational numbers.	

6.NCC.8: Divide multi-digit numbers fluently in real-world and mathematical problems.		
6.NCC.9: Use any standard algorithm to fluently add and subtract multi-digit decimals and fractions in real-world and mathematical problems.	7.NCC.7: Use addition and subtraction with rational numbers in any form to solve multi-step problems in real-world and mathematical contexts.	
6.NCC.10: Use any standard algorithm to fluently multiply and divide multi-digit decimals and fractions in real-world and mathematical problems.	7.NCC.8: Use multiplication and division with rational numbers in any form to solve multi-step problems in real-world and mathematical contexts.	
	7.NCC.9: Apply operations with rational numbers involving the order of operations, involving nested grouping symbols.	8.NCC.7: Solve equations in the form of $x2 = p$ or $x3 = p$ where p is a positive rational number.
		8.NCC.8: Evaluate square roots of perfect squares and cube roots of perfect cubes.
Common Factors and Multiples		
6.NCC.11: Solve real-world and mathematical problems with the greatest common factor of two whole numbers less than or equal to 100.		
6.NCC.12: Solve real-world and mathematical problems with the least common multiple of two whole numbers less than or equal to 12.		
6.NCC.13: Use the distributive property and the greatest common factor to rewrite the sum of two whole numbers, 1 through 100.		
Proportional Relationships & Functions(8th Grade only)		

Ratio & Rates		
6.PR.1: Use precise ratio language and notation to describe a ratio as a relationship between two quantities.	7.PR.1: Determine the unit rate (constant of proportionality) from tables, graphs, equations, diagrams, or verbal descriptions of proportional relationships.	8.FN.1: Graph proportional relationships, interpreting the unit rate as the slope of the graph.
6.PR.2: Calculate unit rates to include unit pricing and constant speed.	7.PR.2: Calculate unit rates in real-world contexts that include complex fractions.	
6.PR.3: Give examples of unit rates as a ratio that compares two quantities with different units of measure, limited to non-complex fractions.		
6.PR.4: Create various representations to compare ratios and find missing values to solve real-world and mathematical problems.		
6.PR.5: Find a percent of a quantity as a rate per 100 and solve problems involving finding the whole when given a part and the percent.	7.PR.3:Solve multi-step ratio and percent problems in a real-world context, including percent error and percent increase and decrease.	
Constant of Proportionality		
	7.PR.4: Determine whether two quantities represent proportional relationships by using equivalent ratios in a table and by graphing on a coordinate plane.	
	7.PR.5: Compare two different proportional relationships represented in different forms.	
	7.PR.6: Create equations in the form of $y=mx$ from tables, verbal descriptions, or graphs.	

	7.PR.7: Given a graph with a proportional relationship, explain the meaning of a point (x,y) on the graph, including the origin (0,0) and the unit rate $(1,r)$.	8.FN.1: Graph proportional relationships, interpreting the unit rate as the slope of the graph.
Functions (8th grade only)		
		8.FN.2: Explain, using similar right triangles, how the slope of a line is the same between two points on a non-vertical line or non-horizontal line. • Slope includes: positive, negative, horizontal (zero), and vertical (undefined)
		8.FN.3: Determine whether a relation is a function or not when given a function map, table, graph, equation, or set of ordered pairs.
		8.FN.4: Compare the rate of change (slope) and y-intercept (initial value) of two linear functions each represented in different forms. • Functions are represented algebraically, graphically, numerically in tables, or by verbal descriptions.
		8.FN.5: Distinguish between linear and nonlinear functions by comparing graphs and equations.
		8.FN.6: Determine the rate of change (slope) and y-intercept (initial value) from tables, graphs, equations, and verbal descriptions of linear relationships.
		8.FN.7: Interpret and explain the meaning of the rate of change (slope) and y-intercept

		(initial value) of a linear relationship in a real-world context.
		8.FN.8: Analyze a graph by describing the functional relationships between two quantities.
		8.FN.9:Sketch a graph that exhibits qualitative features of a function described verbally.
Algebra		
Expressions		
6.ALG.1: Read and write expressions in real-world or mathematical problems in which letters stand for numbers.		
6.ALG.2: Use mathematical terms to identify parts of an expression, including the names of operations, terms, factors, coefficients, variables, and constants.		
6.ALG.3: Write and evaluate expressions for given values of variables, using order of operations, including expressions with whole number exponents.		
6.ALG.4: Generate equivalent expressions by applying the associative, commutative, distributive, and identity properties.	7.ALG.1: Generate and justify equivalent expressions, using properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients within mathematical and real-world problems.	
6.ALG.5: Identify when two expressions are equivalent by using properties of operations including like terms.		
Equations & Inequalities		

6.ALG.6: Use substitution to determine if a given value in a specified set makes an equation or inequality true. • Include the following inequality symbols: <,>,≤,≥,≠		
6.ALG.7: Write and solve one-step equations in real-world and mathematical problems, involving positive rational numbers and zero.	7.ALG.2: Model and solve fluently two-step equations in real-world or mathematical problems.	8.ALG.1: Analyze and solve one-variable linear equations with rational coefficients containing solutions with one, zero, or infinitely many solutions.
6.ALG.8: Write, solve, and graph one-step inequalities in real-world and mathematical problems.	7.ALG.3: Create, solve, and graph two-step inequalities in real-world and mathematical problems in the forms $px\pm q> r$,$px\pm q<r$,$px\pm q\geq r$, and $px\pm q\leq r$.	8.ALG.2: Analyze and solve one-variable linear inequalities with rational coefficients.
Relationship between Quantities (7th grade only) & Systems of Equations (8th grade only)		
	7.ALG.4: Write an equation to express two quantities in terms of the dependent and independent variables.	
	7.ALG.5: Describe the relationship between the dependent and independent variables in an equation using tables and graphs, relating these to the equation.	8.ALG.3: Analyze and solve systems of linear equations in the form $y=mx+b$ in real-world or mathematical contexts, graphically and algebraically.
Geometry & Measurement		
Area, Volume, & Surface Area		
	7.GM.1: Describe the proportional relationship between the circumference and diameter of a circle.	
	7.GM.2: Use area and circumference formulas of a circle to solve real-world and mathematical problems.	
6.GM.1: Find the area of triangles, quadrilaterals, and polygons by composing or decomposing to solve real-world and		

mathematical problems.		
6.GM.2: Apply the formulas $V=lwh$ and $V=Bh$ to find the volume of right rectangular prisms with fractional edge lengths to solve real-world and mathematical problems, including solving for an unknown dimension.	7.GM.3: Apply the formulas for the volume and surface area of right rectangular prisms, rectangular pyramids, triangular prisms, and triangular pyramids to solve real-world and mathematical problems.	8.GM.1: Apply the formulas for the volume and surface area of cylinders, cones, and spheres to solve real-world and mathematical problems.
6.GM.3: Construct nets of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid, using the nets to find the surface area of these prisms.		
Coordinate Plane System (6th Grade Only)		
6.GM.4: Find and graph pairs of rational numbers in all four quadrants of the coordinate plane in real-world and mathematical problems.		
6.GM.5: Draw polygons in the coordinate plane when given coordinates for the vertices.		
6.GM.6: Use coordinates to calculate vertical and horizontal distances between points with the same x-coordinate or the same y-coordinate to solve real-world and mathematical problems.		
Conversions (6th Grade Only)		
6.GM.7: Convert measurements within and between the metric and customary measurement systems to solve real-world and mathematical problems.		

Cross Sections (7th & 8th Grade Only)		
	7.GM.4: Describe the two-dimensional figure that results from slicing a three-dimensional figure parallel and perpendicular to the base. • Three-dimensional figures include: right rectangular prisms, triangular prisms, and cylinders	8.GM.2: Describe the two-dimensional figure that results from slicing a three-dimensional figure parallel and perpendicular to the base. • Three-dimensional figures include: pyramids, cones, and spheres
Triangles & Angles (7th Grade Only)		
	7.GM.5: Solve multi-step problems involving supplementary, complementary, vertical, and adjacent angles to include solving for an unknown angle in a figure.	
Scale (7th Grade Only)		
	7.GM.6: Calculate the scale factor, compute the actual lengths from the scale in a drawing, and reproduce a scale drawing using another scale.	
Pythagorean Theorem (8th Grade Only)		
		8.GM.3: Model or explain an informal proof of the Pythagorean Theorem and its converse.
		8.GM.4: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles
		8.GM.5: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Transformations & Congruence on a Coordinate Plane (8th Grade Only)		
		8.GM.6: Given a figure, draw a congruent

		figure on a coordinate plane resulting from a rotation, reflection, or translation.
		8.GM.7: Identify a single transformation used to transform one figure onto another on a coordinate plane. • Rotations include: 90°, 180°, and 270°
		8.GM.8: Given two congruent figures, describe a sequence of transformations that maps one figure to another.
		8.GM.9: Perform a given sequence of transformations of a figure on the coordinate plane, including rotations, reflections, translations, and dilations. • Rotations include: 90°, 180°, and 270°
		8.GM.10: Describe the effects of rotations, reflections, translations, and dilations on two-dimensional figures using coordinates. • Rotations include: 90°, 180°, and 270°
		8.GM.11: Given two similar two-dimensional figures, describe a sequence of transformations that exhibits similarity, including rotations, reflections, translations, and dilations.
Statistics & Probability		
Statistical & Nonstatistical		
6.SP.1: Identify the difference between statistical and non-statistical questions and write simple statistical questions that allow		

variable responses.		
6.SP.7: Represent numerical data on a number line, histogram, and box plot.	7.SP.1: Interpret data displayed in a histogram and box plot to answer questions about the data.	
6.SP.8 Calculate the relative frequency of an interval of data values when given a histogram		
6.SP.9: Interpret a box plot to answer statistical questions about a data set.		
	7.SP.2: Recognize, create, and interpret categorical data in a circle graph.	
6.SP.5:Calculate and interpret the measure of variation [range and interquartile range (IQR)] of a numerical data set.	7.SP.3: Graph two numerical data sets and compare their variability. • Variability includes: range, interquartile range, or mean absolute deviation	8.SP.1: Construct scatter plots using bivariate data; determine if the data displays a linear or nonlinear pattern and positive, negative, or no association.
		8.SP.2: Construct straight lines to approximately fit data displaying a linear association when presented in scatter plots.
6.SP.6: Determine which measure of variation (range or interquartile range) is more appropriate to describe the shape; justify the choice.	7.SP.4: Select an appropriate measure(s) of center or variability and draw valid comparative inferences for two data sets.	8.SP.3: Construct and interpret a relative frequency table, using data from two categorical variables collected from the same subject
Measures of Center (6th Grade Only)		
6.SP.2:Calculate and interpret any measure of center (mean, median, and mode) of a numerical data set.		
6.SP.3:Determine which measure of center (mean or median) is more appropriate to		

describe the center of data and justify the choice.		
6.SP.4:Describe how the mean or median is affected by outliers of a numerical data set.		
Sampling & Population (7th Grade Only)		
	7.SP.5: Distinguish between a random and non-random sample.	
	7.SP.6: Use a random sampling of a population to draw valid inferences and generalizations of populations.	
Probability (7th and 8th Grade Only)		
	7.SP.7: Determine the sample space of a simple experiment and use the sample space to determine the theoretical probability of a given set of outcomes. • Simple experiments include: tossing a fair coin, spinning a fair spinner, rolling a fair dice, picking a random marble from a bag, and selecting a random card from a deck	8.SP.4: Determine the sample space and use the sample space to determine the theoretical probability of a given set of outcomes for compound experiments, using organized lists, tables, or tree diagrams. • Compound experiments include a combination of two different experiments.
	7.SP.8: Recognize that probabilities in a simple experiment can be qualitative descriptors of likelihood: impossible (0), unlikely, neither likely nor unlikely, likely, or certain (1).	
	7.SP.9: Determine experimental probabilities in simple experiments and represent as fractions, decimals, and percents.	8.SP.5: Determine theoretical and experimental probabilities of compound experiments.
	7.SP.10: Use theoretical probability of an event in a simple experiment to predict the number of times that an event will occur for a large number of	8.SP.6: Use theoretical probability of an event in a compound experiment to predict the number of times that event will occur for a

	experiments.	large number of experiments.