8th Grade Math Pacing Guide

Links:

Arkansas 8th Grade Math Standards

2 Weeks	Unit 0: Setting a Positive Math Mindset/Review
2-3 days	Unit 0: Setting a Positive Math Mindset ● Math Mindset Video & Good Group Work ● Mistakes are Powerful Video & Consecutive Numbers ● Believe in Yourself Video & Art of Patterns ● Visual Math Video & Messing with Pascal ● Desmos: Getting to Know Each Other - Editable and Customizable
4 days	Unit 0: Review **7.NCC.6:** Apply properties of operations as strategies to fluently add, subtract, multiply, and divide rational numbers. **7.NCC.7:** Use addition and subtraction with rational numbers in any form to solve multi-step problems in real-world and mathematical contexts. **7.NCC.8:** Use multiplication and division with rational numbers in any form to solve multi-step problems in real-world and mathematical contexts.
3 Weeks	**Unit 1: Real Numbers & Scientific Notation**

Plan	● Classifying Real Numbers Part I
	  ○ **8.NCC.1:** Describe relationships among numbers in the real number system (rational and irrational). *Number relationships include: decimal expansion for rational and irrational numbers, square roots of non-perfect squares, and cube roots of nonperfect cubes.*
	● Classifying Real Numbers Part II
	  ○ **8.NCC.1:** Describe relationships among numbers in the real number system (rational and irrational). *Number relationships include: decimal expansion for rational and irrational numbers, square roots of non-perfect squares, and cube roots of nonperfect cubes.*
	● Irrational Numbers on the Real Number Line
	  ○ **8.NCC.1:** Describe relationships among numbers in the real number system (rational and irrational). *Number relationships include: decimal expansion for rational and irrational numbers, square roots of non-perfect squares, and cube roots of nonperfect cubes.*
	  ○ **8.NCC.2:** Compare the size of irrational numbers and locate them on a number line by finding the rational approximations.
	● Properties of Exponents, Part I
	  ○ **8.NCC.3:** Know and apply the properties of integer exponents to generate equivalent numerical expressions.
	● Properties of Exponents, Part II
	  ○ **8.NCC.3:** Know and apply the properties of integer exponents to generate equivalent numerical expressions.

	• Scientific Notation Part I
	    ◦ **8.NCC.4:** Write very large and very small numbers in scientific notation using positive and negative exponents.
	• Scientific Notation Part II
	    ◦ **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.
	• Scientific Notation Part III
	    ◦ **8.NCC.6:** Solve real-world and mathematical problems by performing operations with numbers written in standard and scientific notation.

Learning Objectives	**Student-Friendly Objectives:** • I can classify real numbers as natural numbers, whole numbers, integers, rational numbers, and irrational numbers. • I can approximate irrational numbers and their location on the real number line. • I can write very large and very small numbers in scientific notation using positive and negative exponents. • I can convert a rational number in fraction form to its decimal form and recognize that the decimal form of a rational number either terminates in zeroes or eventually repeats. • I can compare numbers written in scientific notation in context and analytically. • I can solve real world problems using scientific notation.
3 Weeks	**Unit 2: Algebra**

Plan	• Square Roots and Cube Roots
	    ◦ **8.NCC.8:** Evaluate square roots of perfect squares and cube roots of perfect cubes.
	• Solve Equations by Taking Square and Cube Roots
	    ◦ **8.NCC.7:** Solve equations in the form of $x^2 = p$ or $x^3 = p$ where p is a positive rational number.
	• Solve One Variable Linear Equations
	    ◦ **8.ALG.1:** Analyze and solve one-variable linear equations with rational coefficients containing solutions with one, zero, or infinitely many solutions.
	• Solve One Variable Linear Inequalities
	    ◦ **8.ALG.2:** Analyze and solve one-variable linear inequalities with rational coefficients.
	• Solve Systems of Linear Equations by Substitution
	    ◦ **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.

Learning Objectives	**Student-Friendly Objectives:** • I can solve equations of the form $x^2 = p$ and $x^3 = q$. • I can solve one variable linear equations. • I can solve one variable linear inequalities. • I can solve systems of linear equations using substitution.

	End of First 9 Weeks
2 Weeks	**Unit 3: Pythagorean Theorem**
Plan	- Establish the Pythagorean Theorem **8.GM.3:** Model or explain an informal proof of the Pythagorean Theorem and its converse. - Use the Pythagorean Theorem to Find Distance **8.GM.5:** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. - Find Missing Side Lengths in Right Triangles **8.GM.4:** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles.
Learning Objectives	**Student-Friendly Objectives:** - I can show why the pythagorean theorem is true. - I can determine if a triangle is a right triangle when given side lengths. - I can determine the length of the third side when given the length of two sides of a right triangle. - I can find the distance between two points in the coordinate plane.
2 Weeks	**Unit 4: Functions, Part I**
Plan	- Graph Proportional Relationships **8.FN.1:** Graph proportional relationships, interpreting the unit rate as the slope of the graph. - Slope: Rate of Change Between Two Points **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. - Is It a Function? **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. - Is This Function Linear or Non-Linear? **8.FN.5:** Distinguish between linear and nonlinear functions by comparing graphs and equations.
Learning Objectives	**Student-Friendly Objectives:** - I can graph proportional relationships and recognize the unit rate is the slope of the graph. - I can use right triangles to show the slope between any two points on a line is the same. - I can determine if a relation is a function. - I can determine if a function is linear or non-linear from its graph or equation.

4 Weeks	Unit 5: Functions, Part II
Plan	- Determine Slope and y-Intercept of Linear Functions **8.FN.6:** Determine the rate of change (slope) and y-intercept (initial value) from tables, graphs, equations, and verbal descriptions of linear relationships. - Compare Slope and y-Intercept of Two Linear Functions **8.FN.4:** Compare the rate of change (slope) and y-intercept (initial value) of two linear functions each represented in different forms. - Interpret and Explain Slope and y-Intercept in Context **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. - Analyze the Graph of a Function **8.FN.8:** Analyze a graph by describing the functional relationships between two quantities. - Sketch a Graph Based on Description of a Function **8.FN.9:** Sketch a graph that exhibits qualitative features of a function described verbally.
Learning Objectives	**Student-Friendly Objectives:** - I can determine the slope and y-intercept of linear functions from multiple representations. - I can compare the slopes and y-intercepts of linear functions from different representations. - I can interpret the slope and y-intercept of a linear function in context. - I can determine if a function is linear or nonlinear from its equation and/or graph. - I can determine the intervals on which a function is increasing or decreasing. - I can sketch the graph of a function from a description of its features.

End Second 9 Weeks	
4 Weeks	Unit 6: Transformations
Plan	- Identify a Transformation **8.GM.7:** Identify a single transformation used to transform one figure onto another on a coordinate plane. - Draw a Transformed Figure on a Coordinate Plane (Single Transformation) **8.GM.6:** Given a figure, draw a congruent figure on a coordinate plane resulting from a rotation, reflection, or translation. - Identify a Series of Transformations (Congruent Figures) **8.GM.8:** Given two congruent figures, describe a sequence of transformations that maps one figure to another. - Draw a Transformed Figure on a Coordinate Plane (Multiple Transformations) **8.GM.9:** Perform a given sequence of transformations of a figure on the coordinate plane, including rotations, reflections, translations, and dilations. - Describe the Effects of a Series of Transformations on Coordinates **8.GM.10:** Describe the effects of rotations, reflections, translations, and dilations on two-dimensional figures using coordinates.

	● Identify a Sequence of Transformations (Similar Figures) ○ **8.GM.11:** Given two similar two-dimensional figures, describe a sequence of transformations that exhibits similarity, including rotations, reflections, translations, and dilations.
Learning Objectives	**Student-Friendly Objectives:** ● I can identify a single transformation that takes one figure onto another. ● I can draw a figure transformed by a rigid transformation. ● I can identify a sequence of transformations that takes one figure onto another congruent figure. ● I can draw a figure transformed by a sequence of transformations, including dilations. ● I can describe the effects of a sequence of transformations on the coordinates of points in the coordinate plane. ● I can sketch the graph of a function from a description of its features. ● I can identify a sequence of transformations that take one figure onto another similar figure.
2 Weeks	**Unit 7: Bivariate Data**
Plan	● Construct and Interpret Relative Frequence Tables ○ **8.SP.3:** Construct and interpret a relative frequency table, using data from two categorical variables collected from the same subject. ● Construct and Interpret Scatter Plots ○ **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. ● Find a Line of Best Fit ○ **8.SP.2:** Construct straight lines to approximately fit data displaying a linear association when presented in scatter plots.
Learning Objectives	● I can construct a relative frequency table for a set of data from two categorical variables.. ● I can interpret data presented in a relative frequency table. ● I can construct a scatterplot from a set of bivariate data. ● I can determine whether a scatterplot displays a linear or nonlinear pattern, and whether or not its association is positive, negative, or there is no association. ● I can estimate a line of best fit to a set of data presented in a scatterplot. ● I can use an estimated line of best fit to predict values of one variable in a scatterplot when given the value of another.
2 Weeks	**Unit 8: Probability**
Plan	● Determine Sample Space and Theoretical Probability ○ **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. ● Determine Theoretical and Experimental Probability of Compound Experiments ○ **8.SP.5:** Determine theoretical and experimental probabilities of compound experiments. ● Use Theoretical Probability to Make Predictions

	○ **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 large number of experiments.
Learning Objectives	● I can determine the sample space for compound experiments. ● I can determine theoretical probability from a sample space for compound experiments. ● I can determine theoretical and experimental probabilities for compound experiments. ● I can use theoretical probability to predict the number of times an event will occur in a large number of experiments.

	End of Third 9 Weeks
2 Weeks	**Unit 9: 3D Geometry**
Plan	● Volume of Spheres, Cylinders, and Cones 　○ **8.GM.1:** Apply the formulas for the volume and surface area of cylinders, cones, and spheres to solve real-world and mathematical problems. ● Surface Area of Spheres, Cylinders, and Cones 　○ **8.GM.1:** Apply the formulas for the volume and surface area of cylinders, cones, and spheres to solve real-world and mathematical problems. ● 2D Cross Sections 　○ **8.GM.2:** Describe the two-dimensional figure that results from slicing a three-dimensional figure parallel and perpendicular to the base.
Learning Objectives	● I can calculate the volume of a sphere, cylinder, and cone. ● I can calculate the surface area of a sphere, cylinder, and cone. ● I can identify the shape of the cross sections created by slicing a sphere, cylinder, or cone with a plane perpendicular or parallel to its base.

	End of New Content
?? Weeks	**ATLAS Review**
	[ATLAS Quizzes on Google Site](#)