Math Curriculum Map: 7th Grade Accelerated

Unit/Topic:	Quarter:	Time Frame:
Unit 1 & 2: Geometric Figures	**1**	**20 days, 16 days**

Essential Questions:

What relationships are created when images are transformed on a plane or a coordinate grid?

Key Concepts:

- I can perform transformations on a shape on and off of the coordinate plane.
- I can reflect points and shapes over vertical and horizontal lines. (Including the axis, but not limited to)
- I can identify congruent properties based on a transformation.
- I can identify the transformation that has occurred given an image and pre-image or coordinates.
- I can determine if two shapes will be similar, congruent, or have no relationship after a given transformation.
- I can determine the scale factor from two given shapes.
- Given an image and pre-image, I can determine what transformation, or series of transformations, was performed.
- I can use coordinates and coordinate notation. (Algebraic rules)
- I can apply properties of triangles to find missing interior or exterior angles.
- I can use angle relationships within parallel lines to determine missing angles.
- I can determine the effect of changing a measurement on the volume. (ie: The radius of a sphere is doubled, how is the volume affected?)

Key Vocabulary:

Congruent	Similar	Transformation	Rotation
Translation	Refection	Dilation	Parallel Lines
Transversal	Alternate Interior	Vertical	Same Side Interior
Same Side Exterior	Alternate Exterior	Coordinate Plane	Corresponding
Supplementary	Image	Pre-image	Center of Rotation
Prime Notation	Coinciding	Preserve	Adjacent
Congruent	Similar	Transformation	Rotation
Translation	Refection	Dilation	Parallel Lines
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Supplementary	Image	Pre-image	Center of Rotation
Prime Notation	Coinciding	Preserve	Adjacent

Priority Standards:

8.G.A Understand congruence and similarity.

- 8.G.A.1: Verify experimentally the properties of rotations, reflections, and translations. Properties include: lines are taken to lines, line segments are taken to line segments of the same length, angles are taken to angles of the same measure, parallel lines are taken to parallel lines.
- 8.G.A.2: Understand that a two-dimensional figure is congruent to another if one can be obtained from the other by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that demonstrates congruence.
- 8.G.A.3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.A.4: Understand that a two-dimensional figure is similar to another if, and only if, one can be obtained from the other by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that demonstrates similarity.
- 8.G.A.5: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

7.EE.B Solve mathematical problems and problems in real-world context using numerical and algebraic expressions and equations.

- 7.EE.B.4 Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.

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.

b. Solve word problems leading to inequalities of the form $px+q > r$ or $px+q < r$, where p, q, and r are rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

7.G.B Solve mathematical problems and problems in real-world context involving angle measure, area, surface area, and volume.

Supporting Standards:

Math Practice Standards

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

• 7.G.B.5: Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure.	

Unit/Topic:	Quarter:	Time Frame:
Unit 3: Linear Relationships	**2**	**31 days**

Essential Questions:

How do I write, model, and solve equations with variables on both sides.
What are systems of equations, when do I use them, and what does it mean to be inconsistent or to have one or many solutions?

Key Concepts:

- I can solve equations with variables on both sides.
- I can identify and justify when an equation (or system of equations) has one-solution, no solutions, or infinitely many solutions.
- I can use substitution to prove my solutions to equations algebraically.
- I can use substitution and elimination to solve systems of equations algebraically.
- I can solve inequalities.
- I can graph solutions to inequalities.
- I can read a real-world scenario, write an equation, model my equation, and solve an equation/ system of equations.
- I can simplify an equation by distributing and combining like terms with rational coefficients.
- I can use the properties of equality to keep equations balanced while I manipulate equations.
- I can determine which strategy to use to solve systems of equations; Substitution, Elimination, or Graphing.

Key Vocabulary:

Input	Output	Linear	Constant Rate of Change
Slope	y-intercept	$\frac{Change\ in\ y}{Change\ in\ x}$	Proportional
Solution	Per	Each	Every
Rate	Initial Value	Starting Value	Beginning Value
	Inconsistent Equations	One-Time-Fee	System of Equations
Zero Pairs	Less than	More than	Inconsistent Equations
Substitution	Elimination	Coefficient	Multiplicative Inverse
Greater than	A minimum of	At least	Inverse Operations
Equivalent	Simplify	Like Terms	Infinitely Many Solutions
Distribution	Variable	Solution	System
Coinciding	Rational Numbers	Unique Solution	Simultaneous Linear Equations

Priority Standards:	Supporting Standards:
8.EE.B Understand the connections between proportional relationships, lines, and linear equations. ● 8.EE.B.5: Graph proportional relationships interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. ● 8.EE.B.6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane. Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at (0, b). 8.EE.C Analyze and solve pairs of simultaneous linear equations. ● 8.EE.C.7: Fluently solve linear equations and inequalities in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solution. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). b. Solve linear equations and inequalities with rational number coefficients, including solutions that require expanding expressions using the distributive property and collecting like terms. ● 8.EE.C.8 Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations including cases of no solution and infinite number of solutions. Solve simple cases by inspection.	Math Practice Standards 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

c. Solve mathematical problems and problems in real-world context leading to two linear equations in two variables.	

Unit/Topic:	Quarter:	Time Frame:
Unit 4: Functions	**2, 3**	**18 days**

Essential Questions:

How do inputs and outputs relate to each other in graphs, tables, equations, and scenarios?
How does a set of data qualify to be a function?
How do functions model relationships between quantities?

Key Concepts:

- I can find the slope of a line given a graph, table, and/or equation.
- I can determine if a table, graph, and/or scenario represents a proportional situation.
- I can identify the y-intercept when given a graph, table, and/or equation.
- I can explain why slope is the same between any two distinct points on any non-vertical line.
- I can use proportional reasoning to explain why similar triangles can be used to find slope. $\frac{y_2-y_1}{x_2-x_1}$
- I can determine the number and value of solution(s) of two linear functions to be the point of intersection.
- I can compare the key attributes of linear functions. (Rate of change, beginning value)
- I can write the equation of a line in the form $y = mx + b$.
- I can interpret the meaning of the rate of change and beginning value from a table, graph, or scenario.
- I can determine if a function is linear or non-linear. (Given a graph, table, or an equation.)
- I can identify what prevents a set of values in a table or graph from being a function or linear and adjust the values to make them a function or
- I can interpret qualitative features of graphs.

Key Vocabulary:

Linear	Non-Linear	Function	Y as a function of X
Increasing	Decreasing	Vertical Line Test	Input
Output	Qualitative	Steeper	Flatter
Table	Mapping	Graph	Equation
Constant Rate of Change	Slope	$\frac{Change\ in\ y}{Change\ in\ x}$	One Unique Output
y-intercept	Proportional	Rate	Initial Value
Starting Value			
Solution	Per	Each	Every

- I can relate qualitative rate of change to real-life contexts. - I can determine if a set of values represent y as a function of x. (In a table, graph, set of coordinates, and a mapping.)	

Priority Standards:	Supporting Standards:
8.F.A Define, evaluate, and compare functions. ● 8.F.A.1: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (Function notation is not required in Grade 8.) ● 8.F.A.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. ● 8.F.A.3: Interpret the equation y = mx + b as defining a linear function whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length in not linear because its graph contains the points (1,1), (2,4), and (3,9) which are not on a straight line. 8.F.B Use functions to model relationships between quantities. ● 8.F.B.4: Given a description of a situation, generate a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or a graph. Track how the values of the two quantities change together. Interpret the rate of change and initial value of a linear function in terms of the situation it models, its graph, or its table of values. ● 8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	Math Practice Standards 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. (include Geometric context. Parallel lines with x+4 and 2x+3 in corresponding angles, solve for x, what's the actual angle measure? Etc)

8.EE.B Understand the connections between proportional relationships, lines, and linear equations. ● 8.EE.B.5: Graph proportional relationships interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	

Unit/Topic:	Quarter:	Time Frame:
Unit 5: Statistics	**3**	**37 days**

Essential Questions:

How can I interpret and predict event outcomes using different models?

Key Concepts:

- I can use the line of best fit to make a prediction about the data. (not find the actual equation)
- I can complete and interpret a two-way table.
- I can construct a scatter plot using given data points and interpret the data therein.
- I can analyze data points in a scatter plot to determine the association.
- I can determine association of data from a two-way table.
- I can Find the probabilities of compound events using tree diagrams, tables, lists, and simulation.
- I can determine possible outcomes for a given sample space.
- I can design a simulation to generate possible frequencies for compound events.

Key Vocabulary:

Event	Association	Categories	Frequency Table
Correlation	Tree Diagram	Sample Space	Line of Best Fit
	Compound Event	Simulation	

Priority Standards:

Supporting Standards:

8.SP.A Investigate patterns of association in bivariate data. ● 8.SP.A.1: Construct and interpret scatter plots for bivariate measurement data to investigate and describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. ● 8.SP.A.2: Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. ● 8.SP.A.3: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. ● 8.SP.A.4: Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. 8.SP.B Investigate chance processes and develop, use, and evaluate probability models. ● 8.SP.B.5: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that 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 organized lists, tables, tree diagrams and other methods. Identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. 7.SP.A Use random sampling to draw inferences about a population. ● 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. 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	Math Practice Standards 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

randomly sampled survey data. Gauge how far off the estimate or prediction might be. 7.SP.B Draw informal comparative inferences about two populations. ● 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. 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. ● 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 chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. a. 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 Investigate chance processes and develop, use and evaluate probability models. ● 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 1/2 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. 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.C.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.	

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?	

Unit/Topic:	Quarter:	Time Frame:
Unit 6 & 7: Integer Exponents & Real Numbers	**4**	**19 days, 25 days**

Essential Questions:

How are exponents useful to represent numbers in different ways?
How do we classify and organize numbers?
What is the relationship between the three side lengths of a right triangle?
How do the volumes of cones, cylinders, and spheres relate to each other?

Key Concepts:

- I can convert a fraction to a decimal and vice-versa.
- I can convert between standard form and scientific notation.
- I can approximate the value of irrational numbers, and locate them on a number line.
- I can convert between repeating/ terminating decimals and fractions.
- I can simplify expressions that include exponents with the same base.
- I can identify numbers that irrational.
- I can compare quantities given in scientific notation.
- I can compare irrational numbers.
- I know why the square root of 2 is irrational.
- I can perform the four operations with numbers that are in scientific notation.
- I can use the Pythagorean theorem to find the missing side lengths of a right triangle.
- I can use the Pythagorean theorem to find the distance between two points.
- I can find the square root of a number.
- I can estimate the value of a square root.
- I can explain what perfect squares are.
- I can use the converse of the Pythagorean theorem to determine if three side lengths make a right triangle.

Key Vocabulary:

Power	Place Value	Base	Scientific Notation
Exponent	Radical	Terminating	Product
Equivalent	Whole Number	Approximate	Repeating Decimal
Square Root	Radical	Perfect Square	Pythagorean Theorem
Leg	Hypotenuse	Right Angle	Right Triangle
Converse	Distance Between Two Points (NOT the distance formula)		
Volume	Cone	Sphere	Cylinder
Pi (π)	Diameter	Radius	Hemisphere

- I can determine the areas of the squares of the side lengths of a right triangle.	

Priority Standards:	Supporting Standards:
8.NS.A Understand that there are irrational numbers, and approximate them using rational numbers. ● 8.NS.A.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion. Know that numbers whose decimal expansions do not terminate in zeros or in a repeating sequence of fixed digits are called irrational. ● 8.NS.A.2: Use rational approximations of irrational numbers to compare the size of irrational numbers. Locate them approximately on a number line diagram, and estimate their values. ● 8.NS.A.3: Understand that given any two distinct rational numbers, a<b, there exist a rational number c and an irrational number d such that a<c<b and a<d<b. Given any two distinct irrational numbers, a<b, there exist a rational number c and an irrational number d such that a<c<b and a<d<b. 8.EE.A Work with radicals and integer exponents. ● 8.EE.A.1: Understand and apply the properties of integer exponents to generate equivalent numerical expressions. ● 8.EE.A.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Know that $\sqrt{2}$ is irrational. a. Evaluate square roots of perfect squares less than or equal to 225. b. Evaluate cube roots of perfect cubes less than or equal to 1000. ● 8.EE.A.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and express how many times larger or smaller one is than the other. ● 8.EE.A.4: Perform operations with numbers expressed in scientific notation including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. 8.G.B Understand and apply the Pythagorean Theorem. ● 8.G.B.6: Understand the Pythagorean Theorem and its converse. ● 8.G.B.7: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world context and mathematical problems in two and three dimensions. ● 8.G.B.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	Math Practice Standards 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

8.G.C Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. ● 8.G.C.9: Understand and use formulas for volumes of cones, cylinders, and spheres and use them to solve real-world context and mathematical problems. 7.G.B Solve mathematical problems and problems in real-world context involving angle measure, area, surface area, and volume. ● 7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	