



Park Hill School District

Building Successful Futures • Each Student • Every Day

7th Grade Accelerated Mathematics Curriculum

Course Description: In this class, instructional time will focus on four critical areas: (1) formulating and reasoning about expressions and equations, including modeling with a linear equations, and solving linear equations and inequalities; (2) deepening the understanding of a proportion and its relationship to an equation; (3) analyzing two- and three-dimensional space and figures using angle, similarity, and congruence; (4) comparing data distributions and populations, using probability models to draw informal inferences about populations.

Scope and Sequence:

Time Frame	Unit
9.5 blocks	Rational Numbers
11.5 blocks	Expressions, Equations, and Inequalities
9.5 blocks	Ratios/Proportions/Percents
8.5 blocks	Probability and Statistics
5.5 blocks	Geometric Shapes and Angles
5 blocks	Surface Area and Volume
5.5 blocks	Transformations
4 blocks	Angles and Triangles
7 blocks	Graphing and Writing Linear Equations
6 blocks	Exponents and Scientific Notation
5 blocks	Real Numbers and the Pythagorean Theorem
4 blocks	Volume of Similar Solids

Unit 1: Rational Numbers

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Rational Numbers

Length of Unit: 9.5 blocks (19 days)

Overview of Unit: Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

Priority Standards for unit:

- MA.7.NS.A.2: Apply and extend previous understandings of numbers to multiply and divide rational numbers.
 - a. Multiply and divide rational numbers.
 - b. Determine that a number and its reciprocal have a product of 1 (multiplicative inverse).
 - c. Understand that every quotient of integers (with non-zero divisor) is a rational number.
 - d. Convert a rational number to a decimal.
- MA.7.NS.A.3: Solve problems involving the four arithmetic operations with rational numbers.
- MA.7.EE1.B.1: Solve multi-step problems posed with rational numbers.
 - a. Convert between equivalent forms of the same number.
 - b. Assess the reasonableness of answers using mental computation and estimation strategies.
- MA.7.EE1.B.2: Write and/or solve linear equations and inequalities in one variable.
 - a. Write and/or solve equations of the form $x+p = q$ and $px = q$ in which p and q are rational numbers.
 - b. Write and/or solve two-step equations of the form $px + q = r$ and $p(x + q) = r$, where p , q and r are rational numbers, and interpret the meaning of the solution in the context of the problem.
 - c. Write, solve and/or graph inequalities of the form $px + q > r$ or $px + q < r$, where p , q and r are rational numbers.

Supporting Standards for unit:

- MA.7.NS.A.1: Apply and extend previous understandings of numbers to add and subtract rational numbers.
 - a. Add and subtract rational numbers.
 - b. Represent addition and subtraction on a horizontal or vertical number line.
 - c. Describe situations and show that a number and its opposite have a sum of 0 (additive inverses).
 - d. Understand subtraction of rational numbers as adding the additive inverse.
 - e. Determine the distance between two rational numbers on the number line is the absolute value of their difference.
 - f. Interpret sums and differences of rational numbers.
- MA.7.EE1.A.1: Apply properties of operations to simplify and to factor linear algebraic expressions with rational coefficients.
- MA.7.EE1.A.2: Understand how to use equivalent expressions to clarify quantities in a problem. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b. Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom’s Taxonomy Levels	Webb's DOK
7.NS.A.2a	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 $(-1)(-1) = 1$	Understand	Understand	1

7.NS.A.2a	The rules for multiplying signed numbers	Understand	Understand	1
7.NS.A.2a	Products of rational numbers by describing real-world contexts	Interpret	Evaluate	3
7.NS.A.2a	That integers can be divided, provided that the divisor is not zero a	Understand	Understand	1
7.NS.A.2c	Every quotient of integers (with non-zero divisor) is a rational number	Understand	Understand	1
7.NS.A.2a	If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$	Understand	Understand	1
7.NS.A.2a	Properties of operations as strategies to multiply rational numbers	Apply	Apply	2
7.NS.A.2d	Properties of operations as strategies to divide rational numbers	Apply	Apply	2
7.NS.A.2d	A rational number to a decimal using division	Convert	Apply	1
7.NS.A.3	Real-world problems involving the four operations with rational numbers.	Solve	Apply	2
7.NS.A.3	Mathematical problems involving the four operations with rational numbers	Solve	Apply	2

Essential Questions:

1. How can you identify different types of rational numbers?
2. How can you solve problems by adding the different types of rational numbers?
3. How can you solve problems by subtracting the different types of rational numbers?
4. How can models and relationships help you make sense of multiplying and dividing positive and negative rational numbers?
5. Fractions, decimals, and percents - when is it most helpful to use each representation?

Enduring Understanding/Big Ideas:

1. Rational numbers are positive and negative fractions, integers, and decimals (and their opposites).
2. You can solve problems that involve adding and subtracting all kinds of positive and negative fractions, decimals, and integers.
3. You can solve problems that involve adding and subtracting all kinds of positive and negative fractions, decimals, and integers.
4. Ways you can model multiplication/division is:
 - multiplication is repeated addition, can use a number line to model this process
 - multiplying/dividing with signed numbers is similar to multiplying/dividing with

positive numbers, but after you perform the operation, you have to think about the sign of the answer

- when you divide by a positive or negative fraction, you can use the inverse relationship between multiplication and division.
5. Decimals are helpful when you want to use a calculator. Percents are common on sale signs. These two representations go back to a fraction.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p style="text-align: center;">Understand Interpret Apply Convert Know Solve Repeating Sum Difference</p>	<p style="text-align: center;"><u>Chapter 1</u> Absolute value Opposites Rational numbers Integers</p> <p style="text-align: center;"><u>Chapter 2</u> Integers Rational numbers Reciprocals Quotient Product</p>

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development.

Big Ideas Chapter 1: Rational Numbers

Standard	Topic & Section	Suggested # of Days	Notes
7.NS.1a	Chapter Opener 1.1 Rational Numbers	1 block	
7.NS.1b ISTE 5a ISTE 5c	1.2 Adding Integers • Desmos Tool	0.5 block	
7.NS.1d	1.3 Adding Rational Numbers	1 block	
7.NS.1b ISTE 5a ISTE 5c	1.4 Subtracting Integers • Desmos Tool	0.5 block	
7.NS.1c	1.5 Subtracting Rational Numbers	1 block	
	Connecting Concepts Review	0.5 block	
	Chapter 1 Test	0.5 block	

Big Ideas Chapter 2: Multiplying and Dividing Rational Numbers

Standard	Topic & Section	Suggested # of Days	Notes
7.NS.2a ISTE 5a ISTE 5c	Chapter Opener 2.1 Multiplying Integers <ul style="list-style-type: none"> • Desmos Tool 	0.5 block	 
7.NS.2b	2.2 Dividing Integers	0.5 block	
7.NS.2b 7.NS.3 7.NS.2d	2.3 Converting Between Fractions and Decimals	0.5 block	
7.NS.2c	2.4 Multiplying Rational Numbers	0.5 block	
7.NS.2b ISTE 5c ISTE 5d	2.5 Dividing Rational Numbers <ul style="list-style-type: none"> • Desmos Tool 	0.5 block	
	Connecting Concepts Review	1 block	
	Ch 2 Test	1 block	

Unit 2: Expressions, Equations, and Inequalities

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Expressions, Equations, and Inequalities

Length of Unit: 11.5 blocks (23 days)

Overview of Unit: Students extend their understanding of integers and develop and understanding of expressions. Students will demonstrate this by combining like terms, distributive property, and factoring. Students will then further their knowledge by expanding expressions into equations and inequalities. Students will demonstrate this by solving a variety of equations and inequalities.

Priority Standards for unit:

- MA.7.EE.1.B.1: Solve multi-step problems posed with rational numbers.
 - a. Convert between equivalent forms of the same number.
 - b. Assess the reasonableness of answers using mental computation and estimation strategies.
- MA.7.EE.1.B.2: Write and/or solve linear equations and inequalities in one variable.
 - a. Write and/or solve equations of the form $x+p = q$ and $px = q$ in which p and q are rational numbers.
 - b. Write and/or solve two-step equations of the form $px + q = r$ and $p(x + q) = r$, where p , q and r are rational numbers, and interpret the meaning of the solution in the context of the problem.
 - c. Write, solve and/or graph inequalities of the form $px + q > r$ or $px + q < r$, where p , q and r are rational numbers.
 - d. 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. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
- 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. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

- 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.
 - 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.

Supporting Standards for unit:

- 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.”

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom’s Taxonomy Levels	Webb’s DOK
7.EE.3	Multi-step real-life problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically.	Solve	Evaluate	3
7.EE.3	Multi-step mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically.	Solve	Evaluate	3
7.EE.3	Properties of operations to calculate with numbers in any form.	Apply	Apply	2

7.EE.3	Numbers between forms as appropriate.	Convert	Apply	2
7.EE.3	The reasonableness of answers using mental computation	Assess	Analyze	3
7.EE.3	The reasonableness of answer using estimation strategies.	Assess	Analyze	3
7.EE.4a	Word problems leading to equations of the form $px + q = r$, where p , q , and r are specific rational numbers.	Solve	Evaluate	3
7.EE.4a	Word problems leading to equations of the form $p(x + q) = r$, where p , q , and r are specific rational numbers	Solve	Evaluate	3
7.EE.4a	equations of these forms fluently	Solve	Evaluate	3
7.EE.4a	an algebraic solution to an arithmetic solution	Compare	Understand	2
7.EE.4a	the sequence of the operations used in each approach.	Identify	Remember	1
7.EE.4b	word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers.	Solve	Evaluate	3
7.EE.4b	the solution set of the inequality	Graph	Apply	1
7.EE.4b	the context of the problem	Interpret	Analyze	3

Essential Questions:

1. When is it useful to model a relationship with an expression, equation, and inequality?
2. How does rewriting an expression, equation, and inequality help you think about the relationship in a new way?
3. How can you represent relationships in a world where expressions and equations don't always work?
4. Why is it important to do the same thing to one side of an equation or inequality as you do to the other?

Enduring Understanding/Big Ideas:

1. You can model a relationship with an expression, equation, and inequality if you have two equivalent expressions.
2. You can write simpler equivalent equations and inequalities to eventually solve for the unknown quantity.
3. You can use inequality symbols to represent unequal relationships.
4. To keep the equation or inequality balanced or true.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Variable Solution Symbol Multiply Graph Equivalent	Chapter 3: Expression Linear Distribute Factor Interpret Chapter 4: Equations Inequalities Model Two-step equations Two-step inequalities

Resources for Vocabulary Development:

Use a Quality Tool (See Adult Learning Framework handbook)

Big Ideas Chapter 3: Expressions

Standard	Topic & Section	Suggested # of Days	Notes
7.EE.1 7.EE.2	Chapter opener 3.1 Algebraic Expressions	1 block	
7.EE.1 7.EE.2	3.2 Adding and subtracting linear expression	0.5 block	
7.EE.1 7.EE.2	3.3 Distributive property	1 block	
7.EE.1 7.EE.2	3.4 Factoring expressions	1 block	
	Connecting concepts	0.5 block	
	Review	0.5 block	
	Ch 3 Test	0.5 block	

Big Ideas Chapter 4: Equations and Inequalities

Standard	Topic & Section	Suggested # of Days	Notes
7.EE.4a	Chapter opener 4.1 Solving equations using addition or subtraction	1 block	
7.EE.4a	4.2 Solving equation using multiplication or division	0.5 block	
7.EE.3 7.EE.4a	4.3 Solving two step equations	1 block	
7.EE.4b	4.4 Writing and graphing inequalities	0.5 block	
7.EE.4b	4.5 Solving inequalities using addition or subtraction	0.5 block	
7.EE.4b	4.6 Solving inequalities using multiplication or division	0.5 block	
7.EE.4b	4.7 Solving two step inequalities	1 block	
	Connecting concepts Review	1 block	
	Ch 4 Test	0.5 block	

Unit 3: Ratios/Proportions/Percents

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Ratios/Proportions/Percents

Length of Unit: 9.5 blocks (19 days)

Overview of Unit: Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

Priority Standards for unit:

- 7.NS.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.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
- 7.RP.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 $t = pn$.
- 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.

Supporting Standards for unit:

- 7.RP.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 $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.
- 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.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b. Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.NS.2a	Multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the	Understand	Understand	1

	properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$			
7.NS.2a	The rules for multiplying signed numbers	Understand	Understand	1
7.NS.2a	Products of rational numbers by describing real-world contexts	Interpret	Evaluate	3
7.NS.2b	That integers can be divided, provided that the divisor is not zero a	Understand	Understand	1
7.NS.2b	Every quotient of integers (with non-zero divisor) is a rational number	Understand	Understand	1
7.NS.2b	If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$	Understand	Understand	1
7.NS.2b	Quotients of rational numbers by describing real-world contexts.	Interpret	Analyze	3
7.NS.2c	Properties of operations as strategies to multiply rational numbers	Apply	Apply	2
7.NS.2c	Properties of operations as strategies to divide rational numbers	Apply	Apply	2
7.NS.2d	A rational number to a decimal using long division	Convert	Apply	1
7.NS.2d	The decimal form of a rational number terminates in 0s or eventually repeats	Know	Remember	1
7.NS.3	Real-world problems involving the four operations with rational numbers.	Solve	Apply	2
7.NS.3	Mathematical problems involving the four operations with rational numbers	Solve	Apply	2
7.RP.2a	whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table	Decide	Apply	1
7.RP.2a	whether two quantities are in a proportional relationship, e.g., by graphing on a coordinate plane	Decide	Apply	1
7.RP.2a	whether the graph is a straight line through the origin.	Observe	Analyze	1
7.RP.2b	the constant of proportionality (unit rate) in tables of proportional relationships.	Identify	Understand	2
7.RP.2b	the constant of proportionality (unit rate) in graphs of proportional relationships.	Identify	Understand	2

7.RP.2b	the constant of proportionality (unit rate) in equations of proportional relationships.	Identify	Understand	2
7.RP.2b	the constant of proportionality (unit rate) in diagrams of proportional relationships.	Identify	Understand	2
7.RP.2b	the constant of proportionality (unit rate) in verbal descriptions of proportional relationships	Identify	Understand	2
7.RP.2c	proportional relationships by equations.	Represent	Apply	2
7.RP.2d	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.	Explain	Understand	2

Essential Questions:

1. What is a ratio?
2. What kinds of real-world relationships are rates?
3. How can you distinguish relationships that are proportional from relationships that are not proportional?
4. When is it most convenient to use percents?
5. How can you differentiate between a rate and unit rate?
6. How are scale drawing and models used in real life situations?
7. Why would I need to convert a decimal to a percent or a percent to a decimal?
8. Why would a business need to use percent increase and decrease?
9. Why does a retail shop use discounts and markups?
10. How can simple interest help you make money?

Enduring Understanding/Big Ideas:

1. A comparison of two quantities.
2. A real world use would be a unit rate that compares two quantities and one of the terms is given as “1” unit, such as \$1.50/lb of meat.
3. You can use a graph, table, or equation to identify if two quantities have a proportional relationship.
 - if two quantities have a proportional relationship:
 - equation is in the form $y=mx$
 - every ratio in a table of values is the same
 - graph is a straight line that passes through the origin
4. You use percents when you talk about the tax or tip on a bill, interest, or price markup or markdown.

5. They both compare two quantities using different units, but a unit rate compares a quantity of one unit of another quantity.
6. They are used to scale down large structural projects into more manageable pieces.
7. You convert to a decimal so you can use with a mathematical tool. You would convert a percent to describe a situation verbally.
8. To calculate and understand if sales are rising or falling and by how much.
9. They would use discounts for sales and markups to increase earnings.
10. A savings account uses simple interest to earn money on your principal.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Proportional Variable Solution Percent Increase Decrease Period Interest Rate	<p style="text-align: center;">Chapter 5:</p> Proportional Relationship Scale Ratio table Ratios Rates Unit rate Proportions Interpret Constant of proportionality <p style="text-align: center;">Chapter 6:</p> Balance Interest Period Interest Rate Percent Decrease Percent Increase Principle Simple Interest Discounts Markups Percent equation Percent proportion

Resources for Vocabulary Development: Use a Quality Tool (See Adult Learning Framework handbook)

Big Ideas Chapter 5: Ratios and Proportions

Standard	Topic & Section	Suggested # of Days	Notes
7.RP.1	Chapter opener 5.1 Ratios and ratio tables	1 block	
7.RP.1 7.RP.2b	5.2 Rates and unit rates	0.5 block	
7.RP.2a	5.3 Identifying proportional relationships	0.5 block	
7.RP.2c	5.4 Writing and solving proportions	0.5 block	
7.RP.2a 7.RP.2d	5.5 Graphs of proportional relationships	0.5 block	
7.G.1	5.6 Scale drawings	0.5 block	
	Connecting concepts	0.5 block	
	Review	0.5 block	
	Chapter 5 Test	0.5 block	

Big Ideas Chapter 6: Percents

Standard	Topic & Section	Suggested # of Days	Notes
7.NS.2b 7.NS.3 7.NS.2d	Chapter opener 6.1 Fractions, decimals, and percents	0.5 block	
7.RP.2b 7.RP.2c ISTE 5c	6.2 The percent proportion • Desmos Tool	0.5 block	
7.RP.2b 7.RP.2c	6.3 The percent equation	0.5 block	
7.RP.3	6.4 Percents of increase and decrease	0.5 block	
7.RP.3	6.5 Discounts and markups	0.5 block	
7.RP.3	6.6 Simple interest	0.5 block	
	Connect concepts Review	1 block	
	Ch 6 Test	0.5 block	

Unit 4: Probability and Statistics

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Probability and Statistics

Length of Unit: 8.5 Blocks (17 days)

Overview of Unit: Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences. Students will use models to compare theoretical to experimental probability. Students will collect data through the process of random sampling to describe populations and draw valid conclusions.

Priority Standards for unit:

- 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.
- 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.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?

Supporting Standards for unit:

- 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 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, 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.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.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?

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.SP.4	measures of center for numerical data from random samples to draw informal	Use	Apply	3

	comparative inferences about two populations.			
7.SP.4	measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	Use	Apply	3
7.SP.6	the probability of a chance event by collecting data on the chance process that produces it	Approximate	Analyze	3
7.SP.6	long-run relative frequency	Observe	Understand	2
7.SP.6	the approximate relative frequency given the probability	Predict	Create	2
7.SP.8a	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.	Understand	Understand	1
7.SP.8b	sample spaces for compound events using methods such as organized lists	Represent	Analyze	1
7.SP.8b	sample spaces for compound events using methods such as tables.	Represent	Analyze	1
7.SP.8b	sample spaces for compound events using methods such as tree diagrams.	Represent	Analyze	1
7.SP.8b	the outcomes in the sample space which compose the event, such as an event described in everyday language (e.g., “rolling double sixes”).	Identify	Understand	2
7.SP.8c	a simulation to generate frequencies for compound events.	Design	Create	3
7.SP.8c	a simulation to generate frequencies for compound events.	Use	Evaluate	3

Essential Questions:

1. How can you make conclusions about the entire group without checking every member of the group?
2. How can you draw conclusions about the groups without checking every member of each group?
3. How do you measure the probability of an event?
4. Can you use probability to predict future events?
5. How do you measure the probability of more than one event?
6. How can statistics be used in sports or the business world?
7. How can a bias sample affect a statistic?

Enduring Understanding/Big Ideas:

1. You can use different types of sampling; such as convenience sampling, systematic sampling, and simple random sampling to predict quantities about the entire group.
2. You can use measures of center; such as mean, median, mode, range, and interquartile range.
3. You can use words such as unlikely and certain, or a number between 0 and 1 to represent the probability that an event will occur.
4. You can perform trials and collect data to find experimental probability. You can reason about all of the possible outcomes of an event and find theoretical probability.
5. A compound event is an event associated with a multi-step action. You can find the number of outcomes of a multi-step process by finding the product of the number of possible outcomes of each step of the process.
6. Statistics can be used in sports to show quantitative values of your performance so you can compare to other groups. Statistics can be used in business to evaluate sales, performance, or product outcomes.
7. It can skew the data so it is not representative of the population.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p style="text-align: center;">Average Range Compare Inference Deviation Probability Theoretical Trial Frequency Dependent Independent Experiment</p>	<p style="text-align: center;">Chapter 7: Mean Comparative Inference Mean absolute deviation Outcomes Event Relative frequency Experimental probability Theoretical probability Sample space Fundamental counting principle Compound event Simulation</p> <p style="text-align: center;">Chapter 8: Population Sample Unbiased sample Bias sample Sample space</p>

	Median Interquartile range Mean Skew Conclude Variation Measures of Center
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Resources for Vocabulary Development: Use quality tools (See Adult Learning Framework)

Big Ideas Chapter 7: Probability

Standard	Topic & Section	Suggested # of Days	Notes
7.SP.5 7.SP.6	Chapter opener 7.1 Probability	1 block	
7.SP.6 7.SP.7a 7.SP.7b	7.2 Experimental and Theoretical probability	0.5 block	
7.SP.8b 7.SP.8a	7.3 Compound events	0.5 block	
7.SP.8c	7.4 Simulations	1 block	
	Connecting concepts Review	1 block	
	Ch 7 Test	0.5 block	

Big Ideas Chapter 8: Statistics

Standard	Topic & Section	Suggested # of Days	Notes
7.SP.1	Chapter opener 8.1 Samples and populations	0.5 block	
7.SP.1 7.SP.2	8.2 Using random samples to describe populations	0.5 block	
7.SP.1 7.SP.3 7.SP.4	8.3 Comparing populations	1 block	
7.SP.8c 7.SP.1 7.SP.3 7.SP.4	8.4 Using random samples to compare populations	1 block	
	Connecting concepts Review	0.5 block	
	Ch 8 Test	0.5 block	

Unit 5: Geometric Shapes and Angles

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Geometric Shapes and Angles

Length of Unit: 5.5 Blocks (11 days)

Overview of Unit: Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students will solve real-world and mathematical problems involving area two-dimensional objects composed of triangles, quadrilaterals, and polygons. Students will solve unknown angle measurements.

Priority Standards for unit:

- 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.

Supporting Standards for unit:

- 7.G.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.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.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b. Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.G.4	the formula for the area of a circle	Know	Remember	1
7.G.4	the formula for the circumference of a circle	Know	Remember	1
7.G.4	the formula for the area of a circle to solve problems	Use	Apply	1
7.G.4	the formulas for circumference of a circle to solve problems	Use	Apply	1
7.G.4	an informal derivation of the relationship between the circumference and area of a circle	Give	Understand	3

Essential Questions:

1. How can you define a circle?
2. What does it mean to talk about the size of a circle?
3. Are some measurements more useful in certain situations than others?
4. How can you differentiate between radius and diameter?
5. How can you differentiate between circumference and area?
6. How can you find the area of a composite figure?

Enduring Understanding/Big Ideas:

1. The set of points in a plane that are the same distance from another point define a circle.
2. The radius, diameter, circumference, and area of a circle are related; you can use them to talk about the size of a circle.
3. Yes depending on what the situation calls for; space occupied by objects or space within an object. The formula will determine what measurement to apply.
4. Radius is half way across the circle and diameter is all the way across the circle, both have to be through the center point.
5. The circumference the distance around a circle and the area is the space inside.
6. Break it into basic shapes like triangles, squares, rectangles, and semicircles. You then find their individual areas and add them together.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Angle Circle Circumference Area of a circle Know Use Solve Adjacent	Chapter 9 Acute angle Adjacent Angles Angle Complementary Angles Obtuse angle Right angle Straight angle Supplementary Angles Vertex of an Angle Vertical Angles Composite figure Pi Radius Diameter Center Cross section Construct Quadrilateral

Resources for Vocabulary Development: Use quality tools (See Adult Learning Framework handbook)

Big Ideas Chapter 9: Geometric Shapes and Angles

Standard	Topic & Section	Suggested # of Days	Notes
7.G.2 7.G.4	Chapter opener 9.1 Circles and circumference	1 block	
7.G.2 7.G.4	9.2 Areas of circles	1 block	
7.G.2 7.G.4	9.3 Perimeters and areas of composite figures	0.5 block	
7.G.2 ISTE 5a	9.4 Constructing polygons • Desmos Tool	1 block	
7.G.5 7.G.2 ISTE 5a	9.5 Finding unknown angle measures • Desmos Tool	0.5 block	
	Connecting concepts Review	1 block	
	Ch 9 Test	0.5 block	

Unit 6: Surface Area and Volume

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Surface Area and Volume

Length of Unit: 5 blocks (10 days)

Overview of Unit: Students will extend their prior knowledge of surface area and volume to include triangular prisms, cylinders, and pyramids. Students will understand and apply various formulas to calculate surface areas and volumes of solids. Students will apply this knowledge to real life situations and scenarios. Students will describe various cross sections of three dimensional figures.

Priority Standards for unit:

- 7.G.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.

Supporting Standards for unit:

- 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.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d.** Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.G.6	Real-world problems involving area of two-	Solve	Apply	1

	dimensional objects composed of triangles .			
7.G.6	Mathematical problems involving area of two-dimensional objects composed of triangles .	Solve	Apply	1
7.G.6	Real-world problems involving area of two-dimensional objects composed of quadrilaterals .	Solve	Apply	1
7.G.6	Mathematical problems involving area of two-dimensional objects composed of quadrilaterals .	Solve	Apply	1
7.G.6	Real-world problems involving area of two-dimensional objects composed of polygons .	Solve	Apply	1
7.G.6	Mathematical problems involving area of two-dimensional objects composed of polygons .	Solve	Apply	1
7.G.6	Real-world problems involving volume of three-dimensional objects composed of cubes .	Solve	Apply	1
7.G.6	Mathematical problems involving volume of three-dimensional objects composed of cubes .	Solve	Apply	1

7.G.6	Real-world problems involving surface area of three-dimensional objects composed of cubes .	Solve	Apply	1
7.G.6	Mathematical problems involving surface area of three-dimensional objects composed of cubes .	Solve	Apply	1
7.G.6	Real-world problems involving volume of three-dimensional objects composed of right prisms .	Solve	Apply	1
7.G.6	Mathematical problems involving volume of three-dimensional objects composed of right prisms .	Solve	Apply	1
7.G.6	Real-world problems involving surface area of three-dimensional objects composed of right prisms .	Solve	Apply	1
7.G.6	Mathematical problems involving surface area of three-dimensional objects composed of right prisms .	Solve	Apply	1

Essential Questions:

1. In what ways can you measure a three-dimensional figure?
2. Are some measurements more useful in certain situations than others?
3. How do you find the surface area of a rectangular prism or a pyramid?
4. How do you find the surface area of a cylinder?
5. How do you find the volume of a prism or cylinder?
6. How do you find the volume of the pyramid?

7. How do you define a cross section of a three dimensional object?

Enduring Understanding/Big Ideas:

1. You can measure a three-dimensional figure by its volume and/or surface area.
2. Yes depending on what the situation calls for; space occupied by objects or space within an object.
3. It is the sum of the bases and the lateral faces.
4. It is the sum of the areas of the bases and the lateral surface.
5. It is the area of the base shape times the height of the object.
6. It is the area of the base shape times the height of the pyramid then multiplied by one third.
7. It is a two dimensional shape that is the intersection of the plane and the solid.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p style="text-align: center;">Circumference of a circle Area of a circle Know Use Solve</p>	<p style="text-align: center;">Chapter 10 Height of a Prism Lateral Face Lateral Area of a Prism Surface Area of a Cube Surface Area of a Prism Volume of a Cube Volume of a Prism Cross section 3-Dimensional figures Base Slant height</p>

Resources for Vocabulary Development: Use quality tools (See Adult Learning Framework handbook)

Big Ideas Chapter 10: Surface Area and Volume

Standard	Topic & Section	Suggested # of Days	Notes
7.G.6	Chapter opener 10.1 Surface areas of prisms	1 block	
7.G.6 ISTE 5a ISTE 5c	10.2 Surface areas of cylinders • Desmos Tool	0.5 block	
7.G.6 ISTE 5a ISTE 5c	10.3 Surface areas of pyramids • Desmos Tool	0.5 block	
7.G.6 ISTE 5a ISTE 5c	10.4 Volumes of prisms • Desmos Tool	0.5 block	
7.G.6	10.5 Volumes of pyramids	0.5 block	
7.G.3	10.6 Cross sections of three dimensional figures	0.5 block	
	Connecting concepts Review	1 block	
	Ch 10 Test	0.5 block	

Unit 7: Transformations

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Transformations

Length of Unit: 5.5 blocks (11 days)

Overview of Unit: The concepts of congruence and similarity are introduced through the study of transformations. Students will identify translations, reflections, rotations, and dilations using coordinates and describe transformations as a sequence of rigid motions between two congruent figures. Students will be able to solve real-life problems involving transformations.

Priority Standards for unit:

- 8.GM.A.2 Understand two-dimensional figures are congruent if a series of rigid transformations can be performed to map the pre-image to the image.
 - a. Describe a possible sequence of rigid transformations between two congruent figures.
- 8.GM.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Supporting Standards for unit:

- 8.GM.A.4 Understand that two-dimensional figures are similar if a series of transformations (rotations, reflections, translations and dilations) can be performed to map a pre-image to the image.
 - a. Describe a possible sequence of transformations between two similar figures.
- 8.GM.A.1 Verify experimentally the congruence properties of rigid transformations.
 - a. Verify the angle measure, betweenness, collinearity and distance are preserved under rigid transformations.
 - b. Investigate if orientation is preserved under rigid transformations.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.GM.A.2	that two-dimensional figures are congruent if a series of rigid transformations can be performed to map the pre-image to the image	Understand	Understand	2
8.GM.A.2	a possible sequence of rigid transformations between two congruent figures	Describe	Knowledge	2
8.GM.A.3	the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates	Describe	Knowledge	2

Essential Questions:

1. What does it mean for two figures to be identical? How can you be sure they are identical?
2. How do you translate a figure on the coordinate plane?
3. How do you reflect a figure on the coordinate plane?
4. How do you rotate a figure on the coordinate plane?
5. How do you know if two figures are congruent?
6. How do you dilate a figure on the coordinate plane?
7. How do you know if two figures are similar?
8. How do you find the perimeter of similar figures?
9. How do you find the area of similar figures?

Enduring Understanding/Big Ideas:

1. Two figures are identical if you can map one to the other by a sequence of rigid motions, such as translations, reflections, and rotations. A rigid motion changes the position of a figure, but not its size or shape. When figures are congruent, all the matching angles and sizes are congruent.

2. To translate a figure a units horizontally and b units vertically in a coordinate plane, add a to the x -coordinates and b to the y -coordinates of the vertices. Positive values of a and b represent translations up and right. Negative values of a and b represent translations down and left.
3. To reflect a figure in the x -axis, take the opposite of the y -coordinate. To reflect a figure in the y -axis, take the opposite of the x -coordinate.
4. When a point (x, y) is rotated counterclockwise about the origin, the following are true:
 - For a rotation of 90 degrees, $(x, y) \rightarrow (-y, x)$
 - For a rotation of 180 degrees $(x, y) \rightarrow (-x, -y)$
 - For a rotation of 270 degrees $(x, y) \rightarrow (y, -x)$

The original figure and its image are identical.

5. Two figures are congruent when one can be obtained from the other by a sequence of rigid motions. Congruent figures have the same size and same shape. Angles with same measure are congruent angles and sides with the same measure are congruent sides.
6. To dilate a figure with respect to the origin, multiply the coordinates of each vertex by the scale factor k . $(x, y) \rightarrow (kx, ky)$ When $k > 1$, the dilation is an enlargement. When $k > 0$ and $k < 1$, the dilation is a reduction.
7. Two figures are similar figures when one can be obtained from the other by a similarity transformation. Similar figures have the same shape but not necessarily the same size.
8. When two figures are similar, the value of the ratio of their perimeters is equal to the value of the ratio of their corresponding side lengths.
9. When two figures are similar, the value of the ratio of their areas is equal to the *square* of the value of the ratio of their corresponding side lengths.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Dilation Enlargement Image Plane Reduction Reflection Scale	Angle of Rotation Congruent Figures Dilation Enlargement Image Line of reflection Reduction Reflection Rigid Motion Rotation Scale Factor Similar Figures Transformation Translation

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development

Big Ideas Chapter 11: Transformations

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.GM.A.1a 8.GM.A.1b 8.GM.A.1c 8.GM.A.3 ISTE 5b	11.1 Translations ● Desmos Tool	0.5 block	
8.GM.A.1a 8.GM.A.1b 8.GM.A.1c 8.GM.A.3 ISTE 5b	11.2 Reflections ● Desmos Tool	0.5 blocks	
8.GM.A.1a 8.GM.A.1b 8.GM.A.1c 8.GM.A.3 ISTE 5b	11.3 Rotations ● Desmos Tool	0.5 block	
8.GM.A.2	11.4 Congruent Figures	0.5 block	
8.GM.A.3 ISTE 5b	11.5 Dilations ● Desmos Tool	0.5 block	
8.GM.A.4	11.6 Similar Figures	0.5 block	
8.GM.A.4 ISTE 5a	11.7 Perimeters and Areas of Similar Figures ● Desmos Tool	0.5 block	
	Connecting Concepts	0.5 block	
	Chapter 11 Review	0.5 block	
	Chapter 11 Test	0.5 block	

Unit 8: Angles and Triangles

Subject: Math

Grade: 7th Grade Accelerated Math

Name of Unit: Angles and Triangles

Length of Unit: 4 blocks (8 days)

Overview of Unit: Students will use prior knowledge of angles, triangles, and polygons. They should be familiar with how angles are measured, and that polygons have the same number of angles and sides. Students will demonstrate that the sum of the interior angle measures of a triangle is 180 degrees and apply this fact to find the unknown measures of angles and the sums of the angle measures of polygons. Students will also classify and determine the measures of angles created when parallel lines are cut by a transversal. Students use similar triangles to solve problems that include height and distance.

Priority Standards for unit:

- 8.GM.A.5 Explore angle relationships and establish informal arguments.
 - a. Derive the sum of the interior angles of a triangle.
 - b. Explore the relationship between the interior and exterior angles of a triangle.
 - c. Construct and explore the angles created when parallel lines are cut by a transversal.
 - d. Use the properties of similar figures to solve problems.

Supporting Standards for unit:

- 7.GM.B.5 Use angle properties to write and solve equations for an unknown angle.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d.** Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.GM.A.5	angle relationships	Explore	Apply	2
8.GM.A.5	informal arguments	Establish	Analyze	3
8.GM.A.5	the sum of the interior angles of a triangle	Derive	Evaluate	3
8.GM.A.5	the relationship between the interior and exterior angles of a triangle	Explore	Apply	2
8.GM.A.5	the angles created when a parallel lines are cut by a transversal	Construct	Create	2
8.GM.A.5	the angles created when a parallel lines are cut by a transversal	Explore	Apply	2
8.GM.A.5	The properties of similar figures to solve problems	Use	Apply	3

Essential Questions:

1. How do you find missing angle measures created by the intersection of lines?
2. How can we use interior and exterior angles of a triangle to solve real-life problems?
3. How do we use an equation to find the interior angle measures of a polygon?
4. Using similar triangles, how do you find missing measures?
5. How do you define corresponding angles?
6. How can you differentiate between alternate interior angles and alternate exterior angles?
7. What characteristics do the angles of similar triangles have?

Enduring Understanding/Big Ideas:

1. Using prior knowledge of angle types and the definition of corresponding angles, identify congruent angles when a transversal intersects parallel lines and find missing measures.
2. You can extend one side of a triangle to form an exterior angle. The sum of the measures of the interior angles of a triangle are 180 degrees. Use this knowledge to set up an equation to find missing angle measurements.
3. Using the formula, $S = (n - 2) \times 180$, you can find the sum (S) of the interior angle measures of a polygon with n sides.

4. You can set up a proportion with corresponding sides and angles to find missing measures of similar figures.
5. When a transversal intersects parallel lines, corresponding angles are congruent.
6. When a transversal intersects parallel lines, alternate interior angles are congruent and alternate exterior angles are congruent.
7. When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent and the triangles are similar.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Similar	Exterior Angles Indirect Measurement Interior Angles Parallel Lines Regular Polygon Transversal

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development

Big Ideas Chapter 12: Angles and Triangles

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.GM.A.5 ISTE 5a	12.1: Parallel Lines and Transversals • Desmos Tool	0.5 block	
8.GM.A.5 ISTE 5c	12.2: Angles of Triangles • Desmos Tool	0.5 block	
8.GM.A.5	12.3: Angles of Polygons	0.5 block	
8.GM.A.5 ISTE 5a	12.4: Using Similar Triangles • Desmos Tool	0.5 block	
	Connecting Concepts	0.5 block	
	Chapter 12 Review	0.5 block	
	Chapter 12 Test	0.5 block	

Unit 9: Graphing and Writing Linear Equations

Subject: Math

Grade: 7th Grade Accelerated Math

Name of Unit: Graphing and Writing Linear Equations

Length of Unit: 7 blocks (14 days)

Overview of Unit: Students will graph and compare proportional relationships, interpreting the unit rate as the slope. Using similar triangles, students will explain why the slope is the same between any two points on a line. Students will derive $y = mx$ and $y = mx + b$. Students will interpret the rate of change and the initial value of a function.

Priority Standards for unit:

- 8.EE1.B.5 Graph proportional relationships
 - a. Interpret the unit rate as the slope of the graph.
 - b. Compare two different proportional relationships.
- 8.EE1.B.6 Apply concepts of slope and y-intercept to graphs, equations, and proportional relationships.
 - a. Explain why the slope (m) is the same between any two distinct points in a non-vertical line in the Cartesian 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 b .
- 8.F.B.4 Use functions to model linear relationships between quantities.
 - a. Explain the parameters of a linear function based on the context of a problem.
 - b. Determine the parameters of a linear function.
 - c. Determine the x-intercept of a linear function.

Supporting Standards for unit:

- 7.RP.A.2 Recognize and represent proportional relationships between quantities.
 - a. Determine when two quantities are in a proportional relationship.
 - b. Identify and/or compute the constant of proportionality (unit rate).
 - c. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
 - d. Recognize that the graph of any proportional relationship will pass through the origin.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

5b. Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

5c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

5d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.EE1.B.5	proportional relationships	Graph	Apply	3
8.EE1.B.5	the unit rate as the slope of the graph	Interpret	Understand	2
8.EE1.B.5	two different proportional relationships	Compare	Analyze	3
8.EE1.B.6	concepts of slope and y-intercept to graphs, equations, and proportional relationships	Apply	Apply	2
8.EE1.B.6	why the slope (m) is the same between any two distinct points in a non-vertical line in the Cartesian coordinate plane	Explain	Analyze	3
8.EE1.B.6	the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.	Derive	Evaluate	3
8.F.B.4	functions to model linear relationships between quantities	Use	Apply	3

8.F.B.4	the parameters of a linear function based on the context of the problem	Explain	Apply	3
8.F.B.4	the parameters of a linear function	Determine	Understand	2
8.F.B.4	the x-intercept of a linear function	Determine	Understand	2

Essential Questions:

1. How can you use unit rate and slope of a graph to compare proportional relationships?
2. How do you graph and compare proportional relationships, interpreting the unit rate as the slope?
3. How do you use similar triangles to explain why the slope is the same between any two points on a line?
4. How do you interpret the rate of change and the initial value of a function?
5. What is a linear equation and what are the solutions of a linear equation?
6. How do you find slope of a line?
7. What are the x and y intercepts?
8. How do you write an equation for a line in slope-intercept form?
9. How do you write an equation for a line in standard form?
10. How do you write an equation in point-slope form?

Enduring Understanding/Big Ideas:

1. By using unit rate and slope of two proportional relationships you can compare situations.
2. Using a table of values and ordered pairs you can graph a linear equation by plotting the ordered pairs on the coordinate plane. Using graphs of two linear equations you can compare proportional relationships by using the slope to draw conclusions about the data.
3. Using rise over run and right triangles, you can connect any two points on a line to create similar triangles. The ratios of the rise over run for each triangle created will be equivalent.
4. You can use the rate of change to determine the constant rate of increase or decrease and the initial value to determine the starting point of the data.
5. A linear equation is an equation whose graph is a line. The points on the line are solutions of the equation.
6. The slope m of a line is the value of the ratio of the change in y (the rise) to the change in x (the run) between any points (x_1, y_1) and (x_2, y_2) on a line. The slope of a line is a measure of the steepness of the line.

7. The x-intercept of a line is the x-coordinate of the point where the line crosses the x-axis. It occurs when $y = 0$. The y-intercept of a line is the y-coordinate of the point where the line crosses the y-axis. It occurs when $x = 0$.
8. A linear equation written in the form $y = mx + b$ is in slope-intercept form. The slope of the line is m , and the y-intercept of the line is b .
9. The standard form of a linear equation is $Ax + By = C$, where A and B are not both 0.
10. A linear equation written in the form $y - y_1 = m(x - x_1)$ is in point-slope form. The line passes through the point (x_1, y_1) , and the slope of the line is m .

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p style="text-align: center;">Rise Run Slope Solutions</p>	<p style="text-align: center;">Linear equation Slope Proportional Slope-Intercept Form Standard Form Point-Slope Form Rate of Change Solutions Rise Run X-intercept Y-intercept</p>

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development.

Big Ideas Chapter 13: Graphing and Writing Linear Equations

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.EE1.B.5 ISTE 5a ISTE 5b	13.1: Graphing Linear Equations • Desmos Tool	0.5 block	
8.EE1.B.6 ISTE 5a ISTE 5b	13.2: Slope of a Line • Desmos Tool	0.5 block	
8.EE1.B.5 8.EE1.B.6 ISTE 5c	13.3: Graphing Proportional Relationships • Desmos Tool	0.5 block	
8.EE1.B.6	13.4: Graphing Linear Equations in Slope-Intercept Form	0.5 block	
8.EE1.B.5 ISTE 5c ISTE 5d	13.5: Graphing Linear Equations in Standard Form • Desmos Tool	1 block	
8.EE1.B.6	13.6: Writing Equations in Slope-Intercept Form	1 block	
8.EE1.B.6 ISTE 5c ISTE 5d	13.7: Writing Equations in Point-Slope Form • Desmos Tool	1 block	
	Connecting Concepts	0.5 block	
	Chapter 13 Review	0.5 block	
	Chapter 13 Test	0.5 block	

Unit 10: Exponents and Scientific Notation

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Exponents and Scientific Notation

Length of Unit: 6 blocks (12 days)

Overview of Unit: Students will use properties of integer exponents to generate equivalent expressions. Students will use numbers expressed as the product of a single digit and a power of 10 to estimate very large or very small quantities. Students will be able to perform operations with numbers expressed in scientific notation and other forms. Students will interpret scientific notation that has been generated by technology.

Priority Standards for unit:

- 8.EE1.A.1 Know and apply the properties of integer exponents to generate equivalent expressions.
- 8.EE1.A.4 Use scientific notation to solve problems.
 - a. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.
 - b. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.
- 8.EE1.A.3 Express very large and very small quantities in scientific notation and approximate how many times larger one is than the other.

Supporting Standards for unit:

- 8.EE1.B.3 Solve multi-step problems posed with rational numbers.
 - a. Convert between equivalent forms of the same number.
 - b. Assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE1.A.2 Understand how to use equivalent expressions to clarify quantities in a problem.
- 7.NS.A.2 Apply and extend previous understandings of numbers to multiply and divide rational numbers.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.EE1.A.1	the properties of integer exponents to generate equivalent expressions	Know	Knowledge	1

8.EE.A.1	the properties of integer exponents to generate equivalent expressions	Apply	Apply	3
8.EE.A.4	scientific notation to solve problems	Use	Understand	1
8.EE.A.4	operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	Perform	Apply	2
8.EE.A.4	scientific notation	Use	Understand	1
8.EE.A.4	units of appropriate size for measurements of very large or very small quantities.	Choose	Understand	2
8.EE.A.3	very large and very small quantities in scientific notation	Express	Apply	2
8.EE.A.3	how many times one number is than the other	Approximate	Apply	2

Essential Questions:

1. How can you use exponents to write and evaluate expressions?
2. How do you use the Product of Powers Property to simplify an expression?
3. How do you use the Power of a Power Property to simplify an expression?
4. How do you use the Power of a Product Property to simplify an expression?
5. How do you use the Quotient of Powers Property to simplify an expression?
6. What are zero exponents and negative exponents?
7. How do you write numbers in scientific notation?
8. How do you write numbers in standard form?

Enduring Understanding/Big Ideas:

1. You can write a power with a base and exponent, where the base is the repeated factor and the exponent indicates the number of times the factor is repeated.
2. To multiply powers with the same base, add their exponents.
3. To find the power of a power, multiply the exponents.
4. To find a power of a product, find the power of each factor and multiply.
5. To divide powers with the same base, subtract their exponents.

6. For any nonzero number a , $a^0 = 1$. The power 0^0 is undefined. For any integer n and any nonzero number a , a^{-n} is the reciprocal of a^n .
7. Move the decimal point so it is located to the right of the leading non-zero digit. The number of places you moved the decimal point indicates the exponent of the power of 10.
8. The absolute value of the exponent indicates how many places to move the decimal point. If the exponent is negative, move the decimal point to the left. If the exponent is positive, move the decimal point to the right.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Evaluate Expressions Product Equivalent Operations Approximate	Power Base Exponent Scientific notation

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development.

Big Ideas Chapter 14: Exponents and Scientific Notation

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.EE1.A.1	14.1 Exponents	0.5 block	
8.EE1.A.1	14.2 Product of Powers Property	0.5 blocks	
8.EE1.A.1	14.3 Quotient of Powers Property	0.5 block	
8.EE1.A.1	14.4 Zero and Negative Exponents	0.5 block	
8.EE1.A.1	14.5 Estimating Quantities	0.5 block	
8.EE1.A.4	14.6 Scientific Notation	0.5 block	
8.EE1.A.4	14.7 Operations in Scientific Notation	1 block	
	Connecting Concepts	0.5 block	
	Chapter 14 Review	0.5 block	
	Chapter 14 Test	0.5 block	

Unit 11: Real Numbers and the Pythagorean Theorem

Subject: Mathematics

Grade: 7th Grade Accelerated Math

Name of Unit: Real Numbers and the Pythagorean Theorem

Length of Unit: 5 blocks (10 days)

Overview of Unit: Students will understand that numbers that are not rational are irrational. Students will be able to compare irrational numbers using rational approximations. Students will evaluate square roots and cube roots, including those resulting from solving equations. Students will explain a proof of the Pythagorean Theorem and its converse and use the Pythagorean Theorem to find missing measures of right triangles and distances between points in a coordinate plane.

Priority Standards for unit:

- 8.EE1.A.2 Investigate concepts of square and cube roots.
 - a. Solve equations of the form $x^2 = p$ and $x^3 = p$, where p is positive rational number.
 - b. Evaluate square roots of perfect squares less than or equal to 625 and cube roots of perfect cubes less than or equal to 1000.
 - c. Recognize the square roots of non-perfect squares are irrational.
- 8.EE1.B.3 Solve multi-step problems posed with rational numbers.
 - a. Convert between equivalent forms of the same number.
 - b. Assess the reasonableness of answers using mental computation and estimation strategies.
- 8.GM.B.6 Use models to demonstrate a proof of the Pythagorean Theorem and its converse.
- 8.GM.B.7 Use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two- and three-dimensional contexts.
- 8.GM.B.8 Use the Pythagorean Theorem to find the distance between points in a Cartesian coordinate system.
- 8.NS.A.1 Explore the real numbers system.
 - a. Know the differences between rational and irrational numbers.
 - b. Understand that all rational numbers have a decimal expansion that terminates or repeats.
 - c. Convert decimals which repeat into fractions and fractions into repeating decimals.
 - d. Generate equivalent representations of rational numbers.
- 8.NS.A.2 Estimate the value and compare the size of irrational numbers and approximate their locations on the number line.

Supporting Standards for unit:

- 7.EE1.B.3 Solve multi-step problems posed with rational numbers.
 - a. Convert between equivalent forms of the same number.
 - b. Assess the reasonableness of answers using mental computation and estimation strategies.
- 7.NS.A.1 Apply and extend previous understandings of numbers to add and subtract rational numbers.
 - a. Add and subtract rational numbers.
 - b. Represent addition and subtraction on a horizontal or vertical number line
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d.** Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.EE1.A.2	concepts of square and cube roots.	Investigate	Analyze	1
8.EE1.A.2	equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational numbers.	Solve	Apply	2
8.EE1.A.2	square roots of perfect squares less than or equal to 625 and cube roots less than or equal to 1000.	Evaluate	Analyze	3
8.EE1.A.2	the square roots of non-perfect squares are irrational	Recognize	Knowledge	1

8.EE1.B.3	multi-step problems posed with rational numbers.	Solve	Apply	3
8.EE1.B.3	between equivalent forms of the same number	Convert	Understand	2
8.EE1.B.3	the reasonableness of answers using mental computation and estimation strategies.	Assess	Analyze	3
8.GM.B.6	models to demonstrate a proof of the Pythagorean Theorem and its converse	Use	Apply	3
8.GM.B.7	the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two-and three-dimensional contexts.	Use	Apply	2
8.GM.B.8	the Pythagorean Theorem to find the distance between points in a Cartesian coordinate system.	Use	Apply	2
8.NS.A.1	the real number system	Explore	Apply	1
8.NS.A.1	the difference between rational and irrational numbers	Know	Knowledge	1
8.NS.A.1	that all rational numbers have a decimal expansion that terminates or repeats	Understand	Understand	2
8.NS.A.1	decimals which repeat into fractions and fractions into repeating decimals	Convert	Understand	2
8.NS.A.1	equivalent representations of rational numbers	Generate	Create	2
8.NS.A.2	the value of irrational numbers	Estimate	Understand	2
8.NS.A.2	the size of irrational numbers	Compare	Analyze	3
8.NS.A.2	the location of irrational numbers on a number line	Approximate	Understand	2

Essential Questions:

1. What is a square root?
2. What is a perfect square?
3. How do you use square roots in real life?
4. How do you use the Pythagorean Theorem to find the missing side length of a triangle?
5. How do you use the Pythagorean Theorem to find distance on the coordinate plane?
6. What is a cube root?
7. What is a perfect cube?
8. How do you convert between different forms of rational numbers?
9. What is an irrational number?
10. What are real numbers?
11. How can you approximate irrational numbers on a number line?
12. What is the converse of the Pythagorean Theorem?

Enduring Understanding/Big Ideas:

1. A square root of a number p is a number whose square is equal to p . So, a square root of a number p is a solution of the equation $x^2 = p$. Every positive number has a positive *and* a negative square root.
2. A perfect square is a number with integers as its square roots.
3. Example: The area of a crop circle is 45, 216 square feet. What is the radius of the crop circle?
4. Using $a^2 + b^2 = c^2$, where a and b are the legs and c is the hypotenuse (longest side), you can plug in information and solve for the missing variable.
5. You can use two points and connect them with a right triangle to form the hypotenuse of that right triangle. By using the distance of a and b (the legs) on the right triangle you can plug in the given information to find the missing hypotenuse, or distance between the two points.
6. A cube root of a number p is a number whose cube is equal to p . So, a cube root of a number p is a solution of the equation $x^3 = p$. The symbol $\sqrt[3]{}$ is used to represent a cube root.
7. A perfect cube is a number that can be written as the cube of an integer.
8. You can convert both repeating and terminating decimals to fractions by dividing by 10, 100, 100, etc. and fractions to decimals by dividing the numerator by the denominator.
9. An irrational number is a number that is not rational. So, an irrational number *cannot* be written as a/b , where a and b are integers and $b \neq 0$.
10. The real number system is made up of natural numbers, whole numbers, integers, and rational and irrational numbers. You can classify numbers in the real number system using these categories.
11. Using perfect squares you can choose the two perfect squares that the number you are approximating falls between. When you find the square root of the perfect squares (two

whole numbers) you can place the non-perfect square (irrational number) on the number line between those two whole numbers.

12. The converse of the Pythagorean Theorem states that if the equation $a^2 + b^2 = c^2$ is true for the side lengths of a triangle, then the triangle is a right triangle.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p>Leg Converse Rational Irrational Theorem Length Edge Terminating Repeating Approximate</p>	<p>Square root Perfect square Radical sign Radicand Pythagorean Theorem Leg Hypotenuse Converse Rational Irrational Theorem Edge Cube Cube Root Perfect Cube Terminating Decimal Repeating Decimal Right Triangle Approximate Real Numbers Natural Numbers Integers Whole Numbers</p>

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development

Big Ideas Chapter 15: Real Numbers and the Pythagorean Theorem

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.EE1.A.2	15.1 Finding Square Roots	0.5 block	
8.GM.B.7 8.GM.B.8	15.2 The Pythagorean Theorem	0.5 blocks	
8.EE1.A.2	15.3 Find the Cube Roots	0.5 block	
8.NS.A.1	15.4 Rational Numbers	0.5 block	
8.NS.A.2 ISTE 5a	15.5 Irrational Numbers • Desmos Tool	0.5 block	
8.GM.B.6	15.6 The Converse of the Pythagorean Theorem	0.5 block	
	Connecting Concepts	0.5 block	
	Chapter 15 Review	0.5 block	
	Chapter 15 Test	0.5 block	

Unit 12: Volume of Similar Solids

Subject: Math

Grade: 7th Grade Accelerated Math

Name of Unit: Volume of Similar Solids

Length of Unit: 4 blocks (8 days)

Overview of Unit: Students will know and apply the formulas for the volumes of cones, cylinders, and spheres. Students find surface area and volume of similar solids and use proportions to find missing side lengths.

Priority Standards for unit:

- 8.GM.C.9 Solve problems involving surface area and volume.
 - a. Understand the concept of surface area and find surface area of pyramids.
 - b. Understand the concepts of volume and find the volume of pyramids, cones, and spheres.

Supporting Standards for unit:

- 7.RP.A.2 Recognize and represent proportional relationships between quantities.
 - a. Determine when two quantities are in a proportional relationship.
- ISTE-COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
 - 5a.** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
 - 5b.** Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
 - 5c.** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
 - 5d.** Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
8.GM.C.9	problems involving surface area and volume	Solve	Apply	3
8.GM.C.9	the concept of surface area	Understand	Understand	2

8.GM.C.9	surface area of pyramids	Find	Apply	2
8.GM.C.9	the concepts of volume	Understand	Understand	2
8.GM.C.9	the volume of pyramids, cones, and spheres	Find	Apply	2

Essential Questions:

1. How do you find volume of cylinder?
2. How do you find the volume of a cone?
3. How do you find the volume of a sphere?
4. How do you define similar solids?
5. How do I find a missing measure using similar solids?
6. How do you find the surface area of similar solids?
7. How do you find the volume of similar solids?

Enduring Understanding/Big Ideas:

1. The volume V of a cylinder is the product of the area of the base and the height of the cylinder, $V=Bh$, B =area of the base.
2. The volume V of a cone is one-third the product of the area of the base and the height of the cone, $V=1/3Bh$, B =area of the base.
3. The volume V of a sphere is the product of $4/3\pi$ and the cube of the radius of the sphere, $V=4/3\pi r^3$.
4. Similar solids are solids that have the same shape and proportional corresponding dimensions.
5. If solids are similar, you can set up proportions with corresponding measurements and solve to find the missing side length.
6. When two solids are similar, the value of the ratio of their surface areas is equal to the square of the value of the ratio of their corresponding linear measures.
7. When two solids are similar, the value of the ratio of their volumes is equal to the cube of the value of the ratio of their corresponding linear measures.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Height Cylinder Cone Sphere Similar Solid	Cylinder Radius Area of the Base Volume Height Cone Sphere Similar Solid

Resources for Vocabulary Development: Use Quality Tools/AVID strategies for vocabulary development

Big Ideas Chapter 16: Volume of Similar Solids

Standard	Topic & Section	Suggested # of Days	Notes
	Chapter Opener	0.5 block	
8.GM.C.9 ISTE 5c ISTE 5d	16.1: Volume of Cylinders • Desmos Tool	0.5 block	
8.GM.C.9 ISTE 5c ISTE 5d	16.2: Volume of Cones • Desmos Tool	0.5 block	
8.GM.C.9 ISTE 5c ISTE 5d	16.3: Volume of Spheres • Desmos Tool	0.5 block	
8.GM.C.9 ISTE 5b	16.4: Surface Areas of Volumes of Similar Solids • Desmos Tool	0.5 block	
	Connecting Concepts	0.5 block	
	Chapter 16 Review	0.5 block	
	Chapter 16 Test	0.5 block	

Unit of Study Terminology

Appendices: All Appendices and supporting material can be found in this course's shell course in the District's Learning Management System.

Assessment Leveling Guide: A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

Big Ideas/Enduring Understandings: Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

Engaging Experience: Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

Engaging Scenario: This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

Essential Questions: Engaging, open-ended questions that teachers can use to engage students in the learning.

Priority Standards: What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

Supporting Standards: Additional standards that support the learning within the unit.

Topic: These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

Unit of Study: Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

Unit Vocabulary: Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.

Symbols:



This symbol depicts an experience that can be used to assess a student's 21st Century Skills using the rubric provided by the district.



This symbol depicts an experience that integrates professional skills, the development of professional communication, and/or the use of professional mentorships in authentic classroom learning activities.