



Park Hill School District

Building Successful Futures • Each Student • Every Day

7th Grade Mathematics Curriculum

Course Description: In grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two-and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

Scope and Sequence:

Time Frame	Unit
20 blocks	Rational Numbers
20 blocks	Expressions, Equations, and Inequalities
16 blocks	Ratios/Proportions/Percents
10 blocks	Probability and Statistics
6 blocks	Geometric Shapes and Angles
9 blocks	Surface Area and Volume

Curriculum Revision Tracking

Spring 2022

- Priority Standards were updated to match DESE Priority Standards
- Learning Targets and Success Criteria from Big Ideas added to each unit
- Scope and sequence adjustment based on teacher feedback
- Unit 1: Rational Numbers
 - Chapter 1, Lesson 1:1: Not tied to a priority standard—teacher can use discretion to determine if this is needed based on student background knowledge and need.
- Unit 4: Probability and Statistics
 - Chapter 7, Lesson 7.3: Not tied to a priority standard—teacher can use discretion to determine if this is needed based on student background knowledge and need.
- Unit 6: Surface Area and Volume
 - Big Ideas does not cover volume of a cylinder in 7th grade so teachers will need to utilize lesson 10.1 from the 8th grade resource-this was added to the lessons table

Spring 2020

- Two days were added after the Chapter 2 test to spend time reviewing Order of Operations, with an emphasis on exponents in order to prepare students to work with exponents and negative numbers
- **Unit 2: Expressions, Equations & Inequalities**
 - Chapter 3: Expressions
 - Teach 3.3 Distributive property, before 3.2, adding and subtracting linear expressions
 - Adjusted timing of lessons
 - Chapter 4: Equations and Inequalities
 - Combine 4.1 and 4.2 as one lesson
 - Adjusted timing of lessons
- **Unit 3: Ratios/Proportions/Percents**
 - Chapter 5: Ratios and Proportions
 - Adjusted timing of lessons
 - Chapter 6: Percents
 - Combine lessons 6.2 and 6.3 into one block, to teach students both strategies at the same time and let them choose which strategy they prefer.

- **Unit 4: Probability and Statistics**
 - Chapter 7: Probability
 - Omit 7.4
 - Chapter 8: Statistics
 - Omit 8.3 and 8.4

- **Unit 5: Geometric Shapes and Angles**
 - Chapter 9: Geometric Shapes and Angles
 - In 9.3, only focus on composite figures
 - Omit 9.4

Unit 1: Rational Numbers

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Rational Numbers

Length of Unit: 20 Blocks (40 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:

- 7.NS.A.1c Apply and extend previous understandings of numbers to add and subtract rational numbers.(Describe situations and show that a number and its opposite have a sum of 0 (additive inverses).)
- 7.NS.A.1f Apply and extend previous understandings of numbers to add and subtract rational numbers.(Interpret sums and differences of rational numbers.)
- 7.NS.A.2b Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Determine that a number and its reciprocal have a product of 1 (multiplicative inverse).)
- 7.NS.A.2f Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Interpret products and quotients of rational numbers by describing real-world contexts.)
- 7.NS.A.3: Solve problems involving the four arithmetic operations with rational numbers.

Supporting Standards for unit:

- 7.NS.A.1a: Apply and extend previous understandings of numbers to add and subtract rational numbers.(Add and subtract rational numbers.)
- 7.NS.A.1b: Apply and extend previous understandings of numbers to add and subtract rational numbers.(Represent addition and subtraction on a horizontal or vertical number line.)
- 7.NS.A.1d: Apply and extend previous understandings of numbers to add and subtract rational numbers.(Understand subtraction of rational numbers as adding the additive inverse.)

- 7.NS.A.1e: Apply and extend previous understandings of numbers to add and subtract rational numbers.(Determine the distance between two rational numbers on the number line is the absolute value of their difference.)
- 7.NS.A.2a Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Multiply and divide rational numbers.)
- 7.NS.A.2c Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Understand that every quotient of integers (with non-zero divisor) is a rational number.)
- 7.NS.A.2d Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Convert a rational number to a decimal.)
- 7.NS.A.2e Apply and extend previous understandings of numbers to multiply and divide rational numbers.(Understand that all rational numbers can be written as fractions or decimal numbers that terminate or repeat.)

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.1	previous understandings of numbers to add and subtract rational numbers	Apply, Extend	Apply	2
7.NS.A.1c	situations and show that a number and its opposite have a sum of 0 (additive inverses)	Describe	Understand	1
7.NS.A.1f	sums and differences of rational numbers.	Interpret	Evaluate	3
7.NS.A.2	previous understandings of numbers to add and subtract rational numbers	Apply, Extend	Apply	2
7.NS.A.2b	that a number and its reciprocal have a product of 1 (multiplicative inverse)	Determine	Evaluate	3
7.NS.A.2f	products and quotients of rational numbers by describing real-world contexts	Interpret	Evaluate	3
7.NS.A.3	Real-world 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:
 - a. multiplication is repeated addition, can use a number line to model this process
 - b. 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
 - c. 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
Understand	<u>Chapter 1</u>
Interpret	Absolute value
Apply	Opposites
Convert	Rational numbers
Know	Integers
Solve	<u>Chapter 2</u>
Repeating	Integers
Sum	Rational numbers
Difference	Reciprocals
	Quotient
	Product

Resources for Vocabulary Development:

Use quality tools (See Adult Learning Framework handbook for ideas)

Topic 1: *Big Ideas* Chapter 1: Adding and Subtracting Rational Numbers

Standard	Topic & Section	Suggested # of Days	Learning Target	Success Criteria
Teacher Discretion	Chapter Opener 1.1 Rational Numbers	1 block	Understand absolute values and ordering of rational numbers.	<ul style="list-style-type: none"> • I can graph rational numbers on a number line. • I can find the absolute value of a rational number. • I can use a number line to compare rational numbers.
7.NS.1c 7.NS.1f 7.NS.A.3	1.2 Adding Integers • Desmos Tool	1 block	Find sums of integers.	<ul style="list-style-type: none"> • I can explain how to model addition of integers on a number line. • I can find sums of integers by reasoning about absolute values. • I can explain why the sum of a number and its opposite is 0.
7.NS.1c 7.NS.1f 7.NS.A.3	1.3 Adding Rational Numbers	2 blocks	Find sums of rational numbers.	<ul style="list-style-type: none"> • I can explain how to model addition of rational numbers on a number line. • I can find sums of rational numbers by reasoning about absolute values. • I can use properties of addition to efficiently add rational numbers.

7.NS.1f 7.NS.A.3	1.4 Subtracting Integers • Desmos Tool	1 block	Find differences of integers.	<ul style="list-style-type: none"> I can explain how subtracting integers is related to adding integers. I can explain how to model subtraction of integers on a number line. I can find differences of integers by reasoning about absolute values.
7.NS.1f 7.NS.A.3	1.5 Subtracting Rational Numbers	2 blocks		<ul style="list-style-type: none"> I can explain how to model subtraction of rational numbers on a number line. I can find differences of rational numbers by reasoning about absolute values. I can find distances between numbers on a number line.
	Connecting Concepts Review	1 block		
	Chapter 1 Test	1 block		

Topic 2: *Big Ideas* Chapter 2: Multiplying and Dividing Rational Numbers

Standard	Topic & Section	Suggested # of Days	Learning Target	Success Criteria
7.NS.A.2b 7.NS.A.2f 7.NS.A.3	Chapter Opener 2.1 Multiplying Integers <ul style="list-style-type: none"> Desmos Tool 	1 block	Find products of integers.	<ul style="list-style-type: none"> I can explain the rules for multiplying integers. I can find products of integers with the same sign. I can find products of integers with different signs.
7.NS.A.2f 7.NS.A.3	2.2 Dividing Integers	1 block	Find quotients of integers.	<ul style="list-style-type: none"> I can explain the rules for dividing integers. I can find quotients of integers with the same sign. I can find quotients of integers with different signs.
7.NS.A.2f	2.3 Converting Between Fractions and Decimals	1 block	Convert between different forms of rational numbers.	<ul style="list-style-type: none"> I can explain the difference between terminating and repeating decimals. I can write fractions and mixed numbers as decimals. I can write decimals as fractions and mixed numbers.

7.NS.A.2b 7.NS.A.2f 7.NS.A.3	2.4 Multiplying Rational Numbers	2 blocks	Find products of rational numbers.	<ul style="list-style-type: none"> • I can explain the rules for multiplying rational numbers. • I can find products of rational numbers with the same sign. • I can find products of rational numbers with different signs.
7.NS.A.2f 7.NS.A.3	2.5 Dividing Rational Numbers <ul style="list-style-type: none"> • Desmos Tool 	2 blocks	Find quotients of rational numbers.	<ul style="list-style-type: none"> • I can explain the rules for dividing rational numbers. • I can find quotients of rational numbers with the same sign. • I can find quotients of rational numbers with different signs.
	Connecting Concepts Review	1 block		
	Ch 2 Test	1 block		
*Spend two blocks reviewing Order of Operations with students in order to prepare them to work with exponents and negative numbers.	Order of Operations, Emphasis on Exponents Review	2 blocks		

Unit 2: Expressions, Equations, and Inequalities

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Expressions, Equations, and Inequalities

Length of Unit: 20 Blocks (40 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:

- 7.EE1.A.1: Apply properties of operations to simplify and to factor linear algebraic expressions with rational coefficients.
- 7.EE1.A.2: Understand how to use equivalent expressions to clarify quantities in a problem.
- 7.EE1.B.4b Write and/or solve linear equations and inequalities in one variable. (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.)
- 7.EE1.B.4c Write and/or solve linear equations and inequalities in one variable. (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:

- 7.EE1.B.3a Solve multi-step problems posed with rational numbers. (Convert between equivalent forms of the same number.)
- 7.EE1.B.4a Write and/or solve linear equations and inequalities in one variable. (Write and/or solve equations of the form $x + p = q$ and $px = q$ in which p and q are rational numbers.)

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.EE1.A.1	properties of operations to simplify and to factor linear algebraic expressions with rational coefficients	Apply	Apply	2

7.EEI.A.2	how to use equivalent expressions to clarify quantities in a problem	Understand	Understand	1
7.EEI.B.4	linear equations and inequalities in one variable	Write, Solve	Apply	2
7.EEI.B.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.EEI.B.4c	the solution set of the inequality	Graph	Apply	1

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

	<p>Chapter 4: Equations Inequalities Model Two-step equations Two-step inequalities</p>
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Resources for Vocabulary Development:

Use a Quality Tool (See Adult Learning Framework handbook)

Topic 1:

Big Ideas Chapter 3: Expressions

Standard	Topic & Section	Suggested # of Days	Learning Targets	Success Criteria
7.EE1.A.1 7.EE1.A.2	Chapter opener 3.1 Algebraic Expressions	1 block	Simplify algebraic expressions.	<ul style="list-style-type: none"> I can identify terms and like terms of algebraic expressions. I can combine like terms to simplify algebraic expressions. I can write and simplify algebraic expressions to solve real-life problems.
7.EE1.A.1 7.EE1.A.2	3.3 Distributive property	2 blocks	Find sums and differences of linear expressions.	<ul style="list-style-type: none"> I can explain the difference between linear and nonlinear expressions. I can find opposites of terms that include variables. I can apply properties of operations to add and subtract linear expressions.
7.EE1.A.1 7.EE1.A.2	3.2 Adding and subtracting linear expression	2 blocks	Apply the Distributive Property to generate equivalent expressions.	<ul style="list-style-type: none"> I can explain how to apply the Distributive Property. I can use the Distributive Property to simplify algebraic expressions.

7.EE1.A.1 7.EE1.A.2	3.4 Factoring expressions	1 block	Factor algebraic expressions.	<ul style="list-style-type: none"> • I can identify the greatest common factor of terms, including variable terms. • I can use the Distributive Property to factor algebraic expressions. • I can write a term as a product involving a given factor.
	Connecting concepts Review	1 block		
	Ch 3 Test	1 block		

Topic 2:

Big Ideas Chapter 4: Equations and Inequalities

Standard	Topic & Section	Suggested # of Days	Learning Targets	Success Criteria
7.EE1.B.4b	Chapter opener 4.1 Solving equations using addition or subtraction 4.2 Solving equations using multiplication or division	1 block	<p>Write and solve equations using addition or Subtraction.</p> <p>Write and solve equations using multiplication or division.</p>	<ul style="list-style-type: none"> • I can apply the Addition and Subtraction Properties of Equality to produce equivalent equations. • I can solve equations using addition or subtraction. • I can apply equations involving addition or subtraction to solve real-life problems. • I can apply the Multiplication and Division Properties of Equality to produce equivalent equations. • I can solve equations using multiplication or division. • I can apply equations involving multiplication or division to solve real-life problems
7.EE1.B.4b	4.3 Solving two step equations	2 blocks	Write and solve two-step equations.	<ul style="list-style-type: none"> • I can apply properties of equality to produce equivalent equations. • I can solve two-step equations using the basic operations. • I can apply two-step equations to solve real-life problems.

	Review Day and Quiz 4.1-4.3	1 block		
7.EE1.B.4c	4.4 Writing and graphing inequalities	2 blocks	Write inequalities and represent solutions of inequalities on number lines.	<ul style="list-style-type: none"> • I can write word sentences as inequalities. • I can determine whether a value is a solution of an inequality. • I can graph the solutions of inequalities.
7.EE1.B.4c	4.5 Solving inequalities using addition or subtraction	1 block	Write and solve inequalities using addition or subtraction.	<ul style="list-style-type: none"> • I can apply the Addition and Subtraction Properties of Inequality to produce equivalent inequalities. • I can solve inequalities using addition or subtraction. • I can apply inequalities involving addition or subtraction to solve real-life problems.
7.EE1.B.4c	4.6 Solving inequalities using multiplication or division	1 block	Write and solve inequalities using multiplication or division.	<ul style="list-style-type: none"> • I can apply the Multiplication and Division Properties of Inequality to produce equivalent inequalities. • I can solve inequalities using multiplication or division. • I can apply inequalities involving multiplication or division to solve real-life problems.

7.EE1.B.4c	4.7 Solving two step inequalities	2 blocks	Write and solve two-step inequalities.	<ul style="list-style-type: none"> • I can apply properties of inequality to generate equivalent inequalities. • I can solve two-step inequalities using the basic operations. • I can apply two-step inequalities to solve real-life problems.
	Connecting concepts Review	1 block		
	Ch 4 Test	1 block		

Unit 3: Ratios/Proportions/Percents

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Ratios/Proportions/Percents

Length of Unit: 16 Blocks (32 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.RP.A.3: Solve problems involving ratios, rates, percentages and proportional relationships.
- 7.RP.A.2a Recognize and represent proportional relationships between quantities. (Determine when two quantities are in a proportional relationship.)
- 7.RP.A.2c Recognize and represent proportional relationships between quantities. (Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.)
- 7.GM.A.1: Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.

Supporting Standards for unit:

- 7.RP.A.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.A.2b Recognize and represent proportional relationships between quantities. (Identify and/or compute the constant of proportionality (unit rate).)
- 7.RP.A.2d Recognize and represent proportional relationships between quantities. (Recognize that the graph of any proportional relationship will pass through the origin.)
- 7.NS.A.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.
- e. Understand that all rational numbers can be written as fractions or decimal numbers that terminate or repeat.
- 7.RP.2 Recognize and represent proportional relationships between quantities.
 - b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
 - 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.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.RP.A.1	problems involving ratios, rates, percentages and proportional relationships	Solve	Apply	2
7.RP.A.2a	whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table	Decide	Apply	1
7.RP.A.2a	whether two quantities are in a proportional relationship, e.g., by graphing on a coordinate plane	Decide	Apply	1
7.RP.A.2a	whether the graph is a straight line through the origin.	Observe	Analyze	1

7.RP.A.2c	proportional relationships by equations.	Represent	Apply	2
7.GM.A.1	problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.	Solve		

Essential Questions:

1. Why would you use 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. To make 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	Chapter 5: Proportional Relationship Scale Ratio table Ratios Rates Unit rate Proportions Interpret Constant of proportionality Chapter 6: 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	Learning Targets	Success Criteria
7.RP.A.3	Chapter opener 5.1 Ratios and ratio tables 5.2 Rates and unit rates *Take out tables with fractions and make sure students have a solid understanding of what a ratio is	1 block	Understand ratios of rational numbers and use ratio tables to represent equivalent ratios. Understand rates involving fractions and use unit rates to solve problems.	<ul style="list-style-type: none"> • I can write and interpret ratios involving rational numbers. • I can use various operations to create tables of equivalent ratios. • I can use ratio tables to solve ratio problems. • I can find unit rates for rates involving fractions. • I can use unit rates to solve rate problems.
7.RP.A.3	5.4 Writing and solving proportions	2 blocks	Use proportions to solve ratio problems.	<ul style="list-style-type: none"> • I can solve proportions using various methods. • I can find a missing value that makes two ratios equivalent. • I can use proportions to represent and solve real-life problems.

7.RP.A.2a	5.3 Identifying proportional relationships	2 blocks	Determine whether two quantities are in a proportional relationship.	<ul style="list-style-type: none"> • I can determine whether ratios form a proportion. • I can explain how to determine whether
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				<p>quantities are proportional.</p> <ul style="list-style-type: none"> • I can distinguish between proportional and nonproportional situations.
<p>7.RP.A.2a 7.RP.A.2c</p>	<p>5.5 Graphs of proportional relationships</p>	<p>1 block</p>	<p>Represent proportional relationships using graphs and equations.</p>	<ul style="list-style-type: none"> • I can determine whether quantities are proportional using a graph. • I can find the unit rate of a proportional relationship using a graph. • I can create equations to represent proportional relationships.
<p>7.GM.A.1</p>	<p>5.6 Scale Drawings</p>	<p>1 block</p>	<p>Solve problems involving scale drawings.</p>	<ul style="list-style-type: none"> • I can find an actual distance in a scale drawing. • I can explain the meaning of scale and scale factor. • I can use a scale drawing to find the actual lengths and areas of real-life objects.
	<p>Connecting concepts Review</p>	<p>1 block</p>		
	<p>Chapter 5 Test</p>	<p>1 block</p>		

Big Ideas Chapter 6: Percents

Standard	Topic & Section	Suggested # of Days	Learning Targets	Success Criteria
7.EE1.B.3b	Chapter opener 6.1 Fractions, decimals, and percents	1 block	Rewrite fractions, decimals, and percents using different representations.	<ul style="list-style-type: none"> I can write percents as decimals and decimals as percents. I can write fractions as decimals and percents. I can compare and order fractions, decimals, and percents.
7.EE1.B.3b 7.RP.A.3	6.2 The percent proportion <ul style="list-style-type: none"> Desmos Tool 6.3 The percent equation	1 block	Use the percent proportion to find missing quantities. Use the percent equation to find missing quantities.	<ul style="list-style-type: none"> I can write proportions to represent percent problems. I can solve a proportion to find a percent, a part, or a whole. I can write equations to represent percent problems. I can use the percent equation to find a percent, a part, or a whole.
7.EE1.B.3b 7.RP.A.3	6.4 Percent of increase and decrease	1 block	Find percents of change in quantities.	<ul style="list-style-type: none"> I can explain the meaning of percent of change. I can find the percent of increase or decrease in a quantity. I can find the percent error of a quantity.

7.EE.B.3b 7.RP.A.3	6.5 Discounts and markups	1 block	Solve percent problems involving discounts and markups.	<ul style="list-style-type: none"> • I can use percent models to solve problems involving discounts and markups. • I can write and solve equations to solve problems involving discounts and markups.
7.EE.B.3b 7.RP.A.3	6.6 Simple interest	1 block	Understand and apply the simple interest formula.	<ul style="list-style-type: none"> • I can explain the meaning of simple interest. • I can use the simple interest formula to solve problems.
	Connect concepts Review	1 block		
	Ch 6 Test	1 block		

Unit 4: Probability and Statistics

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Probability and Statistics

Length of Unit: 10 Blocks (20 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.DSP.C.5a Investigate the probability of chance events.(Determine probabilities of simple events.)
- 7.DSP.C.5b Investigate the probability of chance events.(Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.)
- 7.DSP.C.8a Find probabilities of compound events using organized lists, tables, tree diagrams and simulations.(Represent the sample space of a compound event.)
- 7.DSP.A.1b Understand that statistics can be used to gain information about a population by examining a sample of the population.(Understand that generalizations from a sample are valid only if the sample is representative of the population.)
- 7.DSP.B.3:Analyze different data distributions using statistical measures.

Supporting Standards for unit:

- 7.DSP.C.8b Find probabilities of compound events using organized lists, tables, tree diagrams and simulations.(Design and use a simulation to generate frequencies for compound events.)
- 7.DSP.A.1a Understand that statistics can be used to gain information about a population by examining a sample of the population.(Understand that a sample is a subset of a population.)
- 7.DSP.A.1c Understand that statistics can be used to gain information about a population by examining a sample of the population.(Understand that random sampling is used to produce representative samples and support valid inferences.)
- 7.DSP.A.2:Use data from multiple samples to draw inferences about a population and investigate variability in estimates of the characteristic of interest.

- 7.DSP.B.4: Compare the numerical measures of center, measures of frequency and measures of variability from two random samples to draw inferences about the population.
- 7.DSP.C.6a Investigate the relationship between theoretical and experimental probabilities for simple events.(Predict outcomes using theoretical probability.)
- 7.DSP.C.6b Investigate the relationship between theoretical and experimental probabilities for simple events.(Perform experiments that model theoretical probability.)
- 7.DSP.C.6c Investigate the relationship between theoretical and experimental probabilities for simple events.(Compare theoretical and experimental probabilities.)
- 7.DSP.C.7a Explain possible discrepancies between a developed probability model and observed frequencies.(Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.)
- 7.DSP.C.7b Explain possible discrepancies between a developed probability model and observed frequencies.(Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.)
- 7.DSP.C.8a Find probabilities of compound events using organized lists, tables, tree diagrams and simulations.(Represent the sample space of a compound event.)
- 7.DSP.C.8b Find probabilities of compound events using organized lists, tables, tree diagrams and simulations.(Design and use a simulation to generate frequencies for compound events.)

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.DSP.C.5	the probability of chance events	Investigate	Analyze	2
7.DSP.C.5a	probabilities of simple events.	Determine	Analyze	2
7.DSP.C.5b	that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring	Understand	Understand	1
7.DSP.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.DSP.A.1b	Understand that statistics can be used to gain information about a population by examining a sample of the population.(Understand that generalizations from a sample are valid only if the sample is representative of the population.)	Understand	Understand	1
7.DSP.B.3	Analyze different data distributions using statistical measures.	Analyze	Analyze	4

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
Average Range Compare Inference Deviation Probability Theoretical Trial Frequency Dependent Independent Experiment	Chapter 7: Mean Comparative Inference Mean absolute deviation Outcomes Event Relative frequency Experimental probability Theoretical probability Sample space Fundamental counting principle Compound event Simulation Chapter 8: Population Sample Unbiased sample Bias sample Sample space Median Interquartile range Mean Skew Conclude Variation Measures of Center

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

Big Ideas Chapter 7: Probability

Standard	Topic & Section	Suggested # of Days	Learning Targets	Success Criteria
7.DSP.C.5a 7.DSP.C.5b	Chapter opener 7.1 Probability	1 block	Understand how the probability of an event indicates its likelihood.	<ul style="list-style-type: none"> • I can identify possible outcomes of an experiment. • I can use probability and relative frequency to describe the likelihood of an event. • I can use relative frequency to make predictions.
7.DSP.C.5a 7.DSP.C.5b	7.2 Experimental and Theoretical probability	1 block	Develop probability models using experimental and theoretical probability.	<ul style="list-style-type: none"> • I can explain the meanings of experimental probability and theoretical probability. • I can find experimental and theoretical probabilities. • I can use probability to make predictions.
7.DSP.8a	7.3 Compound events	1 block	Find sample spaces and probabilities of compound events.	<ul style="list-style-type: none"> • I can find the sample space of two or more events. • I can find the total number of possible outcomes of two or more events. • I can find probabilities of compound events.
	Connecting concepts Review	1 block		
	Ch 7 Test	1 block		

Big Ideas Chapter 8: Statistics

Standard	Topic & Section	Suggested # of Days	Learning Targets	Success Criteria
7.DSP.A.1b	Chapter opener 8.1 Samples and populations	1 block	Understand how to use random samples to make conclusions about a population.	<ul style="list-style-type: none"> • I can explain why a sample is biased or unbiased. • I can explain why conclusions made from a biased sample may not be valid. • I can use an unbiased sample to make a conclusion about a population.
	8.2 Using random samples to describe populations *Teacher Discretion—not tied to priority standard	1 block	Understand variability in samples of a population.	<ul style="list-style-type: none"> • I can use multiple random samples to make conclusions about a population. • I can use multiple random samples to examine variation in estimates.
7.DSP.B.3	8.3 Comparing Populations	1 block	Compare populations using measures of center and variation.	<ul style="list-style-type: none"> • I can find the measures of center and variation of a data set. • I can describe the visual overlap of two data distributions numerically. • I can determine whether there is a significant difference in the measures of center of two data sets.

	Connecting concepts Review	1 block		
	Ch 8 Test	1 block		

Unit 5: Geometric Shapes and Angles

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Geometric Shapes and Angles

Length of Unit: 6 Blocks (12 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.GM.A.4a Understand the concepts of circles.(Analyze the relationships among the circumference, the radius, the diameter, the area and Pi in a circle.)
- 7.GM.A.4b Understand the concepts of circles.(Know and apply the formulas for circumference and area of circles to solve problems.)
- 7.GM.B.6a Understand the relationship between area, surface area and volume.(Find the area of triangles, quadrilaterals and other polygons composed of triangles and rectangles.)

Supporting Standards for unit:

- 7.GM.A.2a Use a variety of tools to construct geometric shapes.(Determine if provided constraints will create a unique triangle through construction.)
- 7.GM.A.2b Use a variety of tools to construct geometric shapes.(Construct special quadrilaterals given specific parameters.)
- 7.GM.A.3:Describe two-dimensional cross sections of pyramids, prisms, cones and cylinders.
- 7.GM.B.5:Use angle properties to write and solve equations for an unknown angle.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.GM.A.4a	the relationships among the circumference, the radius, the diameter, the area and Pi in a circle.)	Analyze	Analyze	3

7.GM.A.4b	Know and apply the formulas for circumference and area of circles to solve problems.)	Know	Remember	1
7.GM.B.6a	Understand the relationship between area, surface area and volume.(Find the area of triangles, quadrilaterals and other polygons composed of triangles and rectangles.)	Use	Apply	1

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	Chapter 9 Acute angle Adjacent Angles Angle Complementary Angles

Use Solve Adjacent	Obtuse angle Right angle Straight angle Supplementary Angles Vertex of an Angle Vertical Angles Composite figure Pi Radius Diameter Center Cross section Construct Quadrilateral
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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	Learning Targets	Success Criteria
7.GM.A.4a 7.GM.A.4b	Chapter opener 9.1 Circles and circumference	1 block	Find the circumference of a circle.	<ul style="list-style-type: none"> • I can explain the relationship between the diameter and circumference of a circle. • I can use a formula to find the circumference of a circle.
7.GM.A.4a 7.GM.A.4b	9.2 Areas of circles	1 block	Find the area of a circle.	<ul style="list-style-type: none"> • I can estimate the area of a circle. • I can use a formula to find the area of a circle.
7.GM.B.6a	9.3 Perimeters and areas of composite figures	1 block *Omit teaching grids and only focus on composite figures.	Find perimeters and areas of composite figures.	<ul style="list-style-type: none"> • I can use a grid to estimate perimeters and areas. • I can identify the shapes that make up a composite figure. • I can find the perimeters and areas of shapes that make up composite figures.

7.GM.B.5	9.5 Finding unknown angle measures <ul style="list-style-type: none"> • Desmos Tool 	1 block	Use facts about angle relationships to find unknown angle measures.	<ul style="list-style-type: none"> • I can identify adjacent, complementary, supplementary, and vertical angles. • I can use equations to find unknown angle measures. • I can find unknown angle measures in real-life situations.
	Connecting concepts Review	1 block		
	Ch 9 Test	1 block		

Unit 6: Surface Area and Volume

Subject: Mathematics

Grade: 7th Grade

Name of Unit: Surface Area and Volume

Length of Unit: 9 Blocks (18 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.GM.B.6b Understand the relationship between area, surface area and volume.(Find the volume and surface area of prisms, pyramids and cylinders.)

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.

Standard	Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
7.GM.B.6	the relationship between area, surface area and volume.	Understand	Understand	2
7.GM.B.6b	the volume and surface area of prisms, pyramids and cylinders.	Find	Evaluate	3

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
Circumference of a circle Area of a circle Know Use Solve	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

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	Learning Targets	Success Criteria
7.GM.B.6b	Chapter opener 10.1 Surface areas of prisms	2 block	Find the surface area of a prism.	<ul style="list-style-type: none"> • I can use a formula to find the surface area of a prism. • I can find the lateral surface area of a prism.
7.GM.B.6b	10.2 Surface areas of cylinders <ul style="list-style-type: none"> • Desmos Tool 	1 block	Find the surface area of a cylinder.	<ul style="list-style-type: none"> • I can use a formula to find the surface area of a cylinder. • I can find the lateral surface area of a cylinder.
7.GM.B.6b	10.3 Surface areas of pyramids <ul style="list-style-type: none"> • Desmos Tool 	1 block	Find the surface area of a pyramid.	<ul style="list-style-type: none"> • I can use a net to find the surface area of a regular pyramid. • I can find the lateral surface area of a regular pyramid.
7.GM.B.6b	10.4 Volumes of prisms <ul style="list-style-type: none"> • Desmos Tool 	1 block	Find the volume of a prism.	<ul style="list-style-type: none"> • I can use a formula to find the volume of a prism. • I can use the formula for the volume of a prism to find a missing dimension.
7.GM.B.6b	10.5 Volumes of pyramids	1 block	Find the volume of a pyramid.	<ul style="list-style-type: none"> • I can use a formula to find the volume of a pyramid. • I can use the volume of a pyramid to solve a real-life problem.

7.GM.B.6b	8th Grade 10.1: Volumes of Cylinders	1 block	Find the volume of a cylinder.	<ul style="list-style-type: none"> • I can use a formula to find the volume of a cylinder. • I can use the formula for the volume of a cylinder to find a missing dimension.
	Connecting concepts Review	1 block		
	Ch 10 Test	1 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.