

# ROBERTSON COUNTY SCHOOLS

## State Standards – Mathematics

## Learning Progressions

Kindergarten	1	2	3	4	5	6	7	8	HS
<a href="#">Counting and Cardinality</a>									Number and Quantity
<a href="#">Number and Operations in Base Ten</a>					<a href="#">Ratios and Proportional Relationships</a>				
			<a href="#">Number and Operations - Fractions</a>		<a href="#">The Number System</a>				
<a href="#">Operations and Algebraic Thinking</a>					<a href="#">Expressions and Equations</a>				Algebra
								<a href="#">Functions</a>	Functions
<a href="#">Geometry</a>					<a href="#">Geometry</a>				Geometry
<a href="#">Measurement and Data</a>					<a href="#">Statistics and Probability</a>				Statistics and Probability

Revised 2023-2024

## SEVENTH GRADE MATHEMATICS PACING GUIDE

# Mathematics | Grade 7

## **Ratios and Proportional Relationships**

Students extend their understanding of ratios from 6<sup>th</sup> grade and develop understanding of proportionality to solve single- and multi-step problems. Students use this understanding 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. They distinguish proportional relationships from other relationships.

## **The Number System**

Students develop a unified understanding of numbers, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percent 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. These properties are further explored with respect to negative numbers. This exploration is carried out in real-world problems with various contexts so that the student can gain a deeper understanding and appreciation for the use of mathematics in daily life.

## **Expressions and Equations**

By applying the properties of operations as strategies, students explore working with expressions, equations, and inequalities. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve multi-step real-world problems. They use variables to represent quantities and construct simple equations and inequalities to solve problems by reasoning about the quantities.

## **Geometry**

Students continue their work with area from 6<sup>th</sup> grade, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity, they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## **Statistics and Probability**

Students continue their work from 6<sup>th</sup> grade in order to build a strong foundation for statistics and probability needed for high school. Students understand that statistics can be used to gain information about a population through sampling. They work with drawing inferences about a population based on a sample and use measures of center and of variability to draw informal comparative inferences about two populations. Students investigate the chance processes and develop, use, and evaluate probability models. Students summarize numerical data sets with respect to their context using quantitative measures and describe any overall patterns or deviations from the overall pattern.

## **Standards for Mathematical Practice**

Being successful in mathematics requires the development of approaches, practices, and habits of mind that need to be in place as one strives to develop mathematical fluency, procedural skills, and conceptual understanding. The Standards for Mathematical Practice are meant to address these areas of expertise that teachers should seek to develop in their students. These approaches, practices, and habits of mind can be summarized as “processes and proficiencies” that successful mathematicians have as a part of their work in mathematics. Additional explanations are included in the main introduction of these standards.

#### **Standards for Mathematical Practice**

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

#### **Literacy Standards for Mathematics**

Communication in mathematics employs literacy skills in reading, vocabulary, speaking and listening, and writing. Mathematically proficient students communicate using precise terminology and multiple representations including graphs, tables, charts, and diagrams. By describing and contextualizing mathematics, students create arguments and support conclusions. They evaluate and critique the reasoning of others, analyze, and reflect on their own thought processes. Mathematically proficient students have the capacity to engage fully with mathematics in context by posing questions, choosing appropriate problem-solving approaches, and justifying solutions. Further explanations are included in the main introduction.

#### **Literacy Skills for Mathematical Proficiency**

1. Use multiple reading strategies.
2. Understand and use correct mathematical vocabulary.
3. Discuss and articulate mathematical ideas.
4. Write mathematical arguments.

## 2023-2024 Seventh Grade Math

### A Year-at-a-Glance

<p style="text-align: center;"><b>1<sup>st</sup> Nine Weeks</b></p> <p><b>Topic 1: Rational Number Operations (4 weeks)</b> <i>7.NS.A.1a-c, 7.NS.A.2a-d, 7.NS.A.3, 7.EE.B.3</i></p> <p><b>Topic 2: Analyze and Use Proportional Relationships (3 weeks)</b> <i>7.RP.A.1, 7.RP.A.2.a-d, 7.RP.A.3,</i></p> <p><b>Topic 3: Analyze and Solve Percent Problems (1 week)</b> <i>7.RP.A.2c, 7.RP.A.3</i></p>	<p style="text-align: center;"><b>2<sup>nd</sup> Nine Weeks</b></p> <p><b>Topic 3 Continued - Analyze and Solve Percent Problems (1 week)</b> <i>7.RP.A.2c, 7.RP.A.3</i></p> <p><b>Topic 4: Generate Equivalent Expressions (4 weeks)</b> <i>7.EE.A.1, 7.EE.A.2, 7.EE.B.3, 7.EE.B.3a, 7.EE.B.4</i></p> <p><b>Topic 5: Solve Problems Using Equations and Inequalities (3 weeks)</b> <i>7.EE.B.3, 7.EE.B.3a-b, 7.EE.B.4, 7.EE.B.4a-b</i></p>
<p style="text-align: center;"><b><u>Mathematical Practices (MP)</u></b></p> <ol style="list-style-type: none"><li>1. Make sense of problems and persevere in solving them.</li><li>2. Reason abstractly and quantitatively.</li><li>3. Construct viable arguments and critique the reasoning of others.</li><li>4. Model with mathematics.</li><li>5. Use appropriate tools strategically.</li><li>6. Attend to precision.</li><li>7. Look for and make use of structure.</li><li>8. Look for and express regularity in repeated reasoning.</li></ol>	
<p style="text-align: center;"><b><u>3<sup>rd</sup> Nine Weeks</u></b></p> <p><b>Topic 6: Use Sampling to Draw Inferences About Populations (2 weeks)</b> <i>7.SP.A.1, 7.SP.A.2, 7.SP.B.3, 7.SP.B.4, 7.SP.D.8, 7.SP.D.8a, 7.SP.D.8b, 7.RP.A.2c, 7.RP.A.3</i></p> <p><b>Topic 7: Probability (2 weeks)</b> <i>7.SP.C.5, 7.SP.C.6, 7.SP.C.6a-c, 7.SP.C.7, 7.SP.C.7a-b, 7.EE.B.3a, 7.RP.A.2c</i></p> <p><b>Topic 8: Solve Problems Involving Geometry (4 weeks)</b> <i>7.GA.1, 7.GA.2, 7.GB.3, 7.GB.4, 7.GB.5, 7.EE.B.4a, 7.EE.B.3, 7.NS.A.3</i></p>	<p style="text-align: center;"><b><u>4<sup>th</sup> Nine Weeks</u></b></p> <p><b>TNReady Review Blitz &amp; Testing (4 weeks)</b></p> <p><b>State Testing (2 weeks)</b></p> <p><b>Culminating Projects (3 weeks)</b></p>
<p style="text-align: center;"><b><u>Literacy Skills for Mathematical Proficiency</u></b></p> <ol style="list-style-type: none"><li>1. Use multiple reading strategies.</li><li>2. Understand and use correct mathematical vocabulary.</li><li>3. Discuss and articulate mathematical ideas.</li><li>4. Write mathematical argument.</li></ol>	

# 1<sup>st</sup> Quarter - Topic 1: Rational Number Operations (Suggested Time = 4 weeks)

**Essential Question:** How do operations with integers relate to the same operations with rational numbers? How can you determine the correct operation you use to solve problems?

## Standards

**7.NS.A.1** – Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

**7.NS.A.1a** – Understand  $p + q$  as the number located a distance  $|q|$  from  $p$ , in the positive or negative direction depending on whether  $q$  is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

**7.NS.A.1b** – Understand subtraction of rational numbers as adding the additive inverse,  $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

**7.NS.A.1c** – Apply properties of operations as strategies to add and subtract rational numbers.

**7.NS.A.2** – Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

**7.NS.A.2a** – Understand that multiplication is extended from fractions to all 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.

**7.NS.A.2b** – 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.

**7.NS.A.2c** – Apply properties of operations as strategies to multiply and divide rational numbers.

**7.NS.A.2d** – Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates or eventually repeats.

**7.NS.A.3** – Solve real-world and mathematical problems involving the four operations with rational numbers.  
(Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

**7.EE.B.3** – Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).

# 1<sup>st</sup> Quarter - Topic 1: Rational Number Operations (Suggested Time = 4 weeks)

Vocabulary	Mathematical Practices	Textbook Correlations
integer, negative integer, positive integer, absolute value, opposites, zero pair, repeating decimal, terminating decimal, additive inverse, complex fraction, multiplicative inverse, bar notation, common denominator, least common denominator, like fractions, rational numbers, unlike fractions	<p><b>MP2:</b> Reason Abstractly and quantitatively.</p> <p><b>MP7:</b> Look for and make use of structure</p>	Topic 1: Lessons 1-10  <p style="text-align: center;"><b>3-Act Mathematical Modeling: Win Some, Lose Some</b></p> <ul style="list-style-type: none"> <li>• After Lesson 1-10</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution</li> <li>• Test and verify the appropriateness of their math models</li> </ul>
<b>Learning Targets</b>		
<p>1-1: Understand how integers and their opposites are related.</p> <p>1-2: Identify rational numbers and write them in decimal form.</p> <p>1-3: Add positive and negative integers. Model integer addition in real-life applications.</p> <p>1-4: Understand subtraction of integers as adding the additive inverse, <math>p - q = p + (-q)</math></p> <p>1-5: Use properties of operations to add and subtract rational numbers.</p> <p>1-6: Multiply positive and negative integers. Apply integer multiplication to real-life applications.</p> <p>1-7: Find the product of rational numbers.</p> <p>1-8: Understand how to divide integers by applying the rules of multiplying integers. Determine equivalencies among integer quotients.</p> <p>1-9: Understand how the signs of integers in a multiplication sentence relate to the signs in a related division statement.</p> <p>1-10: Decide which operations to use to solve problems. Use precision when solving problems with rational numbers.</p>		

# 1<sup>st</sup> Quarter - Topic 2: Analyze and Use Proportional Relationships (Suggested Time = 3 weeks)

**Essential Question:** Essential Question: How can you recognize and represent proportional relationships and use them to solve problems?

**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 1/2 mile in each 15 minutes, compute the unit rate as the complex fraction  $^{1/2}/_{15}$  miles per hour, equivalently 2 miles per hour.*

**7.RP.A.2** Recognize and represent proportional relationships between quantities.

**7.RP.A.2a** 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).

**7.RP.A.2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

**7.RP.A.2c** Use the concept of equality to represent proportional relationships with 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  $t = pn$ .*

**7.RP.A.2d** 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.

**7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems. *Examples: batting averages, recipes, simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error, etc.*

Vocabulary	Mathematical Practices	Textbook Correlations
Proportional relationship, proportion, constant of proportionality, cross product, equivalent ratios, nonproportional, rate, unit rate, unit ratio, complex fraction	<p><b>MP 2:</b> Reason abstractly and quantitatively.</p> <p><b>MP 3:</b> Construct viable arguments and critique the reasoning of others.</p>	<p>Topic 2: Lessons 1-6</p> <p><b>3-Act Mathematical Modeling: Mixin' It Up</b></p>
<b>Learning Targets</b>		<ul style="list-style-type: none"> <li>• Between lessons 2-4 and 2-5</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> <li>• Explain why the results from their mathematical models may not align exactly to the problem situation</li> </ul>
<p>2-1: Use ratios and rates to describe the relationship between two quantities. Find equivalent ratios and use unit rates to solve multi-step problems.</p> <p>2-2: Find unit rates with ratios of fractions. Use unit rates to solve multi-step problems.</p> <p>2-3: Determine whether quantities are proportional by testing for equivalent ratios.</p> <p>2-4: Use mathematical modeling to represent a problem situation and to propose a solution. Test and verify the appropriateness of math models. Explain why the results from mathematical models may not align exactly to the problem situation.</p> <p>2-5: Use a graph to recognize proportionality. Identify a constant of proportionality from a graph. Interpret a point on a graph of a proportional relationship.</p> <p>2-6: Explain whether a situation represents a proportional relationship. Use representations to find entry points into problems.</p>		

# 1<sup>st</sup> /2<sup>nd</sup> Quarter - Topic 3: Analyze and Solve Percent Problems (Suggested Time = 2 weeks)

**Essential Question:** How can percents show proportional relationships between quantities and be used to solve problems?

**7.RP.A.2c** Use the concept of equality to represent proportional relationships with 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  $t = pn$ .*

**7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems. *Examples: batting averages, recipes, simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error, etc.*

Vocabulary	Mathematical Practices	Textbook Correlations
percent equation, percent change, percent error, markup, markdown, percent markup, percent markdown, interest rate, principal, simple interest, sales tax, tip, gratuity, discount, percent of decrease, percent of increase, percent proportion, principal, simple interest, commission	<p><b>MP 2:</b> Reason abstractly and quantitatively.</p> <p><b>MP 7:</b> Look for and make use of structure.</p>	<p>Topic 3: Lessons 1-6</p> <p><b>3-Act Mathematical Modeling: The Smart Shopper</b></p> <ul style="list-style-type: none"> <li>• Between 3-4 and 3-5</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> </ul>
Learning Targets		
<p>3-1: Understand that equivalent rates can be used to find percents. Analyze percents of numbers in a real-world context.</p> <p>3-2: Construct a percent proportion. Use a percent proportion to find an unknown part, whole, or percent.</p> <p>3-3: Understand the relationship between proportional reasoning and percent. Interpret the results of a percent equation in a real-life scenario.</p> <p>3-4: Solve real-world problems involving percent of change and percent error. Understand the percent equation and the different ways it can be used.</p> <p>3-5: Understand and calculate markups and markdowns. Relate percent change to percent markup and percent markdown.</p> <p>3-6: Identify the parts of interest problems and how the values are related. Understand what simple interest is and how it is calculated.</p>		



## 2<sup>nd</sup> Quarter - Topic 4: Generate Equivalent Expressions (Suggested Time = 4 weeks)

**Essential Question:** How can properties of operations help to generate equivalent expressions that can be used in solving problems?

**7.EE.A.1** – Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

**7.EE.A.2** – Rewrite and connect equivalent expressions in different forms in a contextual problem to provide multiple ways of interpreting the problem and investigating how the quantities in it are related. *For example, shoes are on sale at a 25% discount. How is the discounted price  $P$  related to the original cost  $C$  of the shoes?  $C - .25C = P$ . In other words,  $P$  is 75% of the original cost since  $C - 0.25C$  can be written as  $.75C$ .*

**7.EE.B.3** – Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).

**7.EE.B.3a** Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.

**7.EE.B.4** Use variables to represent quantities in a real-world and mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Vocabulary	Mathematical Practices	Textbook Correlations
numerical expression, algebraic expression, equivalent expressions, term, like terms, unlike terms, coefficient, constant, variable, Additive Inverse, Associative Property, Commutative Property, Distributive Property, Multiplicative Identity Property, Multiplicative Property of Zero, simplest form, factor, factored form	<p><b>MP 2:</b> Reason abstractly and quantitatively.</p> <p><b>MP 7:</b> Look for and make use of structure.</p>	<p>Topic 4: Lessons 1-8</p> <p><b>3-Act Mathematical Modeling: I've Got You Covered</b></p> <ul style="list-style-type: none"> <li>• Between lessons 4-5 and 4-6.</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> <li>• Explain why the results from their mathematical models may not align exactly to the problem situation.</li> </ul>
<b>Learning Targets</b>		
<p>4-1: Understand how variables are used to represent unknown values in problems.</p> <p>4-2: Recognize when two expressions are equivalent. Use properties of operations to write equivalent expressions.</p> <p>4-3: Combine like integer and rational terms.</p> <p>4-4: Use the Distributive Property to expand expressions.</p> <p>4-5: Understand expanding an expression is the reverse of factoring. Identify the GCF of algebraic terms in expressions.</p> <p>4-6: Use properties of operations to add expressions. Model addition of expressions in real-life.</p> <p>4-7: Use properties of operations to subtract expressions. Model subtraction of expressions in real-life applications.</p> <p>4-8: Write equivalent expressions to show how quantities are related in real-life applications.</p>		

## 2<sup>nd</sup> Quarter - Topic 5: Solve Problems Using Equations and Inequalities (Suggested Time = 3 weeks)

**Essential Question:** How can you solve real-world and mathematical problems with numerical and algebraic equations and inequalities?

**7.EE.B.3** – Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).

**7.EE.B.3a** Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.

**7.EE.B.3b** Assess the reasonableness of answers using mental computation and estimation strategies.

**7.EE.B.4** Use variables to represent quantities in a real-world and mathematical problems, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

**7.EE.B.4a** Solve real-world and mathematical 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?*

**7.EE.B.4b** Solve real-world and mathematical problems leading to inequalities of the form  $px + q > r$ ,  $px + q < r$ ,  $px + q \geq r$ ,  $px + q \leq r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Graph the solution set of the inequality on a number line 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.*

Vocabulary	Mathematical Practices	Textbook Correlations
Addition Property of Equality, Subtraction Property of Equality, Multiplication Property of Equality, Division Property of Equality, Distributive Property, inequality, Addition Property of Inequality, Subtraction Property of Inequality, Multiplication Property of Inequality, Division Property of Inequality solution, solution set	<p><b>MP 2:</b> Reason abstractly and quantitatively.</p> <p><b>MP 3:</b> Construct viable arguments and critique the reasoning of others.</p>	<p>Topic 5: Lessons 1-7</p> <p><b>3-Act Mathematical Modeling: Digital Downloads</b></p> <ul style="list-style-type: none"> <li>• Between lessons 5-5 and 5-6.</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> </ul>
Learning Targets		
<p>5-1: Analyze word problems to write two-step equations. Understand the relationship between the terms of the equation and the values they represent.</p> <p>5-2: Use models to solve two-step equations. Compare algebraic and arithmetic solutions.</p> <p>5-3: Solve equations using the Distributive Property</p> <p>5-4: Graph the solution on inequalities on a number line. Solve inequalities using the Addition and Subtraction Properties of Inequality.</p> <p>5-5: Write inequalities and solve them using Multiplication and Division Properties of Inequality. Graph the solutions on an inequality on a number line.</p> <p>5-6: Write and solve a two-step inequality to solve a problem. Solve an inequality by multiplying or dividing by a negative rational number.</p> <p>5-7: Explore the relationship between two-step inequalities and multi-step inequalities. Apply the Distributive Property to simplify and solve multi-step inequalities.</p>		

## 3<sup>rd</sup> Quarter - Topic 6: Use Sampling to Draw Inferences about Populations (Suggested Time = 2 weeks)

**Essential Question:** How can sampling be used to draw inferences about one or more populations?

**7.SP.A.1** Explore how statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

**7.SP.A.2** Collect and 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.B.3** Informally compare the measures of center (mean, median, mode) of two numerical data distributions with similar variabilities. *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; on a dot plot or box plot, the separation between the two distributions of heights is noticeable.*

**7.SP.B.4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a 4<sup>th</sup> grade science book.*

**7.SP.D.8** Summarize numerical data sets in relation to their context.

**7.SP.D.8.a** Give quantitative measures of center (median and/or mean) and variability (range and/or interquartile range), as well as describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

**7.SP.D.8.b** Relate and understand the choice of measure of center (median and/or mean) and variability (range and/or interquartile range) to the shape of the data distribution and the context in which the data were gathered.

**7.RP.A.2c** Use the concept of equality to represent proportional relationships with 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  $t = pn$ .*

**7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems. *Examples: batting averages, recipes, simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error, etc.*

### 3<sup>rd</sup> Quarter - Topic 6: Use Sampling to Draw Inferences about Populations (Suggested Time = 2 weeks)

Vocabulary	Mathematical Practices	Textbook Correlations
<p>statistics, survey, population, sample, representative sample, unbiased sample, biased sample, random sample, systematic random sample, simple random sample, voluntary response sample, convenience sample, valid inference,</p> <p>measures of center (mean, median, mode), measures of variability (range and interquartile range - IQR), outlier</p> <p>double box plot, double dot plot,</p>	<p><b>MP 2: Reason abstractly and quantitatively.</b></p> <p><b>MP 4: Model with mathematics.</b></p>	<p>Topic 6: Lessons 1-4 and TN1 and TN2</p> <p><b>3-Act Mathematical Modeling: Raising Money</b></p> <ul style="list-style-type: none"> <li>• After Lesson 6-4.</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> <li>• Explain why the results from their mathematical models may not align exactly to the problem situation.</li> </ul>
Learning Targets		
<p>6-1: Distinguish between a population and a sample. Establish whether a sample is representative of a population.</p> <p>6-2: Make qualitative inferences from a sample data set. Make qualitative inferences from a sample data set. Make estimates about a population based on a sample data set, and assess whether the inferences are valid.</p> <p><b>**The TN-1, TN-2, and lesson 6-4 will not be taught in their entirety. Mean absolute deviation is not in the TN standards, however it is included in these lessons. Interquartile range is part of the TN standards.</b></p> <p>TN-1: Calculate the interquartile range (IQR) of a data set. Summarize data using measures of variability.</p> <p>TN-2: Select the most appropriate measure of center and variability for a data set. Use measures to describe data sets.</p> <p>6-3: Use box plots to compare and make inferences about populations. Use the median and IQR of data sets to informally compare and make inferences about two populations.</p> <p>6-4: Use the mode, range, mean, to compare populations.</p>		

## 3rd Quarter - Topic 7: Probability (Suggested Time = 2 weeks)

**Essential Question:** How can you investigate chance processes and develop, use, and evaluate probability models.

**7.SP.C.5** Recognize that the probability of a chance event is a number between 0 and 1 and interpret the likelihood of the event occurring.

**7.SP.C.6** Calculate theoretical and experimental probability of simple events.

**7.SP.C.6a** 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.

**7.SP.C.6b** Calculate the theoretical probability of a simple event.

**7.SP.C.6c** Compare theoretical probabilities to experimental probabilities; explain any possible sources of discrepancy. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*

**7.SP.C.7** Develop a probability model and use it to find experimental or theoretical probabilities of events.

**7.SP.C.7a** Use a uniform probability model, with equal probability assigned to all outcomes, 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.*

**7.SP.C.7b** Develop a probability model, including non-uniform models, by observing frequencies in data generated from a chance process. *Use the model to estimate the probabilities of events. For Example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

**7.EE.B.3a** Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.

**7.RP.A.2c** Use the concept of equality to represent proportional relationships with 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  $t = pn$ .*

## 3<sup>rd</sup> Quarter - Topic 7: Probability (Suggested Time = 2 weeks)

Vocabulary	Mathematical Practices	Textbook Correlations
<p>trial, outcomes, probability, event, theoretical probability, experimental probability, relative frequency, sample space, probability model, complementary events, fair, random, simple event, simulation, unfair</p>	<p><b>MP 1: Make sense of problems and persevere in solving them.</b></p> <p><b>MP 7: Look for and make use of structure.</b></p>	<p>Topic 7: Lessons 1-4. (Lessons 5, 6 and 7 are 8<sup>th</sup> grade standards, may use as enrichment).</p> <p style="text-align: center;"><b>3-Act Mathematical Modeling: Photo Finish</b></p>
Learning Targets		
<p>7-1: Use probability to describe to describe the likelihood that an event will occur. Relate probability to mathematical fairness.</p> <p>7-2: Understand theoretical probability and how it can be used. Use theoretical probability to predict an outcome.</p> <p>7-3: Compare theoretical and experimental probability. Use experimental probability to make predictions. Explain differenced between theoretical and experimental probability.</p> <p>7-4: Develop a probability model. Use a probability model to evaluate a situation. Use a probability model to make an estimate.</p>		<ul style="list-style-type: none"> <li>• After Lesson 7-4.</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> <li>• Explain why the results from their mathematical models may not align exactly to the problem situation.</li> </ul>

## 3rd Quarter - Topic 8: Solve Problems Involving Geometry (Suggested Time = 4 weeks)

**Essential Question:** How can geometry be used to solve problems?

**7.G.A.1** Solve problems involving scale drawings of congruent and similar geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

**7.G.A.2** Draw triangles with given conditions: three angle measures or three side measures. Notice when the conditions determine a unique triangle, more than one triangle, or no triangle.

**7.G.B.3** Know the formulas for the area and circumference of a circle and use them to solve problems. Explore the relationships between the radius, the circumference, and the area of a circle, and the number  $\pi$ .

**7.G.B.4** Know and 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.

**7.G.B.5** Solve real-world and mathematical problems involving area of two-dimensional figures composed of triangles, quadrilaterals, and polygons, and volume and surface area of three-dimensional objects composed of cubes and right prisms.

**7.EE.B.4a** Solve real-world and mathematical 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?*

**7.EE.B.3** – Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers presented in any form (whole numbers, fractions, and decimals).

## 3rd Quarter - Topic 8: Solve Problems Involving Geometry (Suggested Time = 4 weeks)

Vocabulary	Mathematical Practices	Textbook Correlations
<p>Scale drawing, adjacent angles, complementary angles, supplementary angles, vertical angles, circumference, composite figure, acute angle, acute triangle, base, congruent, congruent segments, diagonal, edge, equilateral triangle, face, isosceles triangle, obtuse angle, obtuse triangle, prism, pyramid, right angle, right triangle, scale, scale drawing, scale factor, scale model, scalene triangle, supplementary angles, vertex, vertical angles, center, circle, diameter, pi, radius, regular pyramid, semicircle, slant height, surface area, volume, prism,</p>	<p><b>MP 2: Reason abstractly and quantitatively.</b></p> <p><b>MP 7: Look for and make use of structure.</b></p>	<p>Topic 8: Lessons 1-6 and 9. Lesson 7 is not a 7th grade standard.</p> <p style="text-align: center;"><b>3-Act Mathematical Modeling: Whole Lotta Dough</b></p> <ul style="list-style-type: none"> <li>• Between lessons 6 and 7.</li> <li>• Use mathematical modeling to represent a problem situation and to propose a solution.</li> <li>• Test and verify the appropriateness of math models.</li> </ul>
Learning Targets		
<p>8-1: Use scale drawing as a representation of actual lengths and area.</p> <p>8-2: Sketch quadrilaterals with given conditions. Name and classify quadrilaterals according to their properties.</p> <p>8-3: Construct triangles with given conditions. Conclude whether or not a triangle is formed and what type of triangle it is.</p> <p>8-4: Calculate the measures of angles by using angle relationships.</p> <p>8-5: Calculate the circumference, radius, or diameter of a circle. Recognizing the relationship between the circumference and the diameter of a circle and <math>\pi</math>.</p> <p>8-6: Find the area of a circle. Use the area to find the radius and diameter. Solve problems involving the area of a circle.</p> <p>8-8: Find the surface are of two-dimensional composite shapes. Find the surface area of three-dimensional composite shapes.</p> <p>8-9: Calculate the volume of various three-dimensional figures. Solve problems involving the volume of three-dimensional figures.</p>		



## 4<sup>th</sup> Quarter - Topic 9: Review and Culminating Projects

<b>Essential Question:</b>		
<p><b>TNReady Review Blitz &amp; Testing (4 weeks)</b></p> <p><b>State Testing (2 weeks)</b></p> <p><b>Culminating Projects (3 weeks)</b></p>		
<b>Vocabulary</b>	<b>Mathematical Practices</b>	<b>Textbook Correlations</b>
		Tennessee Standards Practice Guide – New with our current textbook adoption.
<b>Learning Targets</b>		