

Week	Marking Period 1	Week	Marking Period 3
1	Number Systems	21	Ratios and Proportional Relationships
2	Number Systems	22	Ratios and Proportional Relationships
3	Number Systems	23	Ratios and Proportional Relationships
4	Number Systems	24	Ratios and Proportional Relationships
5	Number Systems	25	Ratios and Proportional Relationships
6	Number Systems	26	Ratios and Proportional Relationships
7	Number Systems	27	Geometry
8	Number Systems	28	Geometry
9	Expressions and Equations	29	Geometry
10	Expressions and Equations	30	Geometry
Week	Marking Period 2	Week	Marking Period 4
11	Expressions and Equations	31	Geometry
12	Expressions and Equations	32	Geometry
13	Expressions and Equations	33	Geometry
14	Expressions and Equations	34	Geometry
15	Expressions and Equations	35	Statistics & Probability
16	Expressions and Equations	36	Statistics & Probability
17	Expressions and Equations	37	Statistics & Probability
18	Ratios and Proportional Relationships	38	Statistics & Probability
19	Ratios and Proportional Relationships	39	Statistics & Probability
20	Ratios and Proportional Relationships	40	Statistics & Probability

## Math 7

<b>Time Frame</b>	<b>Weeks 1-8</b>
<b>Topic</b>	
Number Systems	
<b>Essential Questions</b>	
<ul style="list-style-type: none"><li>• Why and when is it important to come to an agreement on procedural rules (i.e. games, family life, math)?</li><li>• How do operations affect numbers?</li><li>• What must be true about the numerator and denominator of a rational number?</li><li>• Is zero a rational number? Explain your answer.</li><li>• Rational numbers can be represented as terminating or repeating decimals. What type of numbers are <i>not</i> rational?</li><li>• Can two different integers have the same absolute value?</li><li>• How can you add integers with the same signs? Different signs?</li><li>• Name the greatest negative integer and the least non-negative integer. How do their absolute values compare?</li><li>• Can you reverse the order of integers when subtracting and still get the same answer?</li><li>• How can change be best represented mathematically?</li></ul>	
<b>Enduring Understandings</b>	
Students will demonstrate number sense. They will be able to perform numerical operations and estimations with rational numbers. They will be able to select and apply various computational methods including mental math, estimation, paper-and-pencil techniques, and the use of calculators.	
<b>Alignment to NJSL</b>	
7.NS.1, 7.NS.2, 7.NS.3	
<b>Key Concepts and Skills</b>	
<p>a. Apply and extend previous understandings of rational numbers (Addition and Subtraction)</p> <ul style="list-style-type: none"><li>i. Properties and operations for rational numbers (integers)</li><li>ii. Represent addition and subtraction on horizontal and vertical line diagram.</li><li>iii. Absolute value</li><li>iv. Additive inverse</li></ul> <p>b. Apply and extend previous understandings of rational numbers (Multiplication and Division)</p> <ul style="list-style-type: none"><li>i. Rules for multiplying signed numbers</li><li>ii. Distributive Property</li><li>iii. Interpret products of rational numbers in real world contexts.</li><li>iv. Quotient of integers with non-zero divisor is a rational numbers.</li><li>v. Apply properties of operations to multiply and divide</li><li>vi. Convert rational number to decimal using long division (terminating and repeating decimals).</li></ul> <p>c. Solve real world problems involving four operations with rational numbers.</p>	
<b>Learning Activities</b>	
<ul style="list-style-type: none"><li>• Fractions Bars and Pattern Blocks</li><li>• Base-Ten Blocks and Decimal Grids to model decimal multiplication</li><li>• Pizza Pie Fractions Worksheet activity</li><li>• <i>Line Up and Sort!</i> rational numbers index card game</li><li>• Discussion on appropriate use of estimation in the real-world</li><li>• Integer Chips and Algebra Tiles</li><li>• Integer Bingo</li><li>• Discuss and explore where integers and opposites are applied in the real-world</li></ul>	

## Math 7

- Dollar Menu & 99 Cent Store activity
- *Accentuate the Negative* activity (Connect Mathematics)
- *Distributive Property Card Game* (Muschla pg. 93)
- *Which One Doesn't Belong* (Muschla pg. 96)
- *Playing the Stock Market* (Muschla pg. 98)

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on placing and ordering rational numbers on a number line
- Quiz on converting fractions to decimals and vice-versa
- Quiz on operations with decimals, fractions, and mixed numbers
- Quiz on addition and subtraction of rational numbers
- Quiz on multiplication and division of rational numbers
- Quiz on multiple operations with rational numbers
- Test on rational numbers

### 21<sup>st</sup> Century Skills

	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

### Interdisciplinary Connections

Science, Physical Education, Art, Business

### Technology Integration

8.1 Educational Technology- All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

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<b>Time Frame</b>	<b>Weeks 9-17</b>
<b>Topic</b>	
Expressions and Equations	
<b>Essential Questions</b>	
<ul style="list-style-type: none"> <li>• How can you determine the rule of an equation given an input/output table?</li> <li>• What trend do you notice when plotting data from a table on a coordinate plane?</li> <li>• How do you decide which inverse operation should be used first when solving a two-step equation?</li> <li>• How can algebraic symbols be used to efficiently express mathematical situations?</li> </ul>	
<b>Enduring Understandings</b>	
<p>Students will explore algebraic concepts by using physical models data, graphs and other mathematical representations. They will learn to generalize number patterns to model, represent, or describe observed patterns, regularities, and problems. Use of manipulatives, graphing calculators, and computers will enhance understanding and provide a means for students with different learning styles to master concepts.</p>	

## Math 7

### Alignment to NJSLs

7.EE.1, 7.EE.2, 7.EE.3, 7.EE.4

### Key Concepts and Skills

- a. Equivalent Expressions
  - i. Apply properties of operations (add, subtract and factor) to expand linear expressions with rational coefficients.
  - ii. Rewrite expressions in different forms to describe the quantity relationships.
- b. Solve real life algebraic equations and expressions
  - i. Multi-step problems incorporating positive and negative numbers (whole numbers, fractions and decimals) using appropriate tools.
  - ii. Apply properties of operations to calculate with numbers in any form.
  - iii. Assess reasonableness of answers using mental computations and estimate strategies
- c. Variables
  - i. Use variables as representation of real world quantities.
  - ii. Solve real world problems using problems modeled as  $px + q = r$  and  $p(x + q) = r$ .
  - iii. Solve problems fluently with understanding of variables.
  - iv. Identify sequence of operations used.
  - v. Solve real world problems leading to inequalities
  - vi. Graph and interpret inequality solutions.

### Learning Activities

- Algebra Tiles and Communicators
- Using a scale and weights to model solving algebraic equations
- *Connect the Dots* coordinate plane activity
- Calculators activities (*Guess My Rule* and *Find the Pattern*)
- Discussion of real-life activities that must be done in a certain order (cooking, construction, etc.)
- *Algebraic Expressions Jigsaw* (Muschla pg. 104)
- *Rewriting Expressions* (Muschla pg. 106)
- *Estimation Game* (Muschla pg. 108)
- *Writing Equations* (Muschla pg. 110)
- *Solving Inequalities* (Muschla pg. 112)

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on writing and evaluating variable expressions
- Quiz on variables and one-step equations
- Quiz on two-step equations
- Test on variables and solving equations
- Quiz on solving and graphing one-step inequalities
- Quiz on tables and linear functions
- Test on equations, inequalities, and linear functions

### 21<sup>st</sup> Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

### Interdisciplinary Connections

## Math 7

Business, Science, Computer Science, and Social Studies

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Time Frame	Weeks 18-26
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### Topic

Ratios and Proportional Relationships

### Essential Questions

- How can a relationship be demonstrated between two quantities or values?
- What does it mean for ratios to be proportional?
- When is it appropriate to reason proportionally?
- How can proportions be used to determine missing side lengths of similar figures?
- A percent is equivalent to a fraction with what denominator?
- When will a percentage be greater than 100? Less than 1?

### Enduring Understandings

Students will be able to understand that a ratio is a multiplicative comparison of two quantities or it is a joining of two quantities in a composed unit. Students will be able to understand that in a proportion, the ratio for two quantities remains constant as the corresponding values of the quantities change. Students will be able to understand the relationship between fractions, decimals, and percents. Students will apply their knowledge of ratios and proportions to realworld situations. They will select and apply various computational methods including mental math, estimation, paper-and-pencil techniques, and the use of calculators.

### Alignment to NJSLS

7.RP.1, 7.RP.2, 7.RP.3

### Key Concepts and Skills

- a. Unit rates using ratios of fractions
  - i. Object lengths
  - ii. Area
  - iii. Other quantities measured with like and unlike units.
- b. Deciding whether two quantities are proportional
  - i. Testing equivalent ratios using tables or graphs on a coordinate plane.
  - ii. Observing whether the graph is a straight line through the origin.
  - iii. Explain what point (x,y) on a graph means to a proportional relationship.
  - iv. Attention to points (0, 0) and (1, r).
- c. Identifying proof of constant proportionality (unit rate)
  - i. Tables
  - ii. Graphs
  - iii. Equations
  - iv. Diagrams
  - v. Verbal descriptions
- d. Represent proportional relationships using equations.
- e. Use proportional relationships to solve multi-step ratio and percent problems.
  - i. Simple interest
  - ii. Tax
  - iii. Markups
  - iv. Markdowns

## Math 7

v. Gratuities and commissions vi.  
Percent – increase, decrease, error

### • Learning Activities

- *Are You a Good Shopper?* Game for unit rates
- Working with a Budget (including coupons and tax)
- Egyptian Eye activity
- *Is it Worth Driving to IKEA?* Activity
- *Sense or Nonsense?*
- Geometer’s Sketchpad (similar figures, scale, etc.)
- Scale Drawings
- *What is the Unit Rate?* (Muschula pg. 80)
- *Proportions Scavenger Hunt* (Muschula pg. 84)
- *Gifts for the Holidays* (Muschula pg. 84)
- *Very Interesting* (Muschula pg. 89)

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on ratios, rates, and proportions
- Test on ratios, rates, and proportions
- Quiz on fraction, decimal, and percent equivalents
- Quiz on finding the missing part, base, or percent in a proportion
- Quiz on sales tax, discount, markup, percent of change, and simple interest • Test on percents and percent applications

### 21<sup>st</sup> Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy		Media Literacy		

### Interdisciplinary Connections

Business, Science, Computer Science, Social Studies, and Consumer Science

### Technology Integration

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<b>Time Frame</b>	<b>Weeks 27-34</b>
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### Topic

Geometry

### Essential Questions

- When is it appropriate to square or cube a unit of measurement?

## Math 7

- How does the distance around a circle compare to the distance across a circle?
- How would the volume of a cylinder be affected if the radius was doubled?
- How does the volume of a cone compare with the volume of a cylinder with the same diameter and height?
- Without using a formula, how would you determine the surface area of a prism? How could a net assist you in doing so?
- How can I use geometry to model this real world problem?
- What types of problems are solved using three dimensional objects?

### Enduring Understandings

Students will be able to understand that geometric shapes maintain relationships when scales are used and that construction of a shape is dependent on side and angle measurements. Students will develop a strong spatial sense from classroom activities using a wide variety of activities organized around physical models, modeling, mapping, and measuring. They will discover geometric relationships, and use mathematical procedures such as drawing, sorting, classifying, finding patterns, and solving geometric problems.

### Alignment to NJSLs

7.G.1, 7.G.2, 7.G.3, 7.G.4, 7.G.5, 7.G.6

### Key Concepts and Skills

- a. Scale Drawings
  - i. Compute lengths and area
  - ii. Reproduce a scale drawing using a different scale.
- b. Construct geometric shapes using geometric tools and technology.
  - i. Triangles with three measures or side lengths
  - ii. Conditions of a unique triangle
  - iii. More than one triangle or no triangle
- c. Two dimensional shapes sliced from three dimensional shapes
- d. Area and circumference of a circle
  - i. Apply formulas to solve problems
  - ii. Describe relationship between area and circumference.
- e. Angle Relationships (write and solve simple equations for an unknown angle in a figure).
  - i. Supplementary
  - ii. Complementary
  - iii. Vertical
  - iv. AdjacentAngles
- f. Area, Volume and Surface Area (real world problems) of two dimensional and three dimensional objects.
  - i. Triangles
  - ii. Quadrilaterals
  - iii. Polygons
  - iv. Cubes
  - v. Right Prisms

### Learning Activities

- Geometer's Sketchpad activities
- Geoboard activities
- *Find the Dimensions* activity
- *Discovering Pi* activity
- *Scaling Your Classroom* (Muschula pg. 114)
- *Creating Triangles* (Muschula pg. 116)
- *Slicing Figures* (Muschula pg. 120)
- *Circle Scavenger Hunt* (Muschula pg. 121)

## Math 7

- *What's the Angle* (Muschula pg. 124)
- *Let's Build It* (Muschula pg. 127)

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on units of measurement
- Quiz on perimeter and area of regular and irregular figures
- Test on measurement, perimeter, and area
- Quiz on surface area
- Quiz on volume
- Test on surface area and volume

### 21<sup>st</sup> Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills		Information Literacy		Media Literacy		

### Interdisciplinary Connections

Science and Art

### Technology Integration

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<b>Time Frame</b>	<b>Weeks 35-40</b>
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### Topic

Statistics & Probability

### Essential Questions

- What makes a game fair?
- How can experimental and theoretical probabilities be used to make predictions or to draw conclusions?
- What type of graph is most appropriate to display percentage data that adds up to 100?
- How can data samples inform us about a given population?
- How do I know my prediction is valid?

### Enduring Understandings

This unit will extend students intuitive understanding of probability and develop more formal methods. They will become more focused on sampling techniques that justify making inferences about entire populations. By exploring a variety of high interest real world examples, students will develop a sense of the application of probability and data to the world around them.

### Alignment to NJSLs



## Math 7

7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8

### Key Concepts and Skills

- a. Using Random Samples to Draw Inferences
  - i. Examine a sample population
  - ii. Impacts of random sampling
  - iii. Make inferences on multiple samples
- b. Comparing Two Populations
  - i. Use of central tendency and frequency to compare the relationship between two populations.
  - ii. Compare the means of two or more data sets
  - iii. Mean Absolute Deviation
  - iv. Measures of variability (quartile ranges)
  - v. Display data using a variety of distribution models (dot plots, histograms, etc.)
- c. Probability
  - i. Event chance between 0 and 1
  - ii. Theoretical and Experimental probability
  - iii. Compound probability
  - iv. Develop probability model using frequencies
  - v. Organize compound probability (tables, list, tree diagrams, and simulations)
  - vi. Design and apply a simulation to generate frequencies for compound events.

### Learning Activities

- *Is the Game Fair?* dice game
  - *Guess my PIN Number* game
  - *Examining Samples* (Muschula pg. 129)
  - *How many cubes?* (Muschula pg. 131)
  - *How well did they do? Analyzing Test Scores* (Muschula pg. 133)
  - *Analyzing Nutritional Values of Cereals* (Muschula pg. 136)
  - *On a Scale of Zero to One* (Muschula pg. 139)
- *Probability Simulations* (Muschula pg. 143)
  - *Spinner Experiment* (Muschula pg. 145)
  - *Working with Sample Spaces: Sum of Dice* (Muschula pg. 148)

### Assessments

- Completing exercise questions
- Teacher observations
- Quiz on experimental and theoretical probability
- Test on probability
- Quiz on measures of central tendency and sampling
- Test on measures of central tendency and graphing and interpreting data

### 21<sup>st</sup> Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy		Media Literacy		

### Interdisciplinary Connections

Business, Science, Computer Science, Social Studies, Consumer Science

### Technology Integration

## Math 7

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