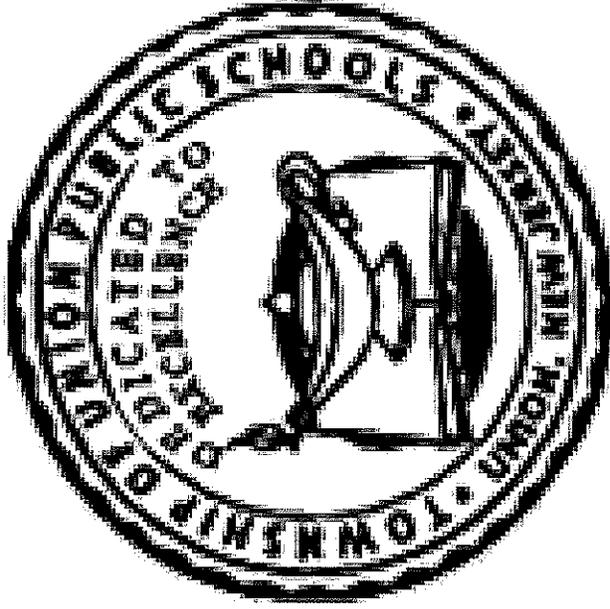


**TOWNSHIP OF UNION PUBLIC SCHOOLS**



**Grade 6 Mathematics**  
**Adopted June 20, 2017**  
**Updated December 18, 2018**

### **Mission Statement**

The mission of the Township of Union Public Schools is to build on the foundations of honesty, excellence, integrity, strong family, and community partnerships. We promote a supportive learning environment where every student is challenged, inspired, empowered, and respected as diverse learners. Through cultivation of students' intellectual curiosity, skills and knowledge, our students can achieve academically and socially, and contribute as responsible and productive citizens of our global community.

### **Philosophy Statement**

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is to formulate a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

## **Course Description**

This course is designed to cover all 6<sup>th</sup> grade New Jersey State Learning Standards as well as introduce skill sets needed to be successful in the 7<sup>th</sup> grade course. The sixth grade math curriculum is currently aligned with the NJSL. All skills required for mastery are a part of the sixth grade learning goals. All lessons are created to address differentiated learning styles to ensure each lesson's objective is obtained by each student. The sixth grade curriculum focuses on sixth critical areas: (1) Ratios; (2) Arithmetic: Decimals, Fractions, and Number Theory; (3) Rational Numbers – representing, comparing and ordering, absolute value, - all operations; (4) Expressions and Equations – translating, substitution, solve one and two step equations; (5) Area, Surface Area and Volume of Prism and Pyramids; and (6) Statistics – Measures of Central Tendency and Measures of Variations.

**Recommended Textbook:**

**Eureka Math – Engage NY Grade 6 Mathematics**

**Curriculum Units**

**Unit 1: Representing and Reasoning about Ratios**

**Unit 2: Arithmetic**

**Unit 3: Rational Numbers**

**Unit 4: Expressions & Equations**

**Unit 5: Area, Surface Area and Volume**

**Unit 6: Statistics**

## I. Unit Standards Overview

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<b>Unit 1</b> <b>Representing &amp; Reasoning About Ratios</b>	<ul style="list-style-type: none"> <li>• 6.RP.A.1</li> <li>• 6.RP.A.2</li> <li>• 6.RP.A.3a</li> <li>• 6.RP.A.3b</li> <li>• 6.RP.A.3c</li> <li>• 6.RP.A.3d</li> </ul>	<ul style="list-style-type: none"> <li>• Understand ratio concepts and use ratio reasoning to solve problems</li> <li>• Be able create and apply Ratio Tables as well as model application problems using Ratio Tables</li> <li>• Calculate Unit Rate</li> <li>• Convert between Units of Measure using Units</li> <li>• Find the Percent of a quantity as a rate per 100</li> </ul>	MP.1 Make sense of problems and persevere in solving them.  MP.2 Reason abstractly and quantitatively.  MP.3 Construct viable arguments & critique the reasoning of others.  MP.4 Model with mathematics.  MP.5 Use appropriate tools strategically.  MP.6 Attend to precision.  MP.7 Look for and make use of structure.  MP.8 Look for and express regularity in repeated reasoning.
<b>Unit 1:</b> <b>Suggested Educational Resources</b>	<u>6.RP.A.1 Games at Recess</u> <u>6.RP.A.2 Price per pound and pounds per dollar</u> <u>6.RP.A.3 Voting for Three, Variation 1</u> <u>6.RP.A.3c Shirt Sale</u>		
<b>Unit 2</b> <b>Arithmetic</b>	<ul style="list-style-type: none"> <li>• 6.NS.A.1</li> <li>• 6.NS.B.2</li> <li>• 6.NS.B.3</li> <li>• 6.NS.B.4</li> </ul>	<ul style="list-style-type: none"> <li>• Apply and extend previous understandings of multiplication and division to divide fractions by fractions</li> <li>• Compute fluently with Decimal Values (all operations)</li> <li>• Fluently divide multi-digit numbers</li> <li>• Identify Least Common Multiple &amp; Greatest Common Factor</li> </ul>	
<b>Unit 2:</b> <b>Suggested Educational Resources</b>	<u>6.NS.A.1 Traffic Jam</u> <u>6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1</u> <u>6.NS.B.4 Factors and Common Factors</u> <u>6.NS.B.4 Multiples and Common Multiples</u>		
<b>Unit 3</b>	<ul style="list-style-type: none"> <li>• 6.NS.C.5</li> </ul>	<ul style="list-style-type: none"> <li>• Understand Positive &amp; Negative Numbers on the Number Line</li> </ul>	

<p><b>Rational Numbers</b></p>	<ul style="list-style-type: none"> <li>6.NS.C.6a</li> <li>6.NS.C.6b</li> <li>6.NS.C.6c</li> <li>6.NS.C.7</li> <li>6.NS.C.8</li> <li>6.G.A.1</li> </ul>	<ul style="list-style-type: none"> <li>Be able to order and understand Absolute Value</li> <li>Use the Coordinate Plane to plot ordered pairs</li> <li>Identify Symmetry in the Coordinate Plane</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments &amp; critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>
<p><b>Unit 3: Suggested Educational Resources</b></p>	<p><u>6.NS.C.5 Warmer in Miami</u>  <u>6.NS.C.6 Mile High</u>  <u>6.NS.C.7 Jumping Flea</u>  <u>6.NS.C.7a Fractions on the Number Line</u>  <u>6.NS.C.7b Comparing Temperatures</u>  <u>6.NS.C.8 Nome, Alaska</u>  <u>6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane</u></p>		
<p><b>Unit 4 Expressions &amp; Equations</b></p>	<ul style="list-style-type: none"> <li>6.EE.A.1</li> <li>6.EE.A.2a</li> <li>6.EE.A.2b</li> <li>6.EE.A.2c</li> <li>6.EE.A.3</li> <li>6.EE.A.4</li> <li>6.EE.B.5</li> <li>6.EE.B.6</li> <li>6.EE.B.7</li> <li>6.EE.B.8</li> <li>6.EE.C.9</li> </ul>	<ul style="list-style-type: none"> <li>Distinguish relationships between Inverse Operations</li> <li>Compute exponents &amp; understand the Order of Operations</li> <li>Understand the concept of substitution</li> <li>Apply and extend previous understanding of arithmetic to algebraic expressions.</li> <li>Be able to identify parts of an algebraic expression</li> <li>Use algebraic properties to write equivalent expressions (distributive property)</li> <li>Be able to expand, factor, and distribute algebraic expressions</li> <li>Write and evaluate expressions including the use of Formulas</li> <li>Reason about and solve one variable equations</li> <li>Reason about and solve one variable inequalities</li> <li>Apply and solve one step equation problems in the real world</li> </ul>	<p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>
<p><b>Unit 4: Suggested Educational Resources</b></p>	<p><u>6.EE.A.1 The Dividers</u>, <u>6.EE.A.2 Rectangle Perimeter 1</u>  <u>6.EE.A.4 Rectangle Perimeter 2</u>  <u>6.EE.A.4 Equivalent Expressions</u>  <u>6.EE.B.5 Make Use of Structure</u></p>	<ul style="list-style-type: none"> <li>Supporting</li> <li>Major Clusters</li> </ul>	

<p><b>Unit 5:</b> <i>Suggested Educational Resources</i></p>	<p>6.EE.B.7 Morning Walk 6.EE.B.8 Fishing Adventures I 6.EE.C.9 Families of Triangles</p>	<ul style="list-style-type: none"> <li>Find the area of triangles and special quadrilaterals</li> <li>Use the known formulas to find the area of composite figures</li> <li>Draw polygons on the Coordinate Plane and be able to determine the perimeter and area of the figure</li> <li>Find the volume of a right rectangular prism</li> <li>Be able to find the surface area of a 3dimensional figures using nets and formula.</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments &amp; critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>
<p><b>Unit 6:</b> <i>Suggested Educational Resources</i></p>	<p>6.G.A.1 6.G.A.2 6.G.A.3 6.G.A.4</p>	<ul style="list-style-type: none"> <li>Be able to understand and describe distributions of numerical data</li> <li>Summarize a normal distribution using mean and mean absolute deviation</li> <li>Summarize a skewed distribution using median and interquartile range</li> </ul>	
<p><b>Unit 6:</b> <i>Suggested Educational Resources</i></p>	<p>6.SP.A.1 Identifying Statistical Questions 6.SP.A.2. 6.SP.B.4 Puppy Weights 6.SP.A.3 Is It Center or Is It Variability? 6.SP.B.5c Number of Siblings 6.SP.B.5d Mean or Median?</p>		

- Major Clusters
- Supporting
- Major Clusters

## II. Units

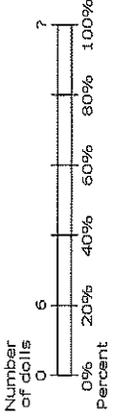
### Unit 1

Unit 1 Ratios & Unit Rates

Content & Practice Standards	SMP	Critical Knowledge & Skills	Standard Mastery Examples										
<p><b>Topic A: Representing and Reasoning About Ratios</b></p> <p><b>6.RP.A.1.</b> Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.</p>	<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>A ratio shows relative sizes or values of two quantities.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>describe a ratio relationship between two quantities using ratio language.</li> <li>Express ratios in simplest form.</li> </ul> <p><b>Learning Goal 1:</b> Explain the relationship of two quantities in given ratio using ratio language.</p>	<p>Can be used on formative, summative, benchmark, and alternative assessments.</p> <ul style="list-style-type: none"> <li>The students in Mr. Hill’s class played games at recess.                             <ul style="list-style-type: none"> <li>6 boys played soccer</li> <li>4 girls played soccer</li> <li>2 boys jumped rope</li> <li>8 girls jumped rope</li> </ul> </li> </ul> <p>Afterward, Mr. Hill asked the students to compare the boys and girls playing different games.</p> <p>Mika said, “Four more girls jumped rope than played soccer.” Chaska said, “For every girl that played soccer, two girls jumped rope.” Mr. Hill said, “Mika compared the girls by looking at the difference and Chaska compared the girls using a ratio.”</p> <ol style="list-style-type: none"> <li>Compare the number of boys who played soccer and jumped rope using the difference. Write your answer as a sentence as Mika did.</li> <li>Compare the number of boys who played soccer and jumped rope using a ratio. Write your answer as a sentence as Chaska did.</li> <li>Compare the number of girls who played soccer to the number of boys who played soccer using a ratio. Write your answer as a sentence as Chaska did</li> </ol> <p>This table shows the numbers of books, by type, checked out from the school library on Monday.</p> <table border="1" data-bbox="1089 478 1211 709"> <thead> <tr> <th>Book Type</th> <th>Number of Books</th> </tr> </thead> <tbody> <tr> <td>mystery</td> <td>24</td> </tr> <tr> <td>nonfiction</td> <td>18</td> </tr> <tr> <td>adventure</td> <td>12</td> </tr> <tr> <td>humor</td> <td>16</td> </tr> </tbody> </table> <p>Use the drop-down menus to complete the statement. For every <input type="text"/> mystery books checked out, <input type="text"/> nonfiction books were</p>	Book Type	Number of Books	mystery	24	nonfiction	18	adventure	12	humor	16
Book Type	Number of Books												
mystery	24												
nonfiction	18												
adventure	12												
humor	16												
<p><b>Topic B: Collections of Equivalent Ratios</b></p> <p><b>6.RP.A.3.</b> Use ratio and rate reasoning</p>	<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p>	<ul style="list-style-type: none"> <li>John, Marie, and Will all ran for 6th grade class president. Of the 36 students, 16 voted for John, 12 for Marie, and 8 for Will.</li> </ul>										

<p>to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *(benchmark)</p> <p><b>6.RP.A.3a.</b> Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p>	<p>MP.4 Model with mathematics. MP.5 Use appropriate tools strategically MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> <li>use ratio reasoning to create tables of equivalent ratios relating quantities with <i>whole number</i> measurements, find missing values in tables.</li> <li>compare ratios using tables of equivalent ratios.</li> </ul> <p><b>Learning Goal 2:</b> Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100</p>	<ul style="list-style-type: none"> <li>What was the ratio of votes for John to votes for Will? What was the ratio of votes for Marie to votes for Will? What was the ratio of votes for Marie to votes for John?</li> <li>Because no one got half the votes, they had to have a run-off election. Marie dropped out and convinced all her voters to vote for Will. What is the new ratio of Will's votes to John's?</li> <li>John and Will also ran for Middle School Council President. There are 90 students voting in middle school. If the ratio of Will's votes to John's votes remains the same as it was in part (b), how many more votes will Will get than John? Use a table.</li> <li>Sam's two new aquariums each hold exactly 200 gallons of water. One aquarium will hold small fish and the other will hold large fish. Now he needs fish for his aquariums.             <ul style="list-style-type: none"> <li>He will buy 5 small fish for every 10 gallons of water in the aquarium.</li> <li>He will buy 8 large fish for every 40 gallons of water in the aquarium.</li> </ul> </li> </ul> <p>What is the total number of fish Sam will have? What will the ratio of Sam's small fish to large fish? Show and explain the ratios in a table.</p>
<p><b>Topic C: Unit Rates</b></p> <p><b>6.RP.A.2.</b> Understand the concept of a unit rate <math>a/b</math> associated with a ratio <math>a:b</math> with <math>b \neq 0</math>, and use rate language in the context of a ratio relationship.</p> <p><b>6.RP.A.3b.</b> Solve unit rate problems including those involving unit pricing and constant speed.</p> <p><b>6.RP.A.3d.</b> Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p>	<p>MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically MP.6 Attend to precision.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>A rate is a ratio comparing two different types of quantities.</li> </ul> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>determine the unit rate given a ratio relationship.</li> <li>describe a unit rate relationship between two quantities using rate language.</li> </ul>	<ul style="list-style-type: none"> <li>We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger. The grocery store sells beans in bulk. The grocer's sign above the beans says, 5 pounds for \$4. At this store, you can buy any number of pounds of beans at this same rate, and all prices include tax.             <ul style="list-style-type: none"> <li>Alberto said, "The ratio of the number of dollars to the number of pounds is 4:5. That's \$0.80 per pound."</li> <li>Beth said, "The sign says the ratio of the number of pounds to the number of dollars is 5:4. That's 1.25 pounds per dollar."</li> </ul> </li> <li>Are Alberto and Beth both correct? Explain.             <ol style="list-style-type: none"> <li>Claude needs two pounds of beans to make soup. Show Claude how much money he will need.</li> <li>Dora has \$10 and wants to stock up on beans. Show</li> </ol> </li> </ul>

<p><b>6.RP.A.3c.</b> Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity); solve problems involving finding the whole, given a part and the percent.</p>	<p>MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> <li>• convert measurement units using ratio reasoning and proportions.</li> <li>• transform units appropriately when multiplying and dividing quantities.</li> </ul> <p><b>Learning Goal 3:</b> Use rate language, in the context of the ratio relationship, to describe a unit rate.</p> <p><b>Learning Goal 4:</b> Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities</p> <p><b>Learning Goal 5:</b> Students will be able to set up and solve proportions.</p>	<p>Dora how many pounds of beans she can buy.</p> <p>4. Do you prefer to answer parts (b) and (c) using Alberto's rate of \$0.80 per pound, using Beth's rate of 1.25 pounds per dollar, or using another strategy? Explain.</p> <ul style="list-style-type: none"> <li>• Chad drove 168 miles in 3 hours. Part A – How many miles per hour did Chad drive?</li> <li>Part B – Chad will drive 672 more miles. He continues to drive at the same rate. How many hours will it take Chad to drive the 672 miles?</li> <li>Part C – Chad stopped and filled the car with 11 gallons of gas. He had driven 308 miles using the previous 11 gallons of gas. How many miles per gallon did Chad's car get?</li> <li>• If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</li> <li>• Jessica sees the following speed limit sign while visiting Australia  where the units for speed are kilometers per hour:</li> </ul> <p>Part a. A conversion table indicates that 1 mile is 1.6 km. With this conversion rate, is the speed limit greater than or less than 65 mph? Explain.</p> <p>Part b. Jessica finds out that 1 mile is not exactly 1.6 km. This number has been rounded to the nearest tenth. Does this influence the answer to part (a)</p> <ul style="list-style-type: none"> <li>▪ John, Marie, and Will all ran for 6th grade class president. Of the 36 students, 16 voted for John, 12 for Marie, and 8 for Will. <ul style="list-style-type: none"> <li>- What was the ratio of votes for John to votes for Will? What was the ratio of votes for Marie to votes for Will? What was the ratio of votes for Marie to votes for John?</li> <li>- Because no one got half the votes, they had to have a run-off election. Marie dropped out and convinced all her voters to vote for Will. What is the new ratio of Will's votes to John's?</li> <li>- John and Will also ran for Middle School Council President. There are 90 students voting in middle school. If the ratio of Will's votes to John's votes remains the same as it was in part (b), how many more votes will Will get than John? Use a table.</li> </ul> </li> </ul>
<p><b>Topic D: Percent</b></p>	<p>MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically MP.6 Attend to precision.</p>	<p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> <li>• Use the percent proportion to solve percent problems</li> <li>• calculate a percent of a quantity and solve problems by finding the whole when given the part and the</li> </ul>	

	<p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning</p>	<p>percent.</p> <p><b>Learning Goal 6:</b> Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.</p>	<ul style="list-style-type: none"> <li>Selina bought a shirt on sale that was 20% less than the original price. The original price was \$5 more than the sale price. What was the original price? Explain or show work.</li> </ul> <p>Anita brings 6 dolls to her grandma's house. These dolls represent 20% of Anita's doll collection, as shown in the diagram.</p>  <p>What is the total number of dolls in Anita's doll collection?</p>
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Unit 1 Vocabulary

Simplest Form; Ratio; Ratio Table; Equivalent Ratios; Rate; Unit Rate; Proportion; Percent

**Suggested Activities/Modifications**

Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,;

1. Activities
  - a. Suggested Educational Resources noted in section I
  - b. Open Middle Problems [www.openmiddle.com](http://www.openmiddle.com)
  - c. Real-World Applications
  - d. One quiz and one test
2. English Language Learners.
  - a. Read written instructions.
  - b. Model and provide examples
  - c. Extended time on assessments when needed.
  - d. Establish a non-verbal cue to redirect student when not on task.
  - e. Students may use a bilingual dictionary.
  - f. Conversion chart
3. Special Education/504 Students.
  - a. Extended time on assessments when needed.
  - b. Preferred seating to be determined by student and teacher.
  - c. Provide modified assessments when necessary.
  - d. Student may complete assessments in alternate setting when requested.
  - e. Establish a non-verbal cue to redirect student when not on task.
  - f. Maintain strong teacher / parent communication.
  - g. Conversion chart
4. Gifted and Talented Students
  - a. Converting between metric and customary systems.
  - b. Converting unit rates from metric system to the customary system and vice versa.
  - c. Provide enrichment activities to expand upon the curriculum.
  - d. Use higher level questioning techniques in class and on assessments.

**New Jersey Student Learning Standards – Technology**

- 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
- 8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.

Use of Edconect, iReady.

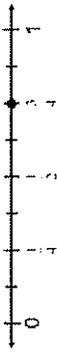
**Career Readiness Practices**

- CRP1. Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> <li>• CRP2. Apply appropriate academic and technical skills.</li> <li>• CRP4. Communicate clearly and effectively and with reason.</li> <li>• CRP6. Demonstrate creativity and innovation.</li> <li>• CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>• CRP11. Use technology to enhance productivity.</li> </ul>
<p><b><u>NJSLS 9.2 - Career Awareness, Exploration, and Preparation</u></b>            9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</p>
<p><b><u>English Language Development Standard 3: Language of Mathematics: Ratios and Proportional Relationships #3 (Grade 6):</u></b> Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p>
<p><b><u>Interdisciplinary Connections: Science - How much water do you use? (connect ratios &amp; percents)</u></b></p>

**Unit 2**

<b>Unit 2 Arithmetic</b>		
<b>Content &amp; Practice Standards</b>	<b>SMP</b>	<b>Critical Knowledge &amp; Skills</b>
		<b>Standard Mastery Examples</b>  Can be used on formative, summative, benchmark, and alternative assessments.

<p><b>Topic A: Multiplying &amp; Dividing Fractions</b></p> <p><b>6.NS.A.1.</b> Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.</p>	<p>MP.4 Model with mathematics.</p> <p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Convert mixed numbers to improper fractions and improper fractions to mixed numbers</li> <li>Find the reciprocal of a fraction and mixed number</li> <li>multiply and divide a fraction by a fraction.</li> <li>represent division of fractions using visual models.</li> <li>interpret quotients of fractions in the context of the problem.</li> <li>compute quotients of fractions in order to solve word problems.</li> <li>write equations to solve word problems involving division of fraction by a fraction.</li> <li>use the relationship between multiplication and division to explain division of fractions.</li> </ul> <p><b>Learning Goal 1:</b> Compute products of fractions and mixed numbers.</p> <p><b>Learning Goal 2:</b> Compute quotients of fractions and mixed numbers.</p> <p><b>Learning Goal 3:</b> Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions.</p> <p><b>Learning Goal 4:</b> Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.</p>	<ul style="list-style-type: none"> <li>Dan observes that</li> </ul> $\frac{6}{10} \div \frac{2}{10} = 6 \div 2$ <p>He says, <b><i>I think that if we are dividing a fraction by a fraction with the same denominator, then we can just divide the numerators.</i></b></p> <p>Is Dan's conjecture true for all fractions? Explain how you know.</p> <ul style="list-style-type: none"> <li>You are stuck in a big traffic jam on the freeway and you are wondering how long it will take to get to the next exit, which is 1 mile away. You are timing your progress and find that you can travel of a mile in one hour. If you continue to make progress at this rate, how long will it be until you reach the exit? Solve the problem with a diagram and explain your answer.</li> <li>James has a board that is <math>\frac{3}{4}</math> foot long. He wants to cut the board into pieces that are each <math>\frac{1}{8}</math> foot long. How many pieces can James cut from the board? Explain how James can use the number line diagram to determine the number of pieces he can cut from the board.</li> </ul> <p>This diagram shows a number line.</p>  <ul style="list-style-type: none"> <li>Every student was given a magnet in Science class today. Each magnet weighed <math>\frac{1}{5}</math> of a pound. If there were 28 students in your class, how much did all of the magnets weigh together?</li> </ul>
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<p><u>Topic B &amp; C: Multi-Digit Decimal Operations &amp; Dividing Whole Numbers and Decimals</u></p>		<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>use the standard algorithm to divide multi-digit numbers with speed and accuracy.</li> <li>add and subtract multi-digit decimals with accuracy and efficiency.</li> <li>multiply and divide multi-digit decimals with accuracy and efficiency.</li> </ul> <p><u>Learning Goal 5:</u> Fluently divide multi-digit numbers using the standard algorithms.</p> <p><u>Learning Goal 6:</u> Fluently add, subtract, multiply and divide multi-digit decimals.</p>	<ul style="list-style-type: none"> <li>Use the computation shown below to find the products.</li> </ul> $\begin{array}{r} 189 \\ 16 \overline{)3024} \\ \underline{16} \phantom{00} \\ 142 \phantom{0} \\ \underline{128} \phantom{0} \\ 144 \phantom{0} \\ \underline{144} \\ 0 \end{array}$
<p>6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.</p> <p>6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.</p>			<ul style="list-style-type: none"> <li>a) <math>189 \times 16</math></li> <li>b) <math>80 \times 16</math></li> <li>c) <math>9 \times 16</math></li> </ul> <ul style="list-style-type: none"> <li>Use the fact that <math>13 \times 17 = 221</math> to find the following.</li> </ul> <ol style="list-style-type: none"> <li><math>13 \times 1.7</math></li> <li><math>130 \times 17</math></li> <li><math>13 \times 1700</math></li> <li><math>1.3 \times 1.7</math></li> <li><math>2210 \div 13</math></li> <li><math>22100 \div 17</math></li> <li><math>221 \div 1.3</math></li> </ol>

<p><b>Topic D: Number Theory</b></p> <p><b>6.NS.B.4.</b> Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.</p>	<p>MP.7 Look for and make use of structure.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>determine whether a number is prime or composite.</li> <li>use divisibility rules.</li> <li>find the prime factorization of a number.</li> <li>create lists of factors for two whole numbers less than or equal to 100; find the largest factor common to both lists.</li> <li>create lists of multiples for two whole numbers less than or equal to 12; find the smallest multiple common to both lists.</li> </ul> <p><b>Learning Goal 7:</b> Use divisibility rules to 2,3,4,5,6,9, and 10 to find factors and determine whether a number is prime or composite.</p> <p><b>Learning Goal 8:</b> Find the prime factorization of a number written in exponential form.</p> <p><b>Learning Goal 9:</b> Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.</p>	<ul style="list-style-type: none"> <li>Thomas buys a case of bottled water. A case contains 36 bottles of water and \$4.69. Thomas will sell each bottle of water for \$0.75 at a school event. How much profit, in dollars, will Thomas earn if he sells all the bottles of water?</li> </ul>
			<p>Part A - List all the factors of 48. List all the factors of 64. What are the common factors of 48 and 64? What is the greatest common factor of 48 and 64?</p> <p>Part B - List all the multiples of 8 that are less than or equal to 100. List all the multiples of 12 that are less than or equal to 100. What are the common multiples of 8 and 12 from the two lists? What is the least common multiple of 8 and 12?</p> <p>Part C - Lyle noticed that the list of common multiples has a pattern. Describe a pattern in the list of numbers that Lyle might have seen.</p> <ul style="list-style-type: none"> <li>The United States wants to adopt another state into our country. If another state joins the United States would it be possible to arrange the stars of the new flag in rows, where each row has the same number of stars? <b>Explain why or why not using your divisibility rules</b></li> <li>The wing span of a red robin is <math>2 \times 3^3</math> cm long. The wing span of a blue jay is <math>2^2 \times 3^2</math> cm long. Which bird has the larger wing span? Compare the prime factorization of the wing spans.</li> </ul>

## Unit 2 Vocabulary

Mixed Number; Improper Fractions; Equivalent Fractions; Reciprocal; Product; Quotient; Divisible; Prime Numbers; Composite Numbers; Prime Factorization; Greatest Common Factor; Least Common Multiple

**Suggested Activities/Modifications**

Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:

1. Activities
  - a. Practice/review games
  - b. Task cards
  - c. One quiz and one test
2. English Language Learners.
  - a. Read written instructions.
  - b. Model and provide examples
  - c. Extended time on assessments when needed.
  - d. Establish a non-verbal cue to redirect student when not on task.
  - e. Students may use a bilingual dictionary.
3. Special Education/504 Students.
  - a. Students may be provided with note organizers / study guides to reinforce key topics.
  - b. Extended time on assessments when needed.
  - c. Preferred seating to be determined by student and teacher.
  - d. Provide modified assessments when necessary.
  - e. Student may complete assessments in alternate setting when requested.
  - f. Establish a non-verbal cue to redirect student when not on task.
  - g. Maintain strong teacher / parent communication.
4. Gifted and Talented Students.
  - a. Find the GCF or LCM of larger numbers.
  - b. Complex order of operation problems with exponents.

- C. Provide enrichment activities to expand upon the curriculum.
- d. Use higher level questioning techniques in class and on assessments.

**New Jersey Student Learning Standards - Technology**

- 8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
- 8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.
- Use of Edconect, iReady.

**Career Readiness Practices**

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.

**NJSLS 9.2 - Career Awareness, Exploration, and Preparation**

- 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

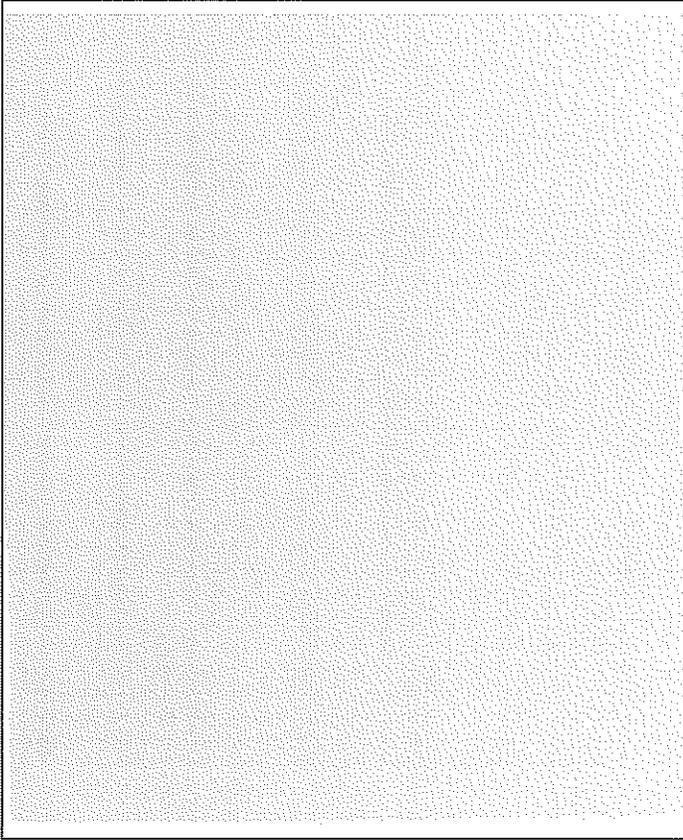
**English Language Development Standard 3: Language of Mathematics: Ratios and Proportional Relationships #3 (Grade 6):** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

**Interdisciplinary Connections:** Instructional connections through working with authentic scenarios, teachers should help students see how expressions can represent situations in life and will reflect their specific grade-level coursework in other content areas, such as English language arts, reading, science, social studies, world languages, physical education, and fine arts, among others.

**Global Perspectives:** What is the relationship between fractions and decimals? Is the use of one better than the other in certain situations?

**Unit 3**

Unit 3 Rational Numbers		Standard Mastery Examples
Content & Practice Standards	SMP	Can be used on formative, summative, benchmark, and alternative assessments.
Topic A & B : Positive and	MP.2 Reason	• Denver, Colorado is called “The Mile High City” because its
	Concept(s):	

<p><b><u>Negative Numbers on a Number Line &amp; Absolute Value</u></b></p> <p><b>6.NS.C.5.</b> Understand that positive and negative numbers are used together to describe quantities having opposite directions or use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</p> <p><b>6.NS.C.6a.</b> Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., <math>-(-3) = 3</math>, and that 0 is its own opposite.</p> <p><b>6.NS.C.6c.</b> Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p> <p><b>6.NS.C.7.</b> Understand ordering and absolute value of rational numbers.</p> <p><b>6.NS.C.7a.</b> Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.</p> <p><b>6.NS.C.7b.</b> Write, interpret, and explain statements of order for rational numbers in real-world</p>	<p>abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>	<ul style="list-style-type: none"> <li>• Positive and negative numbers, used together, describe quantities having opposite directions or opposite values.</li> <li>• Opposite signs of numbers indicate locations on opposite sides of 0 on the number line.</li> <li>• The opposite of the opposite of a number is the number itself (e.g. the opposite of three is -3. The opposite of the opposite of three, <math>-(-3)</math>, is equal to the original number, 3).</li> <li>• The absolute value of a rational number is its distance from 0 on the number line.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• represent quantities with positive and negative numbers in real-world contexts.</li> <li>• interpret positive and negative numbers in real-world contexts.</li> <li>• explain the meaning of zero, in context, in each real-world situation</li> <li>• position rational numbers on horizontal and vertical number lines.</li> <li>• locate numbers and their opposites on the number line and explain their relation to 0.</li> <li>• given an inequality, determine the position of one rational number</li> </ul>	
			<p>City      State      Elevation above sea level      Elevation below sea level</p>



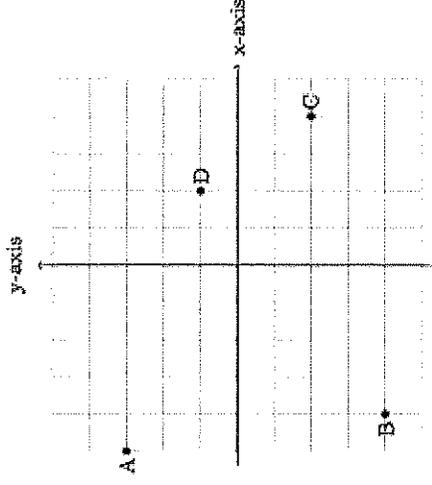
numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

- on a coordinate plane. explain the conditions for which pairs of points are reflections across an axes in the coordinate plane.

**Learning Goal 5:** Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero.

**Learning Goal 6:** Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.

- Below are some points in the coordinate plane:



Find the coordinates of the points.

- Reflect the points over the x-axis and find the coordinates of the new points: label the reflection of point A as  $A'$ , the reflection of B as  $B'$ , the reflection of C as  $C'$ , and the reflection of D as  $D'$ .
- Reflect the points from (b) over the y-axis: label the reflection of point  $A'$  as  $A''$ , the reflection of  $B'$  as  $B''$ , the reflection of  $C'$  as  $C''$ , and the reflection of  $D'$  as  $D''$ .
- How do the points  $A''$ ,  $B''$ ,  $C''$ ,  $D''$  from (c) relate to the points A, B, C, and D?

**Suggested Activities/Modifications**

Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:

1. Activities
  - a. Practice/review games
  - b. Integer project
  - c. One-three quizzes and one test
2. English Language Learners.
  - a. Read written instructions.
  - b. Students may be provided with note organizers / study guides to reinforce key topics.
  - c. Model and provide examples
  - d. Extended time on assessments when needed.
  - e. Establish a non-verbal cue to redirect student when not on task.
  - f. Students may use a bilingual dictionary.
3. Special Education/504 Students.
  - a. Students may be provided with note organizers / study guides to reinforce key topics.
  - b. Extended time on assessments when needed.
  - c. Preferred seating to be determined by student and teacher.
  - d. Provide modified assessments when necessary.
  - e. Student may complete assessments in alternate setting when requested.
  - f. Establish a non-verbal cue to redirect student when not on task.
  - g. Maintain strong teacher / parent communication.
4. Gifted and Talented Students
  - a. Solving two step inequalities.
  - b. Order of operations with integers.
  - c. Provide enrichment activities to expand upon the curriculum.
  - d. Use higher level questioning techniques in class and on assessments.

**Career Readiness Practices**

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.

<ul style="list-style-type: none"> <li>• CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>• CRP1.1. Use technology to enhance productivity.</li> </ul>
<p><b><u>New Jersey Student Learning Standards - Technology</u></b></p> <p>8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.</p> <p>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.</p> <p>8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results.</p> <p>8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.</p> <p>Use of Edconenct, iReady.</p>
<p><b><u>NJSLS 9.2 – Career Awareness, Exploration, and Preparation</u></b></p> <ul style="list-style-type: none"> <li>• 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> </ul>

**Unit 4**

Unit 4 Expressions and Equations		
Content & Practice Standards	SMP	Critical Knowledge & Skills
<p><b><u>Topics A &amp; D: Relationships of the Operations &amp; Expanding, Factoring, and Distributing</u></b></p>	<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Standard Mastery Examples</p> <p>Can be used on formative, summative, benchmark, and alternative assessments.</p>
	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>• Properties of operations: distributive</li> </ul>	

<p><b>Expressions</b></p> <p><b>6.EE.A.3.</b> Apply the properties of operations to generate equivalent expressions.  <i>For example, apply the distributive property to the expression <math>3(2 + x)</math> to produce the equivalent expression <math>6 + 3x</math>; apply the distributive property to the expression <math>24x + 18y</math> to produce the equivalent expression <math>6(4x + 3y)</math>; apply properties of operations to <math>y + y + y</math> to produce the equivalent expression <math>3y</math></i></p> <p><b>6.EE.A.2.</b> Write, read, and evaluate expressions in which letters stand for numbers</p> <p><b>6.EE.A.2a.</b> Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation "Subtract <math>y</math> from 5" as <math>5 - y</math>.</i></p> <p><b>6.EE.A.2b.</b> Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression <math>2(8 + 7)</math> as a product of two factors; view <math>(8 + 7)</math> as both a single entity and a</i></p>	<p>MP.7 Look for and make use of structure.</p>	<p>property, combining like terms</p> <ul style="list-style-type: none"> <li>Solving multi-step problems according to the order of operations</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Write algebraic expressions from verbal descriptions.</li> <li>Use mathematical terms (sum, term, product, factor, quotient, coefficient) to identify the parts of an expression.</li> <li>Evaluate algebraic expressions and formulas, including those involving exponents.</li> <li>Combine like terms to generate an equivalent expression.</li> <li>Factor to generate an equivalent expression.</li> <li>Multiply (apply the distributive property) to generate an equivalent expression.</li> </ul> <p><b>Learning Goal 1:</b> Apply Commutative, Associative, and Distributive Properties to numerical and algebraic expressions to create equivalent expressions.</p> <p><b>Learning Goal 2:</b> Apply properties of operations (factor, distribute, and combine like terms) to generate equivalent expressions and to identify when two expressions are equivalent.</p>	<p>Brianna's teacher asks her which of these three expressions are equivalent to each other.</p> <p>Expression A: <math>9x - 3x - 4</math>  Expression B: <math>12x - 4</math>  Expression C: <math>5x + x - 4</math></p> <p>Brianna says that all three expressions are equivalent because the value of each one is <math>-4</math> when <math>x = 0</math>. Brianna's thinking is incorrect.</p> <ul style="list-style-type: none"> <li>Identify the error in Brianna's thinking.</li> <li>Determine which of the three expressions are equivalent.</li> <li>Explain or show your process in determining which expressions are equivalent.</li> </ul> <ul style="list-style-type: none"> <li>Identify which properties state the following: <ul style="list-style-type: none"> <li><input type="radio"/> <math>ca = ac</math></li> <li><input type="radio"/> <math>a + (b + c) = (a + b) + c</math></li> <li><input type="radio"/> <math>m(n + k) = mn + nk</math></li> </ul> </li> </ul>
			<p>The ideal cooking time, in minutes, for a turkey that weighs <math>p</math> pounds is given by the expression <math>15 + 20p</math>. Which of the following shows the expression written as the product of the GCF and a sum?</p> <ul style="list-style-type: none"> <li>F <math>15p + 20</math></li> <li>G <math>15(1 + 20p)</math></li> <li>H <math>5(3 + 20p)</math></li> <li>J <math>5(3 + 4p)</math></li> </ul>

*sum of two terms*

**6.EE.A.4.** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions  $y + y + y$  and  $3y$  are equivalent because they name the same number regardless of which number  $y$  stands for*

**Topic B: Special Notations of Operations**

**6.EE.A.1.** Write and evaluate numerical expressions involving whole-number exponents

**6.EE.A.2.** Write, read, and evaluate expressions in which letters stand for numbers

**6.EE.A.2c.** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a

MP.2 Reason abstractly and quantitatively.

MP.7 Look for and make use of structure.

Concept(s): No new concept(s) introduced

Students are able to:

- Evaluate algebraic expressions and formulas, including those involving exponents.
- Write numerical expressions (involving whole number exponents) from verbal descriptions.
- Evaluate numerical expressions involving whole number exponents.

**Learning Goal 3:** Write and evaluate numerical expressions involving whole number exponents.

- After opening an ancient bottle, you find on the beach, a Djinni appears. In payment for his freedom, he gives you a choice of either 50,000 gold coins or one magical gold coin. The magic coin will turn into two gold coins on the first day. The two coins will turn into four coins total at the end of two days. By the end of the third day there will be eight gold coins total. The Djinni explains that the magic coins will continue this pattern of doubling each day for one moon cycle, 28 days. Which prize do you choose?

When you have made your choice, answer these questions:

The number of coins on the third day will be  $2 \times 2 \times 2$ .

Can you write another expression using exponents for the number of coins there will be on the third day?

Write an expression for the number of coins there will be on the 28th day. Is this more or less than a million coins?

- Jake tells a joke to 3 people and each of those people tells

<p>particular order (Order of Operations). For example, use the formulas <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = \frac{1}{2}</math></p>			<p>the joke to 3 more people, and so on. How many people will hear the joke in the 4<sup>th</sup> round of jokes told? How many people will hear the joke in total after the fourth round?</p> <ul style="list-style-type: none"> <li>Apply the formula <math>A =</math> to determine the area of a square that has a side length of 8.5 inches.</li> <li>Gina won a contest and was given the option of receiving or . If she wants to take home the most money, which option should she pick?</li> </ul>													
<p><u>Topics C, E, &amp; F: Replacing Letters and Numbers, Expressing Operations in Algebraic Form, and Writing/Evaluating Expressions and Formulas</u></p> <p><b>6.EE.A.2.</b> Write, read, and evaluate expressions in which letters stand for numbers</p> <p><b>6.EE.A.2c.</b> Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = \frac{1}{2}</math></p> <p><b>6.EE.A.4.</b> Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>A variable can represent an unknown number or any number in a set of numbers.</li> <li>Using substitution to replace variables with numbers</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Write expressions for solving real-world problems.</li> <li>Translate between word phrases and algebraic expressions</li> <li>Complete sequence tables and write algebraic expressions based on sequence tables.</li> </ul> <p><b>Learning Goal 4:</b> Write and evaluate algebraic expressions involving exponents (include evaluating formulas).</p> <p><b>Learning Goal 5:</b> Use variables to represent numbers and write expressions when solving real world or mathematical problems.</p> <p><b>Learning Goal 6:</b> Use mathematical language to identify parts of an expression.</p>	<ul style="list-style-type: none"> <li>To compute the perimeter of a rectangle you add the length, <math>l</math> and width, <math>w</math> and double this sum.</li> <li>Write an expression for the perimeter of a rectangle.</li> <li>Use the expression to find the perimeter of a rectangle with length 30 and width 75.</li> <li>Determine the value of... <math>a^2 + 3b \div c - 2d</math>, when <math>a = 3</math>, <math>b = 8</math>, <math>c = 2</math>, and <math>d = 5</math>?</li> <li>Casey brought \$36.75 with her to the state fair. She bought three admission tickets into the fair, and each ticket cost <math>x</math> dollars. Write an expression that represents the amount of money, in dollars, that Casey had after she bought the tickets.</li> <li>The table below shows the cost of renting a kayak.</li> </ul> <table border="1" data-bbox="1068 210 1182 646"> <thead> <tr> <th colspan="3">Clear Lake Kayak Rentals</th> </tr> </thead> <tbody> <tr> <td>Number of Hours</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Total Cost (\$)</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Write 2 difference expressions that can be used for renting the kayak for <math>h</math> hours.</li> <li>How much does it cost to rent the kayak for 6 hours?</li> <li>Given the following table, write 2 possible expressions that could be used in this table. (6 points)</li> </ul>	Clear Lake Kayak Rentals			Number of Hours	1	2	3	4	Total Cost (\$)	15	20	25	30
Clear Lake Kayak Rentals																
Number of Hours	1	2	3	4												
Total Cost (\$)	15	20	25	30												
<p><b>Position</b> 3 n</p>																

them).  
*For example, the expressions  $y + y + y$  and  $3y$  are equivalent because they name the same number regardless of which number  $y$  stands for*

**6.EE.A.2.** Write, read, and evaluate expressions in which letters stand for numbers

**6.EE.A.2a.** Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract  $y$  from 5" as  $5 - y$ .*

**6.EE.A.2b.** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression  $2(8 + 7)$  as a product of two factors; view  $(8 + 7)$  as both a single entity and a sum of two terms*

**6.EE.B.6.** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown

**Learning Goal 7:** Create and complete sequence tables given algebraic expression or determine algebraic expression based on given sequence table.

Position	1	2	3	4	$n$
Value of Term	2	6	10	14	?

Value of Term      10      ?

Rule 1: \_\_\_\_\_      Rule 2: \_\_\_\_\_

- Write an algebraic expression for the following sequence table and use this expression to determine what the 9<sup>th</sup> term would be.
- What is an expression that can represent the expression "18 -  $y$ ". Select all that apply.
  - subtract 18 from  $y$
  - $y$  less than 18
  - the difference between 18 and  $y$
  - take away 18 from  $y$
  - 18 minus  $y$

<p>number, or, depending on the purpose at hand, any number in a specified set.</p> <p><b>Topic G: Solving Equations</b></p> <p><b>6.EE.B.5.</b> Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.</p> <p><b>6.EE.B.6.</b> Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.</p> <p><b>6.EE.B.7.</b> Solve real-world and mathematical problems by writing and solving equations of the form <math>x + p = q</math> and <math>px = q</math> for cases in which <math>p</math>, <math>q</math> and <math>x</math> are all nonnegative rational numbers.</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>Solving an equation is a process of answering the question: determine which values from a specified set, if any, make the equation or true.</li> <li>An equation is defined by two expressions that are equivalent to one another.</li> <li>Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Substitute a number into an equation to determine whether it makes an equation true.</li> <li>Solve real world problems by writing and solving equations of the form <math>x + p = q</math> (<math>p</math>, <math>q</math>, and <math>x</math> are non-negative and rational).</li> <li>Solve real world problems by writing and solving equations of the form <math>px = q</math> (<math>p</math>, <math>q</math>, and <math>x</math> are non-negative and rational).</li> <li>Represent two quantities that related to one another, with variables.</li> <li>Write an equation in two variables.</li> <li>Distinguish the dependent variable from the independent variable.</li> <li>Analyze a given graph and table of values, and relate them to the equation.</li> </ul> <p><b>Learning Goal 8:</b> Use substitution to determine whether a given number makes an equation or true.</p> <p><b>Learning Goal 9:</b> Solve real world problems by</p>	<ul style="list-style-type: none"> <li>A town's total allocation for firefighter's wages and benefits in a new budget is \$600,000. If wages are calculated at \$40,000 per firefighter and benefits at \$20,000 per firefighter, write an equation whose solution is the number of firefighters the town can employ if they spend their whole budget. Solve the equation.</li> <li>The White House is 246 feet tall. A capital fact sheet states that it is 2,552 inches tall. Determine if these two measurements are equal. Explain.</li> <li>Determine whether the given value of the variable is a solution. <ul style="list-style-type: none"> <li><math>94 \div s = 26</math> for <math>s = 3</math></li> <li><math>v + 79 = 167</math> for <math>v = 88</math></li> </ul> </li> <li>Scott has 3 times as many cards in his hand then Jim. Scott has 54 cards. How many does Jim have? Write and solve an algebraic equation. Let <math>j = \#</math> of Jim's cards.</li> <li>Jamie rented a canoe while she was on a camping trip with her family. She paid a flat rental fee of \$85 plus \$9 per day of her trip. In total, she paid \$130 for the canoe. Write AND solve a two-step equation using <math>d</math> for days to see how long she rented the canoe for.</li> <li>Chris is ordering art supplies. Each canvas costs \$16 and the shipping and handling charges are \$6 for the whole order. The total cost <math>y</math> depends on the number of canvasses <math>x</math>. This function is described by the equation <math>y = 16x + 6</math>. To find the solution of the equation with 2 variables, first choose a replacement value for one variable and then find the value of the other variable. <ul style="list-style-type: none"> <li>Use the given <math>x</math>/ values to write solutions of the equation <math>y = 16x + 6</math> as ordered pairs. <math>X = 1, 2, 3, 4</math>. Show the ordered pairs.</li> </ul> </li> <li>Karen buys 4 bouquets of flowers. How many flowers does she buy if each bouquet contains 10, 12,</li> </ul>
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<p><b>Topic H: Relationships of the Operations &amp; Expanding, Factoring, and Distributing Expressions</b></p> <p>6.EE.B.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.</p> <p>6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p>writing and solving equations of the form <math>x + p = q</math> and <math>px = q</math> (<math>p</math>, <math>q</math>, and <math>x</math> are non-negative rational numbers).</p> <p><b>Learning Goal 10:</b> Use knowledge of inverse operations to solve two-step equations and write two-step equations based off real-life situations.</p> <p><b>Learning Goal 11:</b> Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem.</p> <p><b>Learning Goal 12:</b> Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values.</p>	<p>14, or 16 flowers? Write an equation letting <math>n</math> equal the amount of flowers in each bouquet and <math>f</math> represent the total number of flowers.</p>
<p><b>Concept(s):</b></p> <ul style="list-style-type: none"> <li>Solving an inequality is a process of answering the question: determine which values from a specified set, if any, make the equation or inequality true.</li> <li>An inequality may represent a constraint (or a condition) in a real-world problem.</li> <li>Infinity (<math>x &gt; c</math> and <math>x &lt; c</math> have an infinite number of solutions).</li> <li>A variable can represent an unknown number or any number in a set of numbers.</li> <li>Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Write inequality statements to represent real-life situations</li> <li>Substitute a number into an inequality to</li> </ul>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>	<p><b>Concept(s):</b></p> <ul style="list-style-type: none"> <li>Solving an inequality is a process of answering the question: determine which values from a specified set, if any, make the equation or inequality true.</li> <li>An inequality may represent a constraint (or a condition) in a real-world problem.</li> <li>Infinity (<math>x &gt; c</math> and <math>x &lt; c</math> have an infinite number of solutions).</li> <li>A variable can represent an unknown number or any number in a set of numbers.</li> <li>Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Write inequality statements to represent real-life situations</li> <li>Substitute a number into an inequality to</li> </ul>	<ul style="list-style-type: none"> <li>A theme park has a log ride that can hold 12 people. They also have a weight limit of 1500 lbs per log for safety reasons. If the average adult weighs 150 lbs, the average child weighs 100 lbs and the log itself weighs 200, the ride can operate safely if the inequality             <math display="block">150A + 100C + 200 \leq 1500</math>             is satisfied (<math>A</math> is the number of adults and <math>C</math> is the number of children in the log ride together). There are several groups of children of differing numbers waiting to ride. Group one has 4 children, group two has 3 children, group three has 9 children, group four 6 children while group five has 5 children. If 4 adults are already seated in the log, which groups of children can safely ride with them?             <ul style="list-style-type: none"> <li>Fishing Adventures rents small fishing boats to tourists for day-long fishing trips. Each boat can hold at most eight people. Additionally, each boat can only carry 900 pounds of weight for safety reasons.                 <ul style="list-style-type: none"> <li>A) Let <math>p</math> represent the total number of people. Write an inequality to describe the number of people that a boat can hold. Draw a number line diagram that shows all possible solutions.</li> </ul> </li> </ul> </li> </ul>

6.EE.B.7. Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

6.EE.B.8. Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form  $x > c$  or  $x < c$  have infinitely many solutions; represent solutions of such inequalities on number line diagrams

6.EE.C.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation  $d = 65t$  to represent the relationship between distance and time.*

determine whether it makes the inequality true.

- Represent real-world constraint or condition by writing an inequality of the form  $x > c$  or  $x < c$ .
- Graph inequalities of the form  $x > c$  or  $x < c$  on number lines.

**Learning Goal 13:** Use substitution to determine whether a given number makes an equation or inequality true.

**Learning Goal 14:** Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real world or mathematical problem and represent them on a number line.

**Learning Goal 15:** Write, interpret, and graph simple inequalities as presented in real-life situations.

**Learning Goal 16:** Write, interpret, and graph simple inequalities as presented in real-life situations.

B) Let  $w$  represent the total weight of a group of people wishing to rent a boat. Write an inequality that describes all total weights allowed in a boat. Draw a number line diagram that shows all possible solutions.

- Water freezes at  $32^{\circ}\text{F}$  and boils at  $212^{\circ}\text{F}$ . Write 3 inequalities to show the ranges of temperatures for which water is a solid (frozen), liquid (neither frozen nor boiling), and gas (boiling).
- Translate and graph the following simple inequalities.
  - No more than 18 students got first honor roll.
  - Fewer than 85 members attended the meeting.
  - There were at least 41 parents in attendance.
  - The height of the tree is above 18 feet.

Circle which of the following values satisfy each inequality.

- $< 8$
- 120 -100 -110 -115

- Write a real-life situation to represent this simple inequality:



## Unit 4 Vocabulary

Distribute; Distributive Property; Commutative Property; Associative Property; Factor; Coefficient; Term; Equivalent; Equivalent Expressions; Exponent; Base; Power; Exponential Form; Variable; Expression; Equation; Substitute; Evaluate; Inverse Operations; Solution; Solution Set; Inequality; Simple Inequality; Compound; Inequality; Translate

### Suggested Activities/Modifications

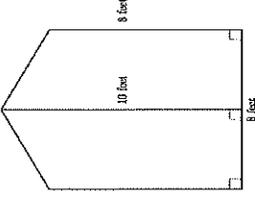
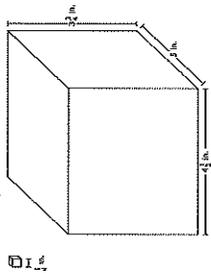
*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:*

1. Activities
  - a. Practice/review games
  - b. Scavenger Hunt
  - c. Modeling Expressions/Equations with Algebra Tiles
  - d. Three quizzes and one test
2. English Language Learners.
  - a. Read written instructions.
  - b. Students may be provided with note organizers / study guides to reinforce key topics.
  - c. Model and provide examples
  - d. Extended time on assessments when needed.
  - e. Establish a non-verbal cue to redirect student when not on task.
  - f. Students may use a bilingual dictionary.
3. Special Education/504 Students.
  - a. Students may be provided with note organizers / study guides to reinforce key topics.
  - b. Extended time on assessments when needed.
  - c. Preferred seating to be determined by student and teacher.
  - d. Provide modified assessments when necessary.
  - e. Student may complete assessments in alternate setting when requested.
  - f. Maintain strong teacher / parent communication.
4. Gifted and Talented Students.
  - a. Write algebraic expressions for everyday situations.
  - b. Solve two step equations.
  - c. Provide enrichment activities to expand upon the curriculum.
  - d. Use higher level questioning techniques in class and on assessments.

<p><b><u>New Jersey Student Learning Standards - Technology</u></b></p> <ul style="list-style-type: none"> <li>8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.</li> <li>8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results.</li> <li>8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.</li> </ul>	
<p><b><u>Career Readiness Practices</u></b></p> <ul style="list-style-type: none"> <li>CRP1. Act as a responsible and contributing citizen and employee.</li> <li>CRP2. Apply appropriate academic and technical skills.</li> <li>CRP4. Communicate clearly and effectively and with reason.</li> <li>CRP6. Demonstrate creativity and innovation.</li> <li>CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>CRP11. Use technology to enhance productivity.</li> </ul>	
<p><b><u>NJSLS 9.2 - Career Awareness, Exploration, and Preparation</u></b></p> <ul style="list-style-type: none"> <li>9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> </ul>	
<p><b><u>Interdisciplinary Connections:</u></b></p> <ul style="list-style-type: none"> <li>Develop Reading Comprehension Strategies when solving word problems.</li> <li>Write an equation on the board, such as <math>3n=18</math>. Have students write real world word problems that would use the equation to solve.</li> <li>Connect life events to equations by creating word problems that reflect real world situations.</li> </ul>	

**Unit 5**

Unit 5 Area, Surface Area, and Volume		
Content & Practice Standards	SMP	Critical Knowledge & Skills
<p><b><u>Topic A: Area of Triangles, Quadrilaterals, and Polygons</u></b></p> <p>6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason</p>	<p>Standard Mastery Examples</p> <p>Can be used on formative, summative, benchmark, and alternative assessments.</p> <ul style="list-style-type: none"> <li>Jamie is planning to cover a wall with red wallpaper. The dimensions of the wall are shown below:</li> </ul>

<p>composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.</p>	<p>abstractly and quantitatively.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.7 Look for and make use of structure.</p>	<p>polygons and determine area</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Compose rectangles in order to find the area of triangles, special quadrilaterals and polygons.</li> <li>• Decompose triangles, special quadrilaterals, and polygons into triangles and other shapes in order to find their area.</li> <li>• Compose rectangles and decompose into triangles in order to solve real-world problems.</li> </ul> <p><b>Learning Goal 1:</b> Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles</p>	 <p>1) How many square feet of wallpaper are required to cover the wall?</p> <p>2) Wallpaper comes in long rectangular strips which are 24 inches wide. If Jamie lays the strips of wallpaper vertically, can she cover the wall without wasting any wallpaper? Explain.</p> <p>3) If Jamie lays the strips of wallpaper horizontally, can she cover the wall without wasting any wallpaper? Explain</p>
<p><b>Topics B &amp; C: Volume of Right Rectangular Prisms &amp; Nets and Surface Area</b></p> <p>6.G.A.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas <math>V = lwh</math> and <math>V = Bh</math> to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</p> <p><b>6.G.A.4.</b> Represent three-dimensional figures using nets</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> <li>• No new concept(s) introduced</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Pack a right rectangular prism with fractional edge lengths with unit fraction cubes.</li> <li>• Show that the volume found by packing is the same as would be found by multiplying the edge lengths of the prism.</li> <li>• Apply volume formulas, <math>V = lwh</math> and <math>V = bh</math>, to right rectangular prisms with fractional edge lengths.</li> <li>• Represent three dimensional objects with nets made up of rectangles and triangles.</li> <li>• Find surface area of three-dimensional objects using nets.</li> <li>• Solve real world and mathematical problems</li> </ul>	<ul style="list-style-type: none"> <li>• To compute the perimeter of a rectangle you add the length, <math>l</math> and width, <math>w</math> and double this sum.             <ol style="list-style-type: none"> <li>1) Write an expression for the perimeter of a rectangle.</li> <li>2) Use the expression to find the perimeter of a rectangle with length 30 and width 75.</li> </ol> </li> </ul>  <p><small>Small cubes with edge lengths of <math>\frac{1}{2}</math> inch can be packed into the right rectangular prism shown.</small></p> <p><small>Net shown inside the box can be used to construct the right rectangular prism.</small></p>

made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

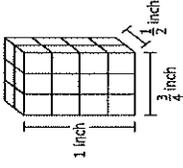
involving surface area using nets.

**Learning Goal 2:** Write and evaluate algebraic expressions involving exponents (include evaluating formulas).

**Learning Goal 3:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes and show that the volume is the same as it would be if found by multiplying the edge lengths; apply volume formulas to right rectangular prisms with fractional edge lengths.

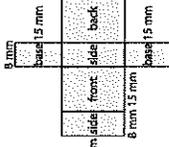
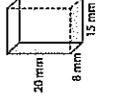
**Learning Goal 4:** Represent three dimensional figures objects with nets made of rectangles and triangles, and use the nets to find the surface area of the figures in order to solve real world and mathematical problems.

This right rectangular prism is built with small cubes.



**Part A**

What is the volume, in cubic inches, of the right rectangular prism?



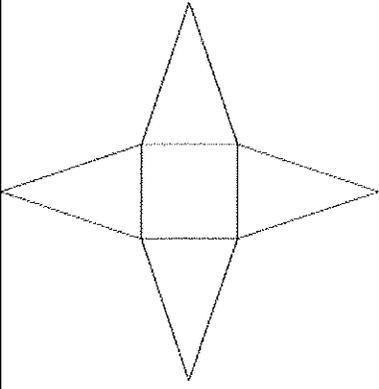
A The lateral area  $L$  of a prism is the area of all faces except the bases.

$$L = 2(\dots) + 2(\dots) = \dots$$

B The area  $B$  of each base is  $\dots$

C The surface area  $S$  of the prism is the sum of the lateral area  $L$  and the total area of the bases, or  $\dots$

- Below is the net for a three-dimensional shape.

			 <p>The inner quadrilateral is a square and the four triangles all have the same size and shape.</p> <ol style="list-style-type: none"><li>1) What three dimensional shape does this net make? Explain.</li><li>2) If the side length of the square is 2 units and the height of the triangles is 3 units, what is the surface area of this shape?</li></ol>
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Unit 5 Vocabulary

Polygon; Quadrilateral; Square; Rectangle; Parallelogram; Trapezoid; Triangle; Congruent; Parallel; Perpendicular; Right Angle; Base; Height; Surface Area; Volume; Cubic units; Squared units; Prism; Pyramid; 2-Dimensional Shape; 3-Dimensional Shape; Composite Figure

**Suggested Activities/Modifications**

Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,;

1. Activities
  - a. Practice/review games
  - b. One quiz and one test
2. English Language Learners.

- a. Read written instructions.
  - b. Students may be provided with note organizers / study guides to reinforce key topics.
  - c. Model and provide examples
  - d. Extended time on assessments when needed.
  - e. Establish a non-verbal cue to redirect student when not on task.
  - f. Students may use a bilingual dictionary.
3. Special Education/504 Students.
- a. Students may be provided with note organizers / study guides to reinforce key topics.
  - b. Extended time on assessments when needed.
  - c. Preferred seating to be determined by student and teacher.
  - d. Provide modified assessments when necessary.
  - e. Student may complete assessments in alternate setting when requested.
  - f. Maintain strong teacher / parent communication.
4. Gifted and Talented Students.
- a. Solid and net manipulatives
  - b. Deconstructing real-life objects – cereal boxes, tissue boxes, etc.

#### New Jersey Student Learning Standards - Technology

- 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
- 8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
- 8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results.
- 8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.

Use of Geometer's Sketchpad

#### Career Readiness Practices

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.

#### NJSLS 9.2 - Career Awareness, Exploration, and Preparation

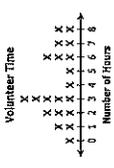
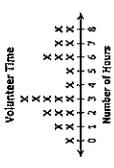
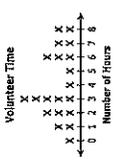
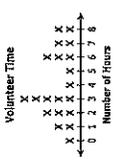
- 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

**Interdisciplinary Connections:** Recap earlier science unit on volume of rectangular prisms.

### Unit 6

Unit 6 Statistics		
Content & Practice Standards	SMP	Critical Knowledge & Skills
<p><u>Topic A: Understanding Distributions</u></p>	<p>MP.2 Reason abstractly and</p>	<p>Concept(s):</p>
		<p><b>Standard Mastery Examples</b></p> <p>Can be used on formative, summative, benchmark, and alternative assessments.</p> <ul style="list-style-type: none"> <li>Zeke likes to collect buttons and he keeps them in a jar. Zeke can empty the buttons out of the jar, so he can see all</li> </ul>

<p><b>6.SP.A.1.</b> Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.</p> <p><b>6.SP.A.2.</b> Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</p> <p><b>6.SP.B.4.</b> Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p> <p><b>6.SP.B.5.</b> Summarize numerical data sets in relation to their context, such as by:</p> <p><b>6.SP.B.5b.</b> Describing the nature of the attribute under investigation, including how it was measured and its units of measurement</p>	<p>quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision</p>	<ul style="list-style-type: none"> <li>• A statistical question is one that anticipates variability in the data that is related to the question</li> <li>• A data set has a distribution which can be described by its center, spread, and overall shape.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Display categorical and numerical data in a frequency table</li> <li>• Display numerical data in dot plots on a number line.</li> <li>• Display numerical data in histograms on a number line.</li> <li>• Display numerical data in box plots on a number line.</li> <li>• Distinguish questions that are statistical (anticipate variability in data) from those that are not.</li> </ul> <p><b>Learning Goal 1:</b> Distinguish questions that are statistical (anticipate variability in data) from those that are not.</p> <p><b>Learning Goal 2:</b> Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.</p>	<p>of his buttons at once.</p>  <p>Which of the following are statistical questions that someone could ask Zeke about his buttons? (A statistical question is one that anticipates an answer based on data that vary.) For each question, explain why it is or is not a statistical question.</p> <ol style="list-style-type: none"> <li>What is a typical number of holes for the buttons in the jar?</li> <li>How many buttons are in the jar?</li> <li>How large is the largest button in the jar?</li> <li>If Zeke grabbed a handful of buttons, what are the chances that all of the buttons in his hand are round?</li> <li>What is a typical size for the buttons in the jar?</li> <li>How are these buttons distributed according to color?</li> <li>Write another statistical question related to Zeke's button collection.</li> </ol> <ul style="list-style-type: none"> <li>• The number of siblings for a group of sixth grade students is shown below: 1,0,2,1,6,0,2,0,1,10.</li> <li>• Make a dot plot of the data.</li> <li>• Find the mean and median of the data.</li> <li>• What does the mean tell you about the data? What about the median?</li> <li>• Which measure of average (mean or median) do you think best describes the data? Why?</li> </ul>
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<p><b>Topics B and C: Summarizing a Distribution that is Approximately Symmetric Using the Mean and Mean Absolute Deviation and Summarizing a Distribution that is Skewed Using the Median and the Interquartile Range</b></p> <p><b>6.SP.A.2.</b> Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</p> <p><b>6.SP.A.3.</b> Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.</p> <p><b>6.SP.B.4.</b> Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p> <p><b>6.SP.B.5.</b> Summarize numerical data sets in relation to their</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>	<p><b>Concept(s):</b></p> <ul style="list-style-type: none"> <li>• A measure of center summarizes, with a single number, the values of an entire data set.</li> <li>• A measure of variation describes, with a single number, how the values of a data set vary.</li> <li>• Variability/Variation in numerical data or presentations of data</li> <li>• A data set has a distribution which can be described by its center, spread, and overall shape.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Compute mean, median, mode, and range of data sets and be able to explain how outliers can affect measures of central tendency</li> <li>• Determine the number of observations of a data set.</li> <li>• Describe the data in context, including how it was measured and the units of measurement.</li> <li>• Calculate measures of center, mean and median, as well as range</li> <li>• Calculate measures of spread, interquartile range and mean absolute deviation.</li> <li>• Create box and whisker plots given data sets and find interquartile range</li> </ul>	<p>Janet surveyed a class of students. She recorded the number of hours that each student volunteered. The line plot shows the results of the survey.</p> <p><b>Volunteer Time</b></p>  <p><b>Part A</b> How many students do Janet survey? Enter your answer in the box. <input type="text"/> students</p> <p><b>Part B</b> What is the mean number of hours volunteered by the students in the survey? Enter your answer in the box. <input type="text"/> hours</p>	<p>Janet surveyed a class of students. She recorded the number of hours that each student volunteered. The line plot shows the results of the survey.</p> <p><b>Volunteer Time</b></p>  <p><b>Part A</b> How many students do Janet survey? Enter your answer in the box. <input type="text"/> students</p> <p><b>Part B</b> What is the mean number of hours volunteered by the students in the survey? Enter your answer in the box. <input type="text"/> hours</p>
<p><b>Topics B and C: Summarizing a Distribution that is Approximately Symmetric Using the Mean and Mean Absolute Deviation and Summarizing a Distribution that is Skewed Using the Median and the Interquartile Range</b></p> <p><b>6.SP.A.2.</b> Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</p> <p><b>6.SP.A.3.</b> Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.</p> <p><b>6.SP.B.4.</b> Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p> <p><b>6.SP.B.5.</b> Summarize numerical data sets in relation to their</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>	<p><b>Concept(s):</b></p> <ul style="list-style-type: none"> <li>• A measure of center summarizes, with a single number, the values of an entire data set.</li> <li>• A measure of variation describes, with a single number, how the values of a data set vary.</li> <li>• Variability/Variation in numerical data or presentations of data</li> <li>• A data set has a distribution which can be described by its center, spread, and overall shape.</li> </ul> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>• Compute mean, median, mode, and range of data sets and be able to explain how outliers can affect measures of central tendency</li> <li>• Determine the number of observations of a data set.</li> <li>• Describe the data in context, including how it was measured and the units of measurement.</li> <li>• Calculate measures of center, mean and median, as well as range</li> <li>• Calculate measures of spread, interquartile range and mean absolute deviation.</li> <li>• Create box and whisker plots given data sets and find interquartile range</li> </ul>	<p>Janet surveyed a class of students. She recorded the number of hours that each student volunteered. The line plot shows the results of the survey.</p> <p><b>Volunteer Time</b></p>  <p><b>Part A</b> How many students do Janet survey? Enter your answer in the box. <input type="text"/> students</p> <p><b>Part B</b> What is the mean number of hours volunteered by the students in the survey? Enter your answer in the box. <input type="text"/> hours</p>	<p>Janet surveyed a class of students. She recorded the number of hours that each student volunteered. The line plot shows the results of the survey.</p> <p><b>Volunteer Time</b></p>  <p><b>Part A</b> How many students do Janet survey? Enter your answer in the box. <input type="text"/> students</p> <p><b>Part B</b> What is the mean number of hours volunteered by the students in the survey? Enter your answer in the box. <input type="text"/> hours</p>

<p>context, such as by:</p> <p><b>6.SP.B.5a.</b> Reporting the number of observations.</p> <p><b>6.SP.B.5b.</b> Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</p> <p><b>6.SP.B.5c.</b> Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.</p> <p><b>6.SP.B.5d.</b> Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>		<ul style="list-style-type: none"> <li>Describe the overall shape of a distribution (skewed left, skewed right, etc).</li> <li>Identify striking deviations (outliers).</li> <li>Choose measures of center and variability appropriate to the shape of the distribution and context.</li> </ul> <p><b>Learning Goal 3:</b> Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context.</p>	<p>Demis wants to find out people's opinions on a new game system. He surveys 10 people to rate the new system from 1 to 10. In his survey, 1 means the system is extremely uncool and 10 means the system is the coolest. The survey shows the following ratings: 9, 7, 7, 8, 7, 9, 9, 3, 10, and 8.</p> <p>a. What is the interquartile range of the ratings?  b. What is the mean absolute deviation of the ratings?  c. What do these measures of variation indicate about the ratings for the game system?</p> <p><b>Multiple Choice</b> A box-and-whisker plot shows that the third quartile is the same as the median. Which data set could represent the data in the box-and-whisker plot?</p> <p><input type="radio"/> A 0, 0, 0, 0, 0, 1, 1, 1, 1</p> <p><input type="radio"/> B 0, 10, 20, 30, 40, 50, 60, 70</p> <p><input type="radio"/> C 1, 1, 15, 15, 15, 15, 16, 16</p> <p><input type="radio"/> D 8, 8, 8, 26, 26, 26, 55</p> <p><b>Write About It</b> Describe how dramatically increasing one number in a data set affects the IQR and the mean absolute deviation. Explain which measure would be most affected by unusually large or small numbers in a data set.</p> <p>In 1988, 77 year old John Glenn became the oldest person to travel into space. Other astronauts traveling on that same mission were 43, 37, 38, 46, 35, and 42 years old. Find the mean, median, and mode with and without Glenn's age. Explain how his age affected the measures of central tendency.</p>
<p><b>Topic D: Summarizing and Describing Distributions</b></p> <p><b>6.SP.B.4.</b> Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> <li>Display and analyze data presented in a variety of ways</li> </ul>	<ul style="list-style-type: none"> <li><b>Short Response.</b> A manager of a retirement home tracks the ages of each of the residents. She creates a dot plot with a number line from 0 to 100. Describe the most likely shape of the distribution of the manager's data, and explain why it will have that shape.</li> </ul>

**6.SP.B.5.** Summarize numerical data sets in relation to their context, such as by:

**6.SP.B.5a.** Reporting the number of observations.

**6.SP.B.5b.** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

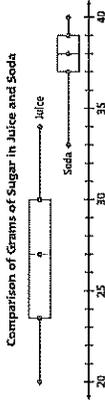
**6.SP.B.5c.** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

**6.SP.B.5d.** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

- Describe data distributions as either normal or skewed

**Learning Goal 4:** Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured.

What conclusions can you make about the amount of sugar in each drink?



**Think and Discuss**

- Explain how a box-and-whisker plot gives information that is hard to see by just looking at the numbers.
- Describe the benefits of displaying data using a dot plot as opposed to a box-and-whisker plot.

The data set and dot plot display the grades of Ms. Lee's students. Describe the shape of the data distribution.

82	95	84	87	85	92	85	76	87	84	83
86	80	86	85	75	83	90	86	84	88	85



The data set and box-and-whisker plot display the heights in inches of players on a basketball team. Describe the shape of the data distribution.

81	72	76	83	81	74
80	85	82	82	71	79



Data; Statistics; Frequency Table; Tally; Frequency; Interval; Scale; Histogram ; Line Plot; Variation; Box-and-whisker plot; Quartile; Interquartile Range; Measures of Central Tendency; Mean; Median; Mode; Outlier; Mean Absolute Deviation; Distribution

### **Suggested Activities/Modifications**

Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:

1. Activities
  - a. Practice/review games
  - b. Review Stations
  - c. Desmos
  - d. One quiz and one test
2. English Language Learners.
  - a. Read written instructions.
  - b. Students may be provided with note organizers / study guides to reinforce key topics.
  - c. Model and provide examples
  - d. Extended time on assessments when needed.
  - e. Establish a non-verbal cue to redirect student when not on task.
  - f. Students may use a bilingual dictionary.
3. Special Education/504 Students.
  - a. Students may be provided with note organizers / study guides to reinforce key topics.
  - b. Extended time on assessments when needed.
  - c. Preferred seating to be determined by student and teacher.
  - d. Provide modified assessments when necessary.
  - e. Student may complete assessments in alternate setting when requested.
  - f. Establish a non-verbal cue to redirect student when not on task.
  - g. Maintain strong teacher / parent communication.
4. Gifted and Talented Students.
  - a. Data-Statistics Project
  - b. Desmos Activity
  - c. Use of Excel

### **New Jersey Student Learning Standards - Technology**

- 8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
- 8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results.

8.2.8.A.4 Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.

**Career Readiness Practices**

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.

**NJSLS 9.2 - Career Awareness, Exploration, and Preparation**

- 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

**Interdisciplinary Connections:** My Blood is Your Blood Project: <https://www.americasblood.org/media/43199/6-8WEBDOC.pdf>

**III. Additional Differentiation/Modifications for Teaching**

Research-Based Effective Teaching Strategies	Additional Modifications for G&T	Additional Strategies for Special Education	Additional Strategies for English Language Learners
Questioning techniques to facilitate learning <ul style="list-style-type: none"> <li>• See also <b>Five Practices for Orchestrating Math Discussion</b></li> </ul>	See EngageNY Grade 6 for Classroom Differentiation for Gifted Students.	See EngageNY Grade 6 for Classroom Differentiation for information on Special Need Students.	<b>Extension:</b> See EngageNY Grade 6 for Scaffolding Instruction for English Language Learners.

<p>Math Discourse</p> <ul style="list-style-type: none"> <li>• Talk Moves</li> </ul> <p>Constructivist learning opportunities</p> <ul style="list-style-type: none"> <li>• Piaget, Vygotsky, Bruner</li> </ul> <p>Multiple Representations</p> <p>Promote linguistic and nonlinguistic representations</p> <p>Various types of feedback</p> <ul style="list-style-type: none"> <li>• Student to student feedback</li> <li>• Teacher to student feedback</li> </ul> <p>Varied opportunities for students to communicate mathematically (orally, writing)</p> <p>Use technological and /or physical tools (manipulatives)</p>		<p><b>ELD Standard</b>  <b>Standard 3 - Language of Mathematics</b>                  English language learners communicate information, ideas and concepts necessary for academic success in the content area of mathematics.</p>
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**IV. Instructional Resources and Materials**

<b>Formative Assessment</b>	<b>Summative Assessment</b>	<b>Supplemental Resources</b>	<b>Print Resource</b>
Short constructed responses	End-of-Module Assessment (EngageNY)	<u>Teacher Resources</u> Annenberg Learning Mathematics Assessment Projects	Eureka Math – Engage NY Grade 6
Extended constructed responses	Mid-Module Assessment (EngageNY)	<u>Student Resources</u> Khan Academy Prodigy	
Teacher Observation			

<p>Checks for understanding</p> <p>Do Now</p> <p>Exit Tickets</p> <p>Problem Sets (EngageNY)</p> <p>Sprints (EngageNY)</p> <p><b>Extension</b> – See additional performance tasks in the <b>Unit Standards Overview</b>.</p>	<p>Achieve the Core</p> <p>Mathplanet.com</p> <p>Interactive Mathematics.com</p> <p>Illustrative Mathematics</p> <p>Inside Mathematics.org</p> <p>EdConnect.org</p> <p>Prodigy</p> <p>Desmos</p> <p>iReady</p> <p>Khan Academy</p>	<p>iReady</p> <p>Math is Fun (website)</p> <p>Virtual Nerd</p> <p>Engage NY (website)</p> <p>Engage NY (Homework Helpers)</p> <p>A Math Dictionary for Kids</p>	<p>Mathematics</p>
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### 6<sup>th</sup> Grade Pacing Guide

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
<p><b><u>Ratios &amp; Proportions</u></b> <b>(20 days)</b></p> <p>6<sup>RP</sup>A.1 6<sup>RP</sup>A.2 6<sup>RP</sup>A.3A 6<sup>RP</sup>A.3B</p>	<p>Percent of a Number</p> <p>Measurement Conversions</p> <p><b><u>Fractions</u></b></p>	<p>Dividing Multi Digit Whole Numbers</p> <p>Dividing Decimals</p>	<p><b><u>Integers &amp; Absolute Value</u></b> <b>(15 days)</b></p> <p>6<sup>NS</sup>C.5 6<sup>NS</sup>C.6</p>	<p><b><u>The Coordinate Plane</u></b> <b>(10 days)</b></p> <p>6<sup>NS</sup>C.6B 6<sup>NS</sup>C.6C</p>	<p>Algebraic Properties</p> <p>Equivalent Expressions</p> <p><b><u>Variables &amp;</u></b></p>	<p>Solving Two Step Equations</p> <p>Using Equations to Solve Real Life Problems</p> <p><b><u>Inequalities</u></b></p>	<p>Two Dimensional <b><u>Figures (15 days)</u></b></p> <p>6.G.A.1</p>	<p>Surface Area using Formula</p> <p>Volume of Rectangular Prisms</p>	<p>Measures of Variation – Interquartile Range &amp; Mean Absolute Deviation</p> <p>Box and Whisker</p>

<p><b>6.RP.A.3, 6.RP.A.3c</b> Simplifying Fractions/Equivalent Fractions</p> <p>Ratios</p> <p>Equivalent Ratios &amp; Tables</p> <p>Unit Rates</p> <p>Proportions</p> <p>Percent to Fraction Conversions</p> <p>Percent Proportion</p>	<p><b>(15 days)</b> <b>6.NS.A.1</b> Mixed Numbers/Improper Fractions</p> <p>Multiplying Fractions &amp; Mixed Numbers</p> <p>Reciprocals</p> <p>Interpreting Division using Models</p> <p>Dividing Fractions &amp; Mixed Numbers</p> <p><b>Decimals (15 days)</b> <b>6.NS.A.1, 6.NS.B.3</b> Adding &amp; Subtracting Decimals</p> <p>Multiplying Decimals</p>	<p><b>6.NS.C.7</b> Representing Integers</p> <p>Opposites</p> <p>Absolute Value</p> <p>Comparing &amp; Ordering Integers</p> <p>Adding Integers</p> <p>Subtracting Integers</p> <p>Multiplying &amp; Dividing Integers</p>	<p><b>6.NS.C.8</b> Ordered Pairs</p> <p>Quadrants</p> <p>Plotting Points on the Coordinate Plane</p> <p>Perimeter on the Coordinate Plane</p> <p>Symmetry &amp; Reflections on the Coordinate Plane</p> <p><b>Algebraic Properties (10 days)</b> <b>6.EE.A.1, 6.EE.A.2a, 6.EE.A.2b, 6.EE.A.2c, 6.EE.A.3, 6.EE.A.4</b> Exponents Order of Operations</p>	<p><b>Expressions (10 days)</b> <b>6.EE.A.2a, 6.EE.A.2b, 6.EE.A.2c, 6.EE.A.3, 6.EE.B.6</b></p> <p>Substitution</p> <p>Evaluating Expressions</p> <p>Translating Words into Math</p> <p>Translating Tables into Math</p> <p><b>Equations (10 days)</b> <b>6.EE.B.5, 6.EE.B.6, 6.EE.B.7</b></p> <p>Checking Solutions</p> <p>Solving One Step Equations</p>	<p><b>(15 days)</b> <b>6.EE.B.5, 6.EE.B.6, 6.EE.B.7, 6.EE.B.8, 6.EE.B.9</b></p> <p>Translating Inequalities</p> <p>Simple Inequalities</p> <p>Compound Inequalities</p> <p>Checking Solutions of Inequalities</p> <p>Solving Inequalities</p>	<p>Area of Squares &amp; Rectangles</p> <p>Area of Triangles</p> <p>Area of Parallelograms</p> <p>Area of Trapezoids</p> <p>Area of Composite Figures</p> <p><b>Three Dimensional Figures (10 days)</b> <b>6.G.A.2, 6.G.A.4</b></p> <p>Surface Area using Nets</p>	<p><b>Statistics (20 days)</b> <b>6.SP.A.1, 6.SP.A.2, 6.SP.A.3, 6.SP.B.4, 6.SP.B.5, 6.SP.B.5b</b></p> <p>Posing Statistical Questions</p> <p>Frequency Tables Histograms</p> <p>Line Plots/Dot Plots</p> <p>Measures of Central Tendency and Range</p>	<p>Plots</p> <p>Describing Distribution</p>
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**Major Clusters** Supporting Clusters Additional Cluster