The Mathematics Curriculum for middle school students in the Lakewood City Schools is based on the Common Core State Standards as adopted by the Ohio State Board of Education.

In Grade 7, instructional time should focus on four critical areas:

1. Developing understanding of and applying proportional relationships.
    a. Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase and decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.
2. Developing understanding of operations with rational numbers and working with expressions and linear equations.
    a. Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.
3. Solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume.
    a. Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawing and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.
4. Drawing inferences about populations based on samples.

a. Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

The Standards for Mathematical Practice describes varieties of expertise that mathematics educators at all levels should seek to develop in their students. These Standards appear at EVERY grade level. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up:* adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibility, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

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

1. **Make sense of problems and persevere in solving them.**
   Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures

to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

In grade 7, students solve problems involving ratios and rates and discuss how they solved them. Students solve real world problems through the application of algebraic and geometric concepts. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?"

2. **Reason abstractly and quantitatively.**
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantities relationships: the ability to *decontextualize* – to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents – and the ability to *contextualize,* to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

In grade 7, students represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. Students contextualize to understand the meaning of the number or variable as related to the problem and decontextualize to manipulate symbolic representations by applying properties of operations.

3. **Construct viable arguments and critique the reasoning of others.**
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and – if there is a flaw in argument – explain what it is. Elementary students can construct arguments using concrete referents such

as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

In grade 7, students construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays (i.e. box plots, dot plots, histograms, etc.). They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. They pose questions like "How did you get that?", "Why is that true?", "Does that always work?" They explain their thinking to others and respond to others' thinking.

4. **Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

In grade 7, students model problem situations symbolically, graphically, tabularly, and contextually. Students form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Students begin to explore covariance and represent two quantities simultaneously, Students use number lines to compare numbers and represent inequalities. They use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences about and make comparisons between data sets. Students need many opportunities to connect and explain the connections between the different representations. They should be able to use all of these representations as appropriate to a problem context.

5. **Use appropriate tools strategically.**

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebraic system, a statistical package, or dynamic geometric software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

Students consider available tools (including estimation and technology) when solving a mathematical problem and decided when certain tools might be helpful. For instance, students in grade 7 may decide to represent similar data sets using dot plots with the same scale to visually compare the center and variability of the data. Additionally, students might use physical objects or applets to construct nets and calculate the surface area of three-dimensional figures.

6. **Attend to precision.**

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem, they calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

In grade 7, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others in their own reasoning. Students define variables, specify units of measure, and label axes accurately. Students use appropriate terminology when referring to rates, ratios, probability models, geometric figures, data displays, and components of expressions, equations or inequalities.

7. **Look for and make use of structure.**

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7\times5+7\times3$, in preparation for learning about the distributive property. In the expression $x^2+9x+14$, older students can see the 14 as 2×7 and the 9 as $2+7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift prospective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5-3(x-y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

Students routinely seek patterns or structures to model and solve problems. For instance, students recognize patterns that exist in ratio tables recognizing both the additive and multiplicative properties. Students apply properties to generate equivalent expressions (i.e. $6+2x=2(3+x)$ *by distributive property) and solve equations (i.e.* $2c+3=15, 2c=12$ *by subtraction property of equality;* $c=6$ *by division property of equality). Students compose and decompose two- and three-dimensional figures to solve real world problems involving scale drawings, surface area, and volume. Students examine tree diagrams or systematic lists to determine the sample space for compound events and verify that they have listed all possibilities.*

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through $(1, 2)$ with slope 3, middle school students might abstract the equation $(y-2)/(x-1)=3$. Noticing the regularity in the way terms cancel when expanding $(x-1)(x+1)$, $(x-1)(x^2+x+1)$, and $(x-1)(x^3+x^2+x+1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

In grade 7, students use repeated reasoning to understand algorithms and make generalizations about patterns. During multiple opportunities to solve and model problems, they may notice that $a/b\div c/d=ad/bc$ *and construct other examples and models that confirm their generalization. They extend their thinking to include complex fractions and rational numbers. Students formally begin to make connections between covariance, rates, and*

representations showing the relationships between quantities. They create, explain, evaluate, and modify probability models to describe simple and compound events.

Ratios and Proportional Relationships

- Analyze proportional relationships and use them to solve real-world and mathematical problems.

The Number System

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Expressions and Equations

- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Geometry

- Draw, construct and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Statistics and Probability

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

UNIT PACING

UNIT	TITLE	STANDARDS COVERED	DAYS
Unit 0	Introduction		5
Unit 1	Rational Numbers	7.NS.1 7.NS.2 7.NS.3	20
Unit 2	Rates & Relationships	7.RP.1 7.RP.2 7.RP.3	20
Modeling Unit			3
Unit 3	Zooming in on Shapes	7.G.1 7.G.2 7.G.3 7.G.4	20
Unit 4	Reasoning with Quantities	7.EE.1 7.EE.2 7.EE.2 7.EE.4	20
Project			5
Unit 5	Areas & Angles	7.G.2 7.G.5 7.G.6 7.EE.3	20
Unit 6	Samples & Probabilities	7.SP.1 7.SP.2 7.SP.3 7.SP.4 7.SP.5 7.SP.6 7.SP.8	20
Project			5
Unit 7	Problem Solving	7.G.6	13

		7.RP.3 7.EE.3 7.EE.4 7.NS.3 7.SP	
Modeling Unit			3

Unit 0: Introduction Days: 5

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

Unit Resources	Topics Covered	Approximate Days
Competition Fivetriangles		1
Mad Libs and Variables Timon		1
Words into Math Elizabeth		

UNIT 1: Rational Numbers Days 20

7.NS.1, 7.NS.2, 7.NS.3

Enduring Understandings for Unit:

- Rational numbers can be represented in multiple ways and are useful when examining situations involving numbers that are not whole.

Essential Questions for Unit:

- In what ways can rational numbers be useful?

Clusters:

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.* b. Understand $p+q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or	I can describe real-world situations where opposite quantities have a sum of zero. I can use a number line or positive/negative chips to show that an integer and its opposite will always have a sum of zero. I can use a number line to show addition as a specific distance from a particular number in one direction or the other, depending on the sign of the value being added.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. **4. <u>Model with mathematics.</u>** 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Positive Negative Opposite Additive inverse Absolute value Integer Rational number

negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. c. Understand subtraction of rational numbers as adding the additive inverse, $p-q=p+(-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.	I can interpret the addition of integers by relating the values to real-world situations. I can rewrite a subtraction problem as an addition problem by using the additive inverse. I can show that the distance between two integers on a number line is the absolute value of their difference. I can describe real-world situations represented by the subtraction of integers. I can use the properties of operations to add and subtract rational numbers.		
7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as	I can use patterns and properties to explore the multiplication of integers. I can use patterns and properties to develop procedures for multiplying integers. I can describe real-world situations represented by the multiplication of integers.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision.	Integer Rational number Terminating decimal Repeating decimal

$(-1)(-1)=1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. b. Understand that integers can be divided, providing that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q)=(-p)/q=p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. c. Apply properties of operations as strategies to multiply and divide rational numbers. d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	I can use the relationship between multiplication and division to develop procedures for dividing integers. I can explain why the property of closure exists for the division of rational numbers, but not for whole numbers. I can describe real-world situations represented by the division of integers. I can interpret the quotient in relation to the original problem. I can generalize the procedures for multiplying and dividing integers to all rational numbers. I can use long division to convert a rational number to a decimal. I can verify that a number is rational based on its decimal equivalent.	7. Look for and make use of structure. **8. <u>Look for and express regularity in repeated reasoning.</u>**	
7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.*	I can solve real-world problems that involve the addition, subtraction, multiplication, and/or division of rational numbers.	**1. <u>Make sense of problems and persevere in solving them.</u>** 2. Reason abstractly and quantitatively.	Rational number Complex fraction

**Computations with rational numbers extend the rules for manipulating fractions to complex fractions.*		3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	
Unit Resources		Standards Covered	Approximate Days
Life on the Number Line Elizabeth		7.NS.1	1
Using Positive and Negative Numbers in Context MARS		7.NS.1 7.NS.2 7.NS.3	3
Division MARS		7.NS.1 7.NS.2	1
Is This a Leap Year Yummymath		7.NS	1
A Billion Nickels John		7.NS.1 7.NS.2 7.NS.3	1
A Day Out MARS		7.NS.1 7.NS.2 7.NS.3	2
Taxi Cabs MARS		7.NS.1 7.NS.2 7.NS.3	2
Visual Patterns 3-6 Patterns		7.EE	2

Fawn	7.NS	

UNIT 2: Rates and Relationships Days 20

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

Enduring Understandings for Unit:

- Ratios and proportional relationships are used to express how quantities are related and how quantities change in relation to each other.

Essential Questions for Unit:

- How can ratios and proportional relationships be used to determine unknown quantities?

Clusters:

- Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction* $\frac{1/2}{1/4}$ *miles per hour, equivalently 2 miles per hour.*	I can compute a unit rate by iterating (repeating) or partitioning given rate. I can compute a unit rate by multiplying or dividing both quantities by the same factor. I can explain the relationship between using composed units and a multiplicative comparison to express a unit rate.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Ratio Rate Unit rate

7.RP.2 Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as* $t = pn$. d. *Explain what a point* (x, y) *on the graph of a proportional relationship means in terms of the situation, with special*	I can determine whether two quantities are proportional by examining the relationship given in a table, graph, equation, diagram, or as a verbal description. I can identify the constraint of proportionality when presented with a proportional relationship in the form of a table, graph, equation, diagram, or verbal description. I can write an equation that represents a proportional relationship. I can use words to explain the relevance of a specific point on the graph of a proportional relationship, including, but not limited to $(0, 0)$ and $(1, r)$.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. **4. <u>Model with mathematics.</u>** 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Proportional relationship Constant of proportionality Unit rate Equivalent ratios Origin

attention to the points $(0, 0)$ *and* $(1, r)$ *where* r *is the unit rate.*			
7.RP.3 Use proportional relationships to solve multi-step ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*	I can use proportional reasoning to solve real-world ratio problems, including those with multiple steps. I can use proportional reasoning to solve real-world percent problems, including those with multiple steps.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Proportional relationship Ratio Percent
Unit Resources		Standards Covered	Approximate Days
Drawing Rectangles Fawn		7.Rp>1	2
Marshmallow Minute John		7.RP.1	1
Buses MARS		7.RP.1 7.RP.2 7.RP.3	2
Developing a Sense of Scale MARS		7.RP.1 7.RP.2 7.RP.3	3
Dueling Discounts Dan		7.RP.3	1

Increasing and Decreasing Quantities by a Percent MARS	7.RP.1 7.RP.2 7.RP.3	3
Ice Cream Sale MARS	7.RP.1 7.RP.2 7.RP.3	2
Proportion and Non-proportion Situations MARS	7.RP.1 7.RP.2 7.RP.3	3
Is gas cheaper with a credit card? Robert	7.RP.3	2

MODELING UNIT

Days: 3

Resources		Standards Covered	Approximate Days
Iditarod Yummymath		6.RP 7.RP 7.NS	3

UNIT 3: Zooming in on Shapes Days 20

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

Enduring Understandings for Unit:

- Geometric attributes (such as shapes, lines, angles, figures, and planes) provide descriptive information about an object's properties and position in space and support visualization and problem solving.

Essential Questions for Unit:

- How does geometry better describe objects?

Clusters:

- Draw construct, and describe geometrical figures and describe the relationship between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	I can use a scale drawing to determine the actual dimensions and area of a geometric figure. I can use a different scale to produce a similar scale drawing.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Scale drawing

		8. Look for and express regularity in repeated reasoning.	
7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	I can draw a geometric shape with specific conditions. I can construct a triangle when given three measurements: 3 side lengths, 3 angle measurements, or a combination of side and angle measurements. I can determine when three specific measurements will result in one unique triangle, more than one possible triangle, or no possible triangles.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. **5. <u>Use appropriate tools strategically.</u>** 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	N/A
7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	I can name the two-dimensional figure that represents a particular slice of a three-dimensional figure.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. **4. <u>Model with mathematics.</u>** 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Right rectangular prism Right rectangular pyramid

		8. Look for and express regularity in repeated reasoning.	
7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	I can state the formula for the area of a circle. I can state the formula for finding the circumference of a circle. I can use formulas to compute the area and circumference of a circle. I can determine the diameter or radius of a circle when the circumference is given. I can use a ratio and algebraic reasoning to compare the area and circumference of a circle.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. Construct viable arguments and critique the reasoning of others.** 4. Model with mathematics. 5. Use appropriate tools strategically. **6. Attend to precision.** 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Radius Diameter Circumference Area Pi
Unit Resources		Standards Covered	Approximate Days
Floor Plan Illustrative Mathematics		7.G.1	1
Roman Mosaic MARS		7.G.2	1
Glowing Rectangles Yummymath		6.RP.1 6.RP.2 6.RP.3 7.RP.1 7.RP.2 7.G.1	2
Coin Carpet Dan		7.G.4 7.RP.3	3

Measuring the Area of a Circle Illustrative Mathematics	7.G.4 7.RP.3	2
Eight Circles Illustrative Mathematics	7.G.4	1
Brita Dan	7.G.4	2
Photographs MARS	7.G.1	2
Historical Bicycle MARS	7.G.4	1
Pizza Doubler Dan	7.G.4	3

UNIT 4: Reasoning with Quantities Days 20

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

Enduring Understandings for Unit:

- Algebraic expressions and equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be mindfully manipulated to reach a solution of make sense of the quantitative relationships.

Essential Questions for Unit:

- How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?

Clusters:

- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	I can use the commutative and associative properties to add linear expressions with rational coefficients. (e.g., $-4x + (3 + x) = -4x + (x + 3) = (-4x + x) + 3 = -3x + 3$). I can use the distributive property to add and/or subtract linear expressions with rational coefficients (e.g., $-\frac{1}{5}x + \frac{3}{5}x = \left(-\frac{1}{5} + \frac{3}{5}\right)x = \frac{2}{5}x$).	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. **7. <u>Look for and make use of structure.</u>**	Linear expression Coefficient Like terms

	I can use the distributive property to factor a linear expression with rational coefficients (e.g., $6x + 9 = 3(2x + 3)$). I can use the distributive property to expand a linear expression with rational coefficients (e.g., $\frac{2}{3}(9x + 6) = \left(\frac{2}{3} \times 9x\right) + \left(\frac{2}{3} \times 6\right) = 6x + 4$).	8. Look for and express regularity in repeated reasoning.	
7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."*	I can use equivalent expressions to understand the relationships between quantities.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	N/A
7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate	I can solve real-world problems using rational numbers in any form, including those problems involving multiple steps.	**1. <u>Make sense of problems and persevere in solving them.</u>** 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others.	Rational number

with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.25, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	I can apply the properties of operations to fluently compute with rational numbers in any form. I can use mental math and estimation strategies to determine if my solution is reasonable.	4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	
7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple questions and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution,	I can use a variable to represent an unknown quantity. I can write a simple algebraic equation (in the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are given rational numbers) to represent a real-world problem. I can solve a simple algebraic equation by using the properties of equality or mathematical reasoning, and show or explain my steps.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	N/A

identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* b. Solve word problems leading to inequalities form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*	I can compare an arithmetic solution to an algebraic solution. I can write a simple algebraic inequality (in the form $px + q > r$ or $px + q < r$, where p, q, and r are given rational numbers) to represent a real-world problem. I can solve a simple algebraic inequality and graph the solution on a number line. I can describe the solution to an inequality in relation to the problem.	8. Look for and express regularity in repeated reasoning.	
Unit Resources		Standards Covered	Approximate Days
Equivalent Expressions Illustrative Mathematics		7.EE.1 7.EE.2	1
Miles to Kilometers Illustrative Mathematics		7.EE.3 7.EE.4	1
Guess my number Illustrative Mathematics		7.EE.3 7.EE.4	1
Steps to Solving Equations MARS		7.EE.1 7.EE.2 7.EE.3 7.EE.4	3

Fencing MARS	7.EE.3 7.EE.4	2
Video Game Download Yummymath	7.RP 7.EE 8.EE.5	2

PROJECT Days 5

Resources	Standards Covered	Approximate Days
Shopping Season Yummymath	6.RP.3 7.EE.2 7.EE.3	1
TV Space Timon		2
Viewing Recommendations Geoff		1

UNIT 5: Angles and Areas Days 20

7.G.2, 7.G.5, 7.G.6, 7.EE.3

Enduring Understandings for Unit:

- Geometric attributes (such as shapes, lines, angles, figures, and planes) provide descriptive information about an object's properties and position in space and support visualization and problem solving.
- Algebraic expressions and equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be mindfully manipulated to reach a solution or make sense of the quantitative relationships.

Essential Questions for Unit:

- How does geometry better describe objects?
- How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?

Clusters:

- Draw, construct, and describe figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	I can draw a geometric shape with specific conditions. I can construct a triangle when given three measurements: 3 side lengths, 3 angle measurements, or a combination of side and angle measurements.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. **5. <u>Use appropriate tools strategically.</u>**	N/A

	I can determine when three specific measurements will result in one unique triangle, more than one possible triangle, or no possible triangles.	6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	
7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	I can state the relationship between supplementary, complementary, and vertical angles. I can use angle relationships to write algebraic equations for unknown angles. I can use algebraic reasoning and angle relationships to solve multi-step problems.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. **7. <u>Look for and make use of structure.</u>** 8. Look for and express regularity in repeated reasoning.	Supplementary angles Complementary angles Vertical angles Adjacent angles
7.G.6 Solve real-world and mathematical problems involving area, volume, area, surface area, and volume.	I can determine the area of two-dimensional figures. I can determine the surface area and volume of three-dimensional figures. I can solve real-world problems involving area, surface area and volume.	1. Make sense of problems and persevere in solving them. **2. <u>Reason abstractly and quantitatively.</u>** 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically.	Length Width Base Height Altitude

		6. Attend to precision. 7. Look for and make use of structure. Look for and express regularity in repeated reasoning.	Area Surface area Volume
7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.25, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	I can solve real-world problems using rational numbers in any form, including those problems involving multiple steps. I can apply the properties of operations to fluently compute with rational numbers in any form. I can use mental math and estimation strategies to determine if my solution is reasonable.	1. **Make sense of problems and persevere in solving them.** 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Rational number
Unit Resources		Standards Covered	Approximate Days
Popcorn Picker Dan		7.G.4 7.G.6	1

Maximizing Area: Gold Rush MARS	7.G.1 7.G.2 7.G.6 7.G.7	3
Ticket to Ride Dan	7.G.6 7.RP.4	2
Holes Dan	7.G.3 7.G.4 7.G.6 7.RP.1	2
Drawing to Scale: Designing a Garden MARS	7.G.1 7.G.2 7.G.6	3
Sand Under the Swing Set Illustrative Mathematics	7.RP.3 7.G.6	2
Using Dimensions: Designing a Sports Bag MARS	7.G.6 7.EE.3	3
Octagon Tile MARS	7.G.6 7.EE.3	1
Applying Angle Theorems MARS	7.G.5	3

UNIT 6: Samples and Probabilities Days 20

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

Enduring Understandings for Unit:

- The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring.

Essential Questions for Unit:

- How is probability used to make informed decisions about uncertain events?

Clusters:

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Standard	Clear Learning Targets	Mathematical Practices	Vocabulary
7. SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	I can explain that inferences about a population can be made by examining a sample. I can explain why the validity of a sample depends on whether the sample is representative of the population. I can explain that random sampling tends to produce representative samples.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Sample Population Random sample Representative sample

		8. Look for and express regularity in repeated reasoning.	
7.SP.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*	I can draw inferences about a population based on data generated by a random sample. I can generate multiple samples from the same population and analyze the estimates or predictions based on the variation of each sample.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Population Sample Random sample
7.SP.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot*	I can find the difference in the mean or median of two different data sets. I can demonstrate how two data sets that are very different can have similar variabilities. I can draw inferences about the data sets by making a comparison of these differences relative to the mean absolute deviation or interquartile range of either set of data.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Centers (also, measures of center) Variabilities (also, measures of variability) Mean Median Mean absolute deviation Interquartile range

plot, the separation between the two distributions of heights is noticeable.		8. Look for and express regularity in repeated reasoning.	
7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*	I can compare two populations by using the means and/or medians of data collected form random samples. I can compare two populations by using the mean absolute deviations and/or interquartile ranges of data from random samples.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Measures of variability Measures of center Mean Median Mean absolute deviation Interquartile range Population' Random sample
7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	I can define probability as a ratio that compares favorable outcomes to all possible outcomes. I can recognize and explain that probabilities are expressed as a number between 0 to 1. I can interpret a probability near 0 as unlikely to occur and a probability near 1 as likely to occur.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure.	Likely Unlikely

	I can interpret a probability near ½, as being as equally to occur as to not occur.	8. Look for and express regularity in repeated reasoning.	
7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*	I can collect data on a chance process to approximate its probability. I can use probability to predict the number of times a particular event will occur given a specific number of trials. I can use variability to explain why the experimental probability will not always exactly equal the theoretical probability.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. **4. <u>Model with mathematics.</u>** 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	Theoretical probability Experimental probability Relative frequency
7.SP.7 Develop a probability model and use it to find the probabilities of events. Compare probabilities from a model to observe frequencies; if the agreement is not good, explain possible sources of discrepancy. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is*	I can develop a simulation to model a situation in which all events are equally likely to occur. I can utilize the simulation to determine the probability of specific events. I can determine the probability of events that may not be equally likely to occur, by utilizing a simulation model.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. **3. <u>Construct viable arguments and critique the reasoning of others.</u>** **4. <u>Model with mathematics.</u>** 5. Use appropriate tools strategically. 6. Attend to precision.	Probability model Uniform probability model Frequency Relative frequency Theoretical probability Experimental probability

selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*		7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	
7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized	I can create a sample space of all possible outcomes for a compound event by using an organized list, a table, or a tree diagram. I can use the sample space to compare the number of favorable outcomes to the total number of outcomes and determine the probability of the compound event.	1. **Make sense of problems and persevere in solving them.** 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision.	Compound events Sample space Tree diagram Outcomes Favorable outcomes Simulation

lists, tables, and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	I can design and utilize a simulation to predict the probability of a compound event.	7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	
Unit Resources		Standards Covered	Approximate Days
Counting Trees MARS		7.SP.1 7.SP.2 7.RP.1 7.RP.2	2
Bermuda Triangle Jason		7.SP.1 7.SP.2 7.SP.3	3
Candy Bars MARS		7.SP.1 7.SP.2	2
Evaluating Statements about Probability MARS		7.SP.5 7.SP.6 7.SP.7	3

	7.SP.8	
Spinner Bingo MARS	7.SP.5 7.SP.6	2
Lottery MARS	7.SP.5 7.SP.6	2
Temperatures MARS	7.SP.3 7.SP.4	2
Memory Game MARS	7.SP.5 7.SP.6	1
Card Game MARS	7.SP.5 7.SP.6	1

PROJECT Days 5

Resources	Standards Covered	Approximate Days
Area Contractor NCTM Illuminations	7.G.1 7.G.6	3

UNIT 7: Problem Solving Days 20

7.G.6, 7.RP.3, 7.EE.3, 7.EE.4, 7.NS.3, 7. SP

Enduring Understandings for Unit:

- Geometric attributes (such as shapes, lines, angles, figures, and planes) provide descriptive information about an object's properties and position in space and support visualization and problem solving.
- Ratios and proportional relationships are used to express how quantities are related and how quantities change in relation to each other.
- Algebraic expressions and equations are used to model real-life problems and represent quantitative relationships, so that the numbers and symbols can be mindfully manipulated to reach a solution or make sense of the quantitative relationships.
- Rational numbers can be represented in multiple ways are and useful when examining situations involving numbers that are not whole.
- The rules of probability can lead to more valid and reliable predictions about the likelihood of an event occurring.

Essential Questions for Unit:

- How does geometry better describe objects?
- How can ratios and proportional relationships be used to determine unknown quantities?
- How can algebraic expressions and equations be used to model, analyze, and solve mathematical situations?
- In what ways can rational numbers be useful?
- How is probability used to make informed decisions about uncertain events?

Clusters:

- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Analyze proportional relationships and use them to solve real-world and mathematical problems.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Unit Resources	Standards Covered	Approximate Days	Unit vocabulary
Patterns and Functions NCTM Illuminations		2	Length Width Base height Altitude Area Surface area Volume Proportional relationship Ratio Percent Rational number Rational number Complex fraction Sample Population Random sample
Intro to Quadratics Elizabeth		2	
Coffee Traveler Dan	G.GMD.4 7.G.3 7.G.6	2	
Estimating: Counting Trees MARS	7.RP.3 7.SP 7.G	3	
Foil Prank Robert	7.G.6 6.RP.2 6.RP.3 6.G.4	2	
Estimation and Approximations: The Money Munchers MARS	7.G	3	
Linear Inequalities Day 1 and Day 2 Julie	7.EE 7.NS A.REI.3	2	
Visual Patterns (3-6 Patterns) Fawn	7.EE 7.NS	1	
Harry Potter Statistics Yummymath	7.SP.2 7.EE.3	1	

			Representative sample Centers (also, measures of center) Variabilities (also, measures of variability) Mean Median Mean absolute deviation Interquartile range Likely Unlikely Theoretical probability Experimental probability Relative frequency Probability model Uniform probability model Frequency

			Compound events Sample space Tree diagrams Outcomes Favorable outcomes Simulation

MODELING UNIT Days 3

Resources	Standards Covered	Approximate Days
Oreo Cookie Math Julie et al.		3

Resources used to create 7th Grade Math Course of Study

"The Common Core: Clarifying Expectations for Teachers & Students." *MATH Grade 7*. Worthington: 2011. <http://www.qualityinstruction.org>.

Common Core State Standards: Mathematics

Emergent Math

Standards for Mathematical Practices Progression through Grade Levels