In Grade 7 Accelerated Pathway, instructional time should focus on five Critical Areas:
    (1) **developing understanding of and applying proportional relationships;**
    (2) **developing understanding of operations with rational numbers and working with expressions and linear equations;**
    (3) **solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume;**
    (4) **drawing inferences about populations based on samples; and**
    (5) **analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.**

(1) Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

(2) Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

(3) 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 drawings 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) 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.

(5) Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

Information from the *PARCC Model Content Framework for Mathematics*
Grade 7

The following are examples of *Key Advances* from Grade 6 to Grade 7
- In grade 6, students learned about negative numbers and the kinds of quantities they can be used to represent; they also learned about absolute value and ordering of rational numbers, including in real-world contexts. In grade 7, students will add, subtract, multiply and divide within the system of rational numbers.
- Students grow in their ability to analyze proportional relationships. They decide whether two quantities are in a proportional relationship (7.RP.2a); they work with percents, including simple interest, percent increase and decrease, tax, markups and markdowns, gratuities and commission, and percent error (7.RP.3); they analyze proportional relationships and solve problems involving unit rates associated with ratios of fractions (e.g., if a person walks 1/2 mile in each 1/4 hour, the unit rate is the complex fraction ½ / ¼ miles per hour or 2 miles per hour) (7.RP.1); and they analyze proportional relationships in geometric figures (7.G.1).
- Students solve a variety of problems involving angle measure, area, surface area and volume (7.G.4–6).

Fluency Expectations or Examples of Culminating Standards
7.EE.3 Students solve multi-step problems posed with positive and negative rational numbers in any form (whole numbers, fractions and decimals), using tools strategically. This work is the culmination of many progressions of learning in arithmetic, problem solving and mathematical practices.
7.EE.4 In solving word problems leading to one-variable equations of the form $px + q = r$ and $p(x + q) = r$, students solve the equations fluently. This will require fluency with rational number arithmetic (7.NS.1–3), as well as fluency to some extent with applying properties operations to rewrite linear expressions with rational coefficients (7.EE.1).
7.NS.1–2 Adding, subtracting, multiplying and dividing rational numbers is the culmination of numerical work with the four basic operations. The number system will continue to develop in grade 8, expanding to become the real numbers by the introduction of irrational numbers, and will develop further in high school, expanding to become the complex numbers with the introduction of imaginary numbers. Because there are no specific standards for rational number arithmetic in later grades and because so much other work in grade 7 depends on rational number arithmetic (see below), fluency with rational number arithmetic should be the goal in grade 7.

Examples of Major Within-Grade Dependencies
- Meeting standard 7.EE.3 in its entirety will involve using rational number arithmetic (7.NS.1–3) and percents (7.RP.3). Work leading to meeting this standard could be organized as a recurring activity that tracks the students' ongoing acquisition of new skills in rational number arithmetic and percents.
- Because rational number arithmetic (7.NS.1–3) underlies the problem solving detailed in 7.EE.3 as well as the solution of linear expressions and equations (7.EE.1–2, 4), this work should likely begin at or near the start of the year.
- The work leading to meeting standards 7.EE.1–4 could be divided into two phases, one centered on addition and subtraction (e.g., solving $x + q = r$) in relation to rational number addition and subtraction (7.NS.1) and another centered on multiplication and division (e.g., solving $px + q = r$ and $p(x + q) = r$) in relation to rational number multiplication and division (7.NS.2).

Standards for Mathematical Practice

The 2011 framework introduces Standards for Mathematical Practice. These standards complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years. These standards are the same at all grades from Prekindergarten to 12th grade. These eight practices can be clustered into the following categories as shown in the chart below:

Habits of Mind of a Productive Mathematical Thinker: MP.1: Make sense of problems and persevere in solving them. MP.6: Attend to precision.	**Reasoning and Explaining** MP.2: Reason abstractly and quantitatively. MP.3: Construct viable arguments and critique the reasoning of others
	Modeling and Using Tools MP.4: Model with mathematics. MP.5: Use appropriate tools strategically.
	Seeing Structure and Generalizing MP.7: Look for and make use of structure. MP.8: Look for and express regularity in repeated reasoning.

The Standards for Mathematical Practice in Grade 7

The Pre-K – 12 Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. The following lists examples of what the practice standards look like in Grade 7.

Standards	*Explanations and Examples*
Students are expected to: **1. Make sense of problems and persevere in solving them**.	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?"
Students are expected to: **2. Reason abstractly and quantitatively.**	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.
Students are expected to: **3. Construct viable arguments and critique the reasoning of others.**	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.
Students are expected to: **4. Model with mathematics.**	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 explore covariance and represent two quantities simultaneously. They use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences, make comparisons and formulate predictions. Students use experiments or simulations to generate data sets and create probability models. 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.
Students are expected to: **5. Use appropriate tools strategically.**	Students consider available tools (including estimation and technology) when solving a mathematical problem and decide 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. Students might use physical objects or applets to generate probability data and use graphing calculators or spreadsheets to manage and represent data in different forms.
Students are expected to: **6. Attend to precision.**	In grade 7, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and 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.
Students are expected to: **7. Look for and make use of structure.**	Students routinely seek patterns or structures to model and solve problems. For instance, students recognize patterns that exist in ratio tables making connections between the constant of proportionality in a table with the slope of a graph. Students apply properties to generate equivalent expressions (i.e. $6 + 2x = 3 (2 + x)$ 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.

Students are expected to: **8. Look for and express regularity in repeated reasoning**.	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.

Organization of the Pre-Kindergarten to Grade 8 Content Standards in the 2011 framework
The Pre-Kindergarten through Grade 8 content standards are organized by **grade level**. Within each grade level, standards are grouped first by **domain**, and then are further subdivided into **clusters** of related standards.
- **Standards** define what students should understand and be able to do.
- **Clusters** are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.
- **Domains** are larger groups of related standards. Standards from different domains may sometimes be closely related.

The table below shows which domains are addressed at each grade level from Prekindergarten through Grade 5. When the domain ends, it is expected that students will show mastery of that content by the end of that grade (i.e., Students should mastery in Counting and Cardinality by the end of Kindergarten).

Grade	PreK	K	1	2	3	4	5	6	7	8
Domains	Counting and Cardinality									
	Operations and Algebraic Thinking									
		Number and Operations in Base Ten								
					Number and Operations – Fractions					
							The Number System			
								Ratios and Proportional Relationships		
								Expressions and Equations		
										Functions
	Measurement and Data									
	Geometry									
								Statistics and Probability		

Standards Identifiers/Coding
Each standard has a unique identifier that consists of the grade level, (PK, K, 1, 2, 3, 4, 5, 6, 7, or 8), the domain code, and the standard number, as shown in the example below. The standard below is identified as **2.NBT.1**, identifying it as a Grade 2 standard in the Numbers in Base Ten domain, and as the first standard in that domain.

Unique Massachusetts Standards
Standards unique to Massachusetts are included in the appropriate domain and cluster and are initially coded by "MA." For example, the Massachusetts standard **MA.2.OA.2a** is identified with "MA" indicating a Massachusetts addition, "2" indicating a grade 2 standard, "OA" indicating the Operations and Algebraic Thinking domain, and "2a" indicating that it is a further specification to the second standard in that domain.

UNIT 1: *September 8 – October 6*
Chapter 1: The Real Number System

Unit Notes:
- Lessons 1.3 – 1.5 include 8th grade content (8.NS.1, 8.NS.2) and can be used for extension.
- This unit will extend understanding of the system of rational numbers to all real numbers.
- Students will explore the idea that between every pair of rational numbers, there is another rational number. A big idea is that real numbers are used to represent quantities, and can be located on an infinite number line. Students will need to draw number lines to scale with the correct interval. You may need to provide number lines for some students.
- In this unit, students will use long division to write fractions as decimals and explore terminating and repeating decimals.

Standards:
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. *(partial coverage of this standard, just absolute value)*
    7.NS.1a   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.*
    7.NS.1b   Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
Scope of Standard:
- Visual representations may be helpful as students begin this work; they become less necessary as students become more fluent with the operations. This work builds on student understanding of number lines developed in Grade 6.
- Attention should be paid to helping students relate situations to mathematical expressions.

7.NS.2   Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
    7.NS.2d   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.
Scope of Standard:
- Using long division, students understand the difference between terminating and repeating decimals. This understanding is foundational for the work with rational and irrational numbers in Grade 8.
- Although the long division algorithm is taught in Grade 6, students will likely need significant review and practice, and they may not be familiar with using the algorithm for converting fractions to decimals.

UNIT 2: *October 7 – October 27*
Chapter 2: Rational Number Operations

Unit Notes:
- This is a VERY important chapter for Grade 7. This is the first time students will explore computation with integers. Use integer chips and then number lines to build understanding. Be sure to do the hands on activities and avoid jumping into the rules for integers or simply trying to provide a "trick." Students must build the understanding before moving into the latter part of the chapter, which includes operations with all rational numbers.
- Before you begin the chapter, you may need to spend time reviewing operations with fractions and decimals as well as percents. Teach this entire chapter - spend most of your time on Lessons 2.1-2.4 and be sure that students understand integer operations before moving onto Lessons 2.5 and 2.6.

Standards:
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.
    7.NS.1a   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.*
    7.NS.1c   Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
    7.NS.1d   Apply properties of operations as strategies to add and subtract rational numbers.
Unit Considerations:
The use of number lines and chips are used to model this work. It is important that students are able to solve addition and subtraction problems without the use of models by developing algorithms.
Making combinations that equal zero is helpful in teaching students the algorithms for addition and subtraction. For example: $14 + - 22 = (14 + - 14) + -8 = 0 + -8$. For 7.NS.1c, the outlined strategy is powerful for students whom are struggling with subtracting rational numbers.

7.NS.2   Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
    7.NS.2a   Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
    7.NS.2b   Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
    7.NS.2c   Apply properties of operations as strategies to multiply and divide rational numbers.
Scope of Standard:
- Multiplication and division of rational numbers is an extension of multiplication and division of whole numbers. For example, students can use the patterns of families of equations ("fact" families) to help them make sense of operations involving fractions, decimals, and/or negative numbers.
- Students need to understand that when division of rational numbers is represented with a fraction bar, each part of the fraction can have a negative sign.
- Be sure to provide students with many opportunities to operate on decimals and fractions within this unit.

UNIT 3: *October 28 - November 24*
Chapter 3: Algebraic Expressions

Unit Notes:
● Students might need to begin this unit with Grade 6, Chapter 7 material first.
● In this unit, students will simplify all types of expressions with rational coefficients.
● Students should understand what an algebraic expression is, and that it can be simplified or expanded to create an equivalent expression.
● If students are struggling with this chapter, go back and work with whole number coefficients.
● It is important for students to master working with like terms, expanding and factoring before moving into equations in Chapter 4.
● Spend time translating verbal descriptions into algebraic expressions with all students in lesson 3.6.
● Students continue this in Lesson 3.7 and you may want o use this time to practice operations with rational variable expressions.

Standards:
7.EE.1   Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
Scope of Standard:
● This is a continuation of work from Grade 6 using properties of operations and combining like terms. Students apply properties of operations and work with rational numbers (integers and positive/negative fractions and decimals) to write equivalent expressions.

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."*

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.
Scope of Standard:
Students understand the reason for rewriting an expression in terms of a contextual situation. For example, students understand that a 20% discount is the same as finding 80% of the cost, *c* (0.80*c*).

UNIT 4: *November 25 - December 23*
Chapter 4: Algebraic Equations and Inequalities

Unit Notes:
- In Grade 6, students solved one-step equations and graphed basic inequalities on a number line. In this unit, students will solve multi-step equations and inequalities with variables on both sides and with parenthesis.
- It is important for students to make algebraic connections to problem solving. Modeling equations is important for algebraic understanding.
- Students should continue to become more comfortable with expressions and equations, and begin to develop the ability to re-write expressions as equivalent expressions in order to solve problems.

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

    7.EE.4a   Solve word problems leading to equations of the form $px + q = r$ and $p(x \div q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

    7.EE.4b   Solve word problems leading to inequalities of the 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.*

    MA.7.EE.4c Extend analysis of patterns to include analyzing, extending, and determining an expression for simple arithmetic and geometric sequences (e.g., compounding, increasing area), using tables, graphs, words, and expressions.

Scope of Standard:
- Students write an equation or inequality to model a situation. They explain how they determined whether to write an equation or inequality.
- In contextual problems, students define the variable and use appropriate units.
- Students solve multi-step equations derived from word problems. They use the arithmetic from the problem to generalize an algebraic solution

MINI- UNIT: *January 4 - January 12*
Unit Rates and Percents

Mini-Unit Notes:
● Start instruction with the Online Common Core Additional Resources: Begin Instruction with Grade 6
   Chapters 5 & 6 to review these topics.
● Then move into Chapter 5 in the textbook, covering Lessons 5.1 through 5.3.
● Consider teaching unit rates by setting up a proportion to solve for an unknown.

UNIT 5: *January 13 - February 12*
Chapter 5: Direct and Inverse Proportion

Unit Notes:
● Provide explicit instruction on making a line graph before lesson 5.2. Check for understanding of coordinate
   pairs.
● Use proportions to teach percent and percent change after lesson 5.3 when students learn cross product. Use
   materials from course 1, Chapter 6 (Grade 6).
● Lesson 5.4 (Understanding Inverse Proportion) can be used as an extension.
● Lesson 7.5 (Book B) is a direct application of proportions and can be taught here after Chapter 5.
● Chapter 5 is another chapter that addresses a major cluster of CCSS. Students must be able to recognize
   proportional relationships and understand how writing proportions can help them to solve real world problems.
● This chapter builds on a solid understanding of ratio and rate that started in Grade 6. If students do not have a
   deep understanding of ratio and rate, go back before moving into direct proportion.
● In this unit, you may spend an entire class period on 1-2 problems, but remember it is important to slow down
   in order to develop understanding as well as procedure. Students will need experiences with tables, graphs and
   algebraic equations.
● Students identify the constant of proportionality and recognize it as a constant rate of change. They understand
   this graphically as well as algebraically and in tables.

Mini-Unit Standards:
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 (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.*
Scope of the Standard:
● This work on unit rates is continued from Grade 6, but now includes fractions compared to fractions (both
   proper and improper). Comparisons may or may not have like units.

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

Unit Standards:

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

    7.RP.2a   Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table, or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

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

    7.RP.2c   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.*

    7.RP.2d   Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.

Scope of Standard:

● Students' understanding of the multiplicative reasoning used with proportions continues from Grade 6. Students determine if two quantities are in a proportional relationship from a table. Fractions and decimals should be used with this standard.

● When graphing, students will graph points to see if they form a line through the origin. If they do, then all points on a line through the origin are in a proportional relationship.

● When naming a coordinate pair, teachers should emphasize what the pair means.

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

UNIT 6: *February 22 - February 29*
Grade 7 Chapter 6: Angle Properties and Straight Lines

Grade 7 Unit Notes:
- Chapter 6 is a great Chapter to apply writing algebraic expressions. You may need to go back, so use the transition guide to access materials from Grade 5 & 6.
- Students will understand that angle properties can be used to help solve real world problems.

Standards:
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.

Scope of Standard:
- Students draw geometric shapes given parameters, such as parallel and perpendicular lines, type/measure of angles, number and/or length of line segments, etc.
- Conditions may involve points, line segments, angles, parallelism, congruence, angles, and perpendicularity.
- This standard is addressed in CC Problem 4.3

7.G.5   Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.

Scope of standard:
- Students use understandings of angles and deductive reasoning to write and solve equations

UNIT 7: *March 1 – March 8*
Chapter 7: Geometric Construction

Unit Notes:
- Keep in mind that students will need direct instruction in the use of the tools needed in this unit.
- In this unit, students will draw two-dimensional figures with a ruler, protractor, and a compass. Use this chapter to review all types of measurement.
- Constructing geometric figures is important in preparation for working with congruent and similar figures in Grade 8 and is a major focus of Grade 7 CCSS.

Standards:
7.G.1 Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
Scope of Standard:
- Students should be able to determine the dimensions of figures when given a scale and identify the impact of scale on length (one-dimension) and area (two-dimensions).
- Students should be able to identify the scale factor, given two figures.
- Using a given scale drawing, students should be able to reproduce the drawing at a different scale.

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.

MINI-UNIT: *March 9 – March 12*
Circumference and Area of Circles

Senquencing:
- Before beginning Chapter 8, start instruction with the ***Online Common Core Additional Resources***: *Grade 6 Chapters and lessons*
  - Lesson 10.4: Area of Composite Figures (7.G.6)
  - Lesson 11.1: Radius, Diameter, and Circumference of Circles (7.G.4)
  - Lesson 11.2: Area of a Circle (7.G.4)
  - Lesson 11.3: Real-World Problems: Circles (7.G.4)
  - Use the related test items for these lessons.
- Then continue instruction with ***Online Common Core Additional Resources***
  - Lesson 12.4: Real-World Problems: Surface Area and Volume (7.G.6)
  - Use the related test items for this lesson.
- Then move into Chapter 8 of the book, covering all lessons.

Mini - Unit Notes:
- Students will solve many different types of problems involving the circumference and area of circles. The problems in this chapter are non-routine and challenge students to think deeply about the circumference and area of circles and how they can apply what they know about circles to problem solving.
- This is a good opportunity to go back and review area of triangles, parallelograms, and trapezoids before moving into volume and surface area.

Mini-Unit Standards:
7.G.4   Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
Scope of Standard:
- Students should be able to understand the relationship between the radius and the diameter of a circle.
- Regarding pi, students need to understand:
  o that the ratio of circumference to diameter can be expressed as pi
  o that pi is not a variable, but a non-repeating decimal known as an irrational number represented by a symbol
  o that because pi is a number, answers can therefore be expressed in terms of pi, using the symbol
  o that because 3.14 is an approximation of the value of pi, measurements using that value will also be approximations.
- Students informally derive formulas for circumference and area of a circle and understand the relationship between a circle's circumference and its area. In Grade 6, students used the relationship among radius, diameter, and center of a circle to find its circumference and area. This should be reviewed in Grade 7.

UNIT 8: *March 13 - March 24*
Grade 7 Chapter 8: Volume and Surface Area of Solids

Unit Notes:
- Students should be able to find the volume and surface area of 3-D prisms. Use 3-D shapes and solids to help students to understand surface area. You may need to provide nets for some students as well as linking or centimeter cubes to introduce volume at a concrete level.
- If ready, students can spend time examining cross-sections, but be sure they have a solid understanding of area and volume of 2-D and 3-D figures before diving into this section of the chapter.

Standards:
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.
Scope of Standard:

- Students should be able to describe that cuts made parallel to the base will take the shape of the base, cuts make perpendicular to the base will take the shape of the lateral (side) face, and cuts make at an angle through the right rectangular prism will produce a parallelogram.
- Students should be able to describe cuts made to a pyramid.

    o   *If the pyramid is cut with a plane parallel to the base, the intersection of the pyramid and the plane is a square cross section.*

    o   *If the pyramid is cut with a plane passing through the top vertex and perpendicular to the base, the intersection of the pyramid and the plane is a triangular cross section.*
    o *If the pyramid is cut with a plane perpendicular to the base, but not through the top vertex, the intersection of the pyramid and the plane is a trapezoidal cross section.*

7.G.6   Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Scope of standard:
- Students continue work from 5th and 6th grade to work with area, volume and surface area of two-dimensional and three-dimensional objects (composite shapes).
- Students will not work with cylinders, as circles are not polygons.
- At this level, students determine the dimensions of the figures given the area or volume.

- "Know the formula" does not mean memorization of the formula. To "know" means to have an understanding of why the formula works and how the formula relates to the measure (area and volume) and the figure. This understanding should be for all students.
- Surface area formulas are not the expectation with this standard. Building on work with nets in Grade 6, students should recognize that finding the area of each face of a three-dimensional figure and adding the areas will give the surface area. No nets will be given at this level; however, students could create nets to aid in surface area calculations.
- Students understanding of volume can be supported by focusing on the area of base times the height to calculate volume.

MA.7.G.7 Solve real-world problems involving the surface area of spheres.
Scope of Standard:
- A sphere is a perfectly round geometrical object in three-dimensional space, such as the shape of a round ball. Like a circle, which is two-dimensional, a sphere is the set of points, which are all the same distance, r, from a given point in space.
- The surface area of half a sphere is equal to the area of two great circles, that is, circles with the same radius as the sphere.

Unit Considerations:
This standard can be addressed using lessons created from Alfinio Flores' article, "Experiments on the Surface Area of a Sphere," from NCTM Mathematics in the Middle School, Vol. 17, No.4, November 2011.

UNIT 9: *March 28 - April 5*
Grade 7 Chapter 9: Statistics *and*
Grade 8 Chapter 10: Statistics

Grade 7 Unit Notes:
● Grade 7 focuses on variability as well as central tendency to describe and compare data sets. This is a critical topic.
● Students should not only calculate the mean, median, and mode, but also use the calculations to solve problems and make inferences based on variability (mean absolute deviation).
● Note that box and whiskers are listed as 6ᵗʰ grade CCSS, but they are used here to meet Grade 7 standard of comparing data sets and variability.
● Focus on the BIG IDEA. Skip Lesson 9.2.

Grade 8 Unit Notes:
● In this chapter, students will construct and interpret scatter plots to investigate patterns of association between two quantities. This includes interpreting whether the association is strong or weak, and positive or negative.
● Use of graphing calculator or spreadsheet is particularly helpful in this chapter.
● This is a good connection of bivariate data to linear equations.
● Students also work with two-way tables to explore categorical data.

Grade 7 Standards:
7.SP.1   Use random sampling to draw inferences about a population. 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.
Scope of Standard:
● Students should recognize that it is difficult to gather statistics on an entire population. They need to think about whom they would ask and how many people to ask.
● Students find that a random sample best represents the total population and will generate valid predictions.
● Students use information from random samples to draw inferences from data. A random sample must clearly relate to the population to get accurate data. For example, a random sample of elementary students cannot be used to give a survey about the prom.
Unit Considerations:
● As you teach about selecting a sample, make sure students take into account the sample size but do not dwell on the sample size. Who they select is equally important to how many they select.

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.*
Scope of Standard:
● Students collect and use multiple samples of data to make generalizations about a population.
● Make sure to address issues of variance that result in a large range in the data.

7.SP.3   Draw informal comparative inferences about two populations. Informally assess the degree of visual overlap of two numerical data distributions with similar variability, 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 plot, the separation between the two distributions of heights is noticeable.

Scope of Standard:
- Students understand that:
  - a full understanding of the data requires consideration of the measures of variability as well as mean or median,
  - variability is responsible for the overlap of two data sets and that an increase in variability can increase the overlap, and
  - median is paired with the interquartile range and mean is paired with the mean absolute deviation.
- The mean absolute deviation may need to be reviewed. The mean absolute deviation (MAD) is calculated by: 1) finding the mean of the data set; 2) finding the difference (deviation) between each data point and the mean (recorded in the second column); 3) finding the mean of the absolute values (recorded in the third column) of the deviations.

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.*

Scope of Standard:
- Showing two graphs vertically rather than side by side helps students make comparisons.

Standards:
8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Scope of standard:
- Bivariate data refers to two-variable data, one to be graphed on the *x*-axis and the other on the *y*-axis. Students represent numerical data on a scatter plot, to examine relationships between variables. They analyze scatter plots to determine if the relationship is linear (positive, negative association or no association) or nonlinear.
- Students recognize that points may be away from the other points (outliers) and have an effect on the linear model.
- NOTE: Use of the formula to identify outliers is not expected at this level.
- Students recognize that not all data will have a linear association. Some associations will be non-linear.

8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

Scope of standard:
- Students understand that a straight line can represent a scatter plot with linear association. The most appropriate linear model is the line that comes closest to most data points. The use of linear regression is not expected. If there is a linear relationship, students draw a linear model. Given a linear model, students write an equation.

8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.* (*8.P.5*)

Scope of standard:

- Linear models can be represented with a linear equation. Students interpret the slope and *y*-intercept of the line in the context of the problem.

8.SP.4   Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

Scope of standard:

- Students understand that a two-way table provides a way to organize data between two categorical variables. Data for both categories needs to be collected from each subject. Students calculate the relative frequencies to describe associations.

UNIT 10: *April 6 - April 15*
Grade 7 Chapter 10: Probability
Grade 8 Chapter 11: Probability

Sequencing
● Begin with instruction of Lessons 10.2 – 10.4 in the textbook.
● Lesson 10.1 can be used as an extension.

Unit Notes:
● In Grade 7, students should understand the meaning of probability and chance. They should find the probability of an event using multiple strategies.
● After studying probability, students should be able to think about developing a probability model, use it, and evaluate it. Only simple probability is covered in Grade 7. Compound probability is covered in Grade 8.

Standards:
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.
Scope of Standard:
● Students recognize that the probability of any single event can be can be expressed in terms such as impossible, unlikely, likely, or certain or as a number between 0 and 1. Larger numbers indicate greater likelihood. The sum of all the possible probabilities always equals 1.
Unit Considerations:
● Students can use simulations such as Marble Mania on
http://sciencenetlinks.com/interactives/marble/marblemania.html or the Random Drawing Tool on NCTM's
Illuminations to generate data and examine patterns: http://illuminations.nctm.org/activitydetail.aspx?id=67

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.*
Scope of Standard:
● Students collect data from a probability experiment, recognizing that as the number of trials increase, the experimental probability approaches the theoretical probability.
● The focus of this standard is relative frequency -- the observed number of successful events for a finite sample of trials. Relative frequency is the observed proportion of successful event, expressed as the value calculated by dividing the number of times an event occurs by the total times an experiment is carried out.
Unit Considerations:
● Students should try the experiment and compare their predictions to the experimental outcomes to continue to explore and refine conjectures about theoretical probability.
● Students can collect data using physical objects or graphing calculators or web-based simulations.
● Students can perform experiments multiple times, pool data with other groups, or increase the number of trials in a simulation to look at the long-run relative frequencies.

7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

7.SP.7a   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 selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*

7.SP.7b   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?*

Scope of Standard:
- Students use theoretical probability to predict frequencies of outcomes.
- Students will understand that experimental data gives realistic estimates of the probability of an event but are affected by sample size.

Unit Considerations:
- Teachers should make sure to discuss the sources for discrepancy that cause the experimental probability to differ from the theoretical probability.

7.SP.8   Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

7.SP.8a   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.

7.SP.8b   Represent sample spaces for compound events using methods such as organized 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.

7.SP.8c   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?*

Scope of standard:
- Students use tree diagrams, frequency tables, and organized lists, and simulations to determine the probability of compound events.

UNIT 11: *April 25 - May 13*
Grade 8 Chapter 7: Pythagorean Theorem

Unit Notes:
- In Chapter 7, students will begin to understand and apply the Pythagorean Theorem. Use hands on activities to help students build conceptual understanding.
- Spend time exploring the proof of the Pythagorean Theorem (page 7) and its converse. Break up the instructions so that students don't see the solutions right away.
- There are many visual and geometric proofs of the Pythagorean theorem online.
- As you move through the chapter, students will apply the Pythagorean Theorem to determine unknown side lengths and to find the distance between two points.
- The distance formula is taught as an extension of the Pythagorean on the coordinate grid. Rather than memorizing the formula, students derive it from the vertical and horizontal distances. Solving distance lengths of 3-dimensional objects is a good application of the theorem.

Standards:
8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p,$ where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that   is irrational.

8.G.6 Explain a proof of the Pythagorean Theorem and its converse.
Scope of standard:
- Using models, students explain the Pythagorean Theorem, understanding that the sum of the squares of the legs is equal to the square of the hypotenuse in a right triangle. Students also understand that given three side lengths with this relationship forms a right triangle (the converse of the Pythagorean Theorem).

8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real- world and mathematical problems in two and three dimensions.

8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Scope of standard:
- One application of the Pythagorean Theorem is finding the distance between two points on the coordinate plane. Students build on work from 6th grade (finding vertical and horizontal distances on the coordinate plane) to determine the lengths of the legs of the right triangle drawn connecting the points. Students understand that the line segment between the two points is the length of the hypotenuse.
- NOTE: The use of the distance formula is not an expectation.

8.G.9 Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real world and mathematical problems.
Scope of standard:
Students construct various triangles having lines segments of different lengths, but with two corresponding congruent angles. Comparing ratios of sides will produce a constant scale factor, meaning the triangles are similar. Students solve problems with similar triangles.

UNIT 12: *May 16 - June 3*
Grade 8 Chapter 8: Geometric Transformations

Grade 8 Unit Notes:
● Transformations are taught with similarity and congruence because these concepts are as satisfying a series of transformations. (e.g similarity as a dilation).
● Students should experiment with the effects of rotations, reflections and translations. Provide scaffolding for students with tools like symmetry mirrors or graph paper.
● Students will use the coordinate grid to help describe the effect of dilations, translations, rotations and reflections. Use technology such as Geogebra, to enable students to visualize and see the effects of geometric transformations.

Standards:
8.G.1   Verify experimentally the properties of rotations, reflections, and translations:
  8.G.1a   Lines are taken to lines, and line segments to line segments of the same length.
  8.G.1b   Angles are taken to angles of the same measure.
  8.G.1c   Parallel lines are taken to parallel lines.
Scope of standard:
● Students use compasses, protractors and rulers or technology to explore figures created from translations, reflections and rotations. Characteristics of figures, such as lengths of line segments, angle measures and parallel lines, are explored before the transformation (pre-image) and after the transformation (image). Students understand that these transformations produce images of exactly the same size and shape as the pre-image and are known as rigid transformations.

8.G.2   Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
Scope of standard:
● This standard is the students' introduction to congruency. Congruent figures have the same shape and size. Translations, reflections and rotations are examples of rigid transformations. A rigid transformation is one in which the pre-image and the image both have exactly the same size and shape since the measures of the corresponding angles and corresponding line segments remain equal (are congruent).
● Students examine two figures to determine congruency by identifying the rigid transformation(s) that produced the figures. Students recognize the symbol for congruency (   ) and write statements of congruency.

8.G.3   Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
Scope of standard:
● Students identify resulting coordinates from translations, reflections, and rotations (90º, 180º, and 270º, both clockwise and counterclockwise), recognizing the relationship between coordinates and the transformation.
● Translations: Translations move the object so that every point of the object moves in the same direction as well as the same distance. In a translation, the translated object is congruent to its pre-image.
● Reflections: A reflection is the "flipping" of an object over a line, known as the "line of reflection". In the 8th grade, the line of reflection will be the *x*-axis and the *y*-axis. Students recognize that when an object is reflected across the *y*-axis, the reflected *x*-coordinate is the opposite of the pre-image *x*-coordinate. Likewise, in a reflection across the *x*-axis, the reflected *y*-coordinate is the opposite of the pre-image *y*-coordinate.

- Rotations: A rotation is a transformation performed by "spinning" the figure around a fixed point known as the center of rotation. The figure may be rotated clockwise or counterclockwise up to 360º (at 8th grade, rotations will be around the origin and a multiple of 90º). In a rotation, the rotated object is congruent to its pre-image.
- Dilations: A dilation is a non-rigid transformation that moves each point along a ray which starts from a fixed center, and multiplies distances from this center by a common scale factor. Dilations enlarge (scale factors greater than one) or reduce (scale factors less than one) the size of a figure by the scale factor.
In 8th grade, dilations will be from the origin. The dilated figure is similar to its pre-image. The scale factor

would also be evident in the length of the line segments using the ratio: .
- Students recognize the relationship between the coordinates of the pre-image, the image and the scale factor for a dilation from the origin. Using the coordinates, students are able to identify the scale factor (image/pre-image). Students identify the transformation based on given coordinates.

8.G.5   Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

Scope of standard:
- Students use exploration and deductive reasoning to determine relationships that exist between the following: a) angle sums and exterior angle sums of triangles, b) angles created when parallel lines are cut by a transversal, and c) the angle-angle criterion for similarity of triangle.
- Students construct various triangles and find the measures of the interior and exterior angles. Students make conjectures about the relationship between the measure of an exterior angle and the other two angles of a
  - triangle: the measure of an exterior angle of a triangle is equal to the sum of the measures of the other two interior angles, and the sum of the exterior angles (360º). Using these relationships, students use deductive reasoning to find the measure of missing angles.
  - Students construct parallel lines and a transversal to examine the relationships between the created angles. Students recognize vertical angles, adjacent angles, and supplementary angles from 7th grade and build on these relationships to identify other pairs of congruent angles. Using these relationships, students use deductive reasoning to find the measure of missing angles.
  - Students can informally conclude that the sum of the angles in a triangle is 180º (the angle-sum theorem) by applying their understanding of lines and alternate interior angles.
  - Students construct various triangles having line segments of different lengths but with two corresponding congruent angles. Comparing ratios of sides will produce a constant scale factor, meaning the triangles are similar. Students solve problems with similar triangles.

8.G.9   Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real world and mathematical problems.

UNIT 13: *June 6 - June 21*
Grade 8 Chapter 9: Congruence and Similarity

Unit Notes:
- Students will work on building understanding that a two-dimensional figure is congruent to another if a second can be obtained through a sequence of rotations, reflections and translations.
- It is very important that students have a good knowledge of transformations from Chapter 10. You may need to spend time going back to scale factor and scale drawing and help students link the constant of proportionality (Grade 7) to similar triangles.

Standards:
8.G.2   Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
Scope of standard:
- This standard is the students' introduction to congruency. Congruent figures have the same shape and size. Translations, reflections and rotations are examples of rigid transformations. A rigid transformation is one in which the pre-image and the image both have exactly the same size and shape since the measures of the corresponding angles and corresponding line segments remain equal (are congruent).
- Students examine two figures to determine congruency by identifying the rigid transformation(s) that produced the figures. Students recognize the symbol for congruency (   ) and write statements of congruency.

8.G.4   Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
Scope of standard:
- Similar figures and similarity are first introduced in the 8th grade. Students understand similar figures have congruent angles and sides that are proportional. Similar figures are produced from dilations. Students describe the sequence that would produce similar figures, including the scale factors. Students understand that a scale factor greater than one will produce an enlargement in the figure, while a scale factor less than one will produce a reduction in size.
- Students need to be able to identify that triangles are similar or congruent based on given information.

8.G.5   Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

End of Year: *June 22 - end of June*
Review for Transition to Grade 8 Accelerated Pathway.