



*Diocese of Fresno*  
**Office of Catholic Education**

*In Partnership with*



*Present*

**MATHEMATICS POWER STANDARDS 2021-2022**

**SEVENTH GRADE**

## **Introduction**

In June 2021, a committee comprised of teachers and administrators led by Dr. Bill Sternberg from Creative Leadership Solutions worked over a period of three days to identify math Power Standards in Kindergarten through 8<sup>th</sup> Grade (and Algebra). This work, grounded in research from Doug Reeves, Larry Ainsworth, Dylan Wiliam and others offered the opportunity to collaboratively identify those standards that would be consistently focused upon throughout the year for maximum learning impact in math. The following three criteria were used in the identification of these standards:

***Leverage:*** *Does this indicator apply to other subjects?*

***Endurance:*** *Will this indicator be taught over multiple years of instruction?*

***Essentiality:*** *Is this indicator an essential skill students need to know and be able to do as soon as they enter their next level of instruction?*

Over the course of three days, our committee met in grade level teams to first identify those indicators that possessed leverage. From this list, grade level teams then identified indicators that also possessed endurance, effectively reducing the number of indicators from the original list. Lastly, grade level teams were paired with their vertical counterparts (e.g., Kindergarten was paired with First Grade) to identify indicators that possessed essentiality. Thus, from a list of 30 (or more) grade level math indicators, teams were able to identify 8-12 (depending upon grade level) indicators that would become Power Standards for their specific grade level.

As explained during this process, the intent is to focus consistently on these Power Standards through multiple units of instruction. In reviewing grade level math indicators, there are some that do not require an equal amount of focus as others: In other words, there are supporting standards that may only need to be taught for a smaller time period (e.g., 4-6 weeks) in order for a student to demonstrate mastery of that specific indicator. However, Power Standards identified in this process are those that will require a much more concerted focus throughout the academic year to better prepare students in their learning journey.

Under each Power Standard identified, you'll note graphic organizers that identify the *Concepts* (nouns or noun phrases) of each Power Standard along with *Skills* (what we want students to know and be able to do). As well, there is a section labeled "*Topics*" which allows other content area teachers to identify units of instruction where these specific Power Standards can be inserted as a means of building cross-curricular connections. The "*Topics*" section is one that should continually be added to over time as there will undoubtedly be multiple opportunities for insertion of these Power Standards in other content areas.

The last piece you'll note under each identified Power Standard is a table listing "*Big Ideas*" and "*Essential Questions*". The "*Big Ideas*" are those critical understandings of the purpose and meaning behind learning the Power Standard that we want students to possess in *their own words*. In essence, students should know the *why* of what they are learning, not just the *what*. The "*Essential Questions*" are those questions teachers use during instruction encompassing these Power Standards as a means to build interest and understanding from their students. We would expect student replies to these "*Essential Questions*" to resemble the "*Big Ideas*" within this table.

<b>Power Standard #1:</b>	<b>6</b>
<b>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.</b>	<b>6</b>
<b>Power Standard #2:</b>	<b>7</b>
<b>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. d. 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.</b>	<b>9</b>
<b>Power Standard #3:</b>	<b>12</b>
<b>7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.</b>	<b>12</b>
<b>Power Standard #4:</b>	<b>15</b>
<b>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.</b>	<b>15</b>
<b>Power Standard #5:</b>	<b>18</b>
<b>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. a. Solve word problems leading to equations of the form <math>px + q = r</math> and <math>p(x + q) = r</math>, 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. b. Solve word problems leading to inequalities of the form <math>px + q &gt; r</math> or <math>px + q &lt; r</math>, 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.</b>	<b>18</b>
<b>Power Standard #6:</b>	<b>21</b>
<b>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.</b>	<b>21</b>
<b>Power Standard #7:</b>	<b>24</b>
<b>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</b>	<b>24</b>
<b>Power Standard #8:</b>	<b>27</b>

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.	27
<b>Power Standard #9:</b>	30
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.	30
<b>Power Standard #10:</b>	33
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.	33
<b>Power Standard #11:</b>	36
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.	36
<b>Power Standard #12:</b>	39
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. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	39

## Power Standard #1:

**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.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"><li>● Rates</li><li>● Complex Fractions</li><li>● Unit Rates</li><li>● Conversion</li><li>● Percent</li><li>● Sales tax</li><li>● Interest</li><li>● Discount</li><li>● Mark-up</li></ul>	<ul style="list-style-type: none"><li>● Divide fractions</li><li>● Compute unit rates with ratios as fractions</li><li>● Compute rates with like and different units</li><li>● Understand the purpose of unit rates</li><li>● Compute ratios involving lengths, areas, and other quantities</li><li>● Understand the relationship between a percent and a ratio and a fraction and a decimal</li><li>● Convert fractions to decimals to percents and vice versa</li><li>● Find the percent of a number</li><li>● Compute the percent of change</li><li>● Understand the meaning and effect discount, tax, interest, and mark-up have on a value</li><li>● Solve financial literacy problems with simple interest, sales tax, tips, markups, and discounts</li></ul>
<p data-bbox="760 1381 841 1413" style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● Ratios and rates found throughout science lessons - make comparisons</li></ul>	

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none"><li>● Students extend their understanding of ratios to solve single- and multi-step problems.</li><li>● Students use unit rates to solve real-world problems</li></ul>	<ul style="list-style-type: none"><li>● Where do we see unit rates in real world and how can we use them to solve problems?</li></ul>

Bloom's Taxonomy Level: Apply

Depth of Knowledge Level: 1

**Assessment Item:**

An XBOX Series X game has a 25% Markup, the selling price of the item is \$49.99. Find the wholesale price of the item.

**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
Convert fractions to decimals to percents and vice versa		
Compute the percent of change.		
Solve financial literacy problems with simple markups and discounts.		

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
Convert fractions to decimals to percents and vice versa	3	2	1	
Compute the percent of change	3	2	1	

Solve financial literacy problems with simple markups and discounts.	<b>3</b>	<b>2</b>	<b>1</b>	
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\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

<b>EXPECTATION</b>	<b>3</b>	<b>2</b>	<b>1</b>
Convert fractions to decimals to percents and vice versa	converts fraction to decimal and can convert decimals to fraction	is able to convert but needs help following through	knows when to use fractions or decimals
Compute the percent of change	multiplied the change and then added it to the original amount given	did not apply the change to the original amount given	converted percent to decimal
Solve financial literacy problems with simple markups and discounts.	understand the formula for percent change and applied the percent change to original amount		read the problem and used



## Power Standard #2:

**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. d. 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.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"><li>● Equivalent Ratios</li><li>● Proportional Relationships</li><li>● Slope</li><li>● Direct Variation</li></ul>	<ul style="list-style-type: none"><li>● Create and solve equivalent ratios</li><li>● Understand and identify when two quantities are proportional by testing with equivalent ratios</li><li>● Graph ratios on a coordinate plane</li><li>● Understand the relationship and define <math>x</math> and <math>y</math></li><li>● Connect constant rate of change with slope and direct variation</li><li>● Use graphs, equations, and diagrams to identify the constant of proportionality</li><li>● Write equations representing proportional relationships</li><li>● Explain what points on a graph of a proportional relationship mean including the origin and unit rate</li></ul>
<p data-bbox="760 1602 837 1633" style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● Proportional relationships are seen throughout history and in all cultures.</li><li>● Religion - following God's will leads to greater peace</li></ul>	

<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
<ul style="list-style-type: none"> <li>• Students extend their understanding of ratios and to develop understanding of proportionality</li> <li>• Students solve single- and multi-step problems using proportions.</li> <li>• Students use their understanding of proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease.</li> </ul>	<ul style="list-style-type: none"> <li>• How can you show that two objects are proportional and how do proportions help us solve everyday problems?</li> <li>• How can percents help you understand situations involving money?</li> </ul>

Bloom's Taxonomy Level: Evaluate
Depth of Knowledge Level: 4

**Assessment Item:**

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**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
Use graphs, equations, and diagrams to identify the constant of proportionality		


**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

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**Power Standard #3:**

**7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> <li>● Integers</li> <li>● Absolute Value</li> <li>● Number line</li> <li>● Complex fractions</li> <li>● Four operations with integers and rational numbers</li> <li>● Terminating</li> <li>● Repeating decimals</li> <li>● Conversion</li> </ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"> <li>● Graph negative numbers on a number line</li> <li>● Divide fractions</li> <li>● Change fractions to decimals and vice versa</li> <li>● Understand the difference between terminating and repeating decimals</li> <li>● Understand the difference between a rational number and an integer</li> <li>● Understand the meaning of absolute value and its implication in real world problems</li> <li>● Apply and extend previous understandings of operations with fractions and decimals to add, subtract, multiply and divide rational numbers</li> <li>● Solve real world problems using rational numbers and the four operations</li> <li>● Solve mathematical problems using rational numbers and the four operations</li> </ul>
<p><u>Topics</u></p> <ul style="list-style-type: none"> <li>● Real life problems that arise in literature, social science, and religion</li> </ul>	

<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
<ul style="list-style-type: none"> <li>• Students develop a unified understanding of numbers, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Since we see fractions and decimals in many common objects and situations, what happens when you add, subtract, multiply, and divide fractions and decimals?</li> </ul>

Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: 2

**Assessment Item:**

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**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

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**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

## Power Standard #4:

**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.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"><li>● Integers</li><li>● Rational numbers</li><li>● Four operations</li><li>● Conversion</li><li>● Mental computation</li><li>● Estimation strategies</li><li>● sequences</li><li>● Properties of Operations</li><li>● Distributive Property</li><li>● Linear expressions</li><li>● Order of Operation</li></ul>	<ul style="list-style-type: none"><li>● Understand the difference between rational numbers and integers</li><li>● Understand the difference between linear and nonlinear and an expression and an equation</li><li>● Solve positive and negative rational number problems</li><li>● Solve multi-step positive and negative decimal and fraction problems</li><li>● Solve problems using order of operations</li><li>● Manipulate the properties of operations and the distributive property</li><li>● Use mental math, facilitate estimation, and discover the reasonableness of an answer</li></ul>
<p data-bbox="760 1308 841 1339" style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● Real life problems that arise in literature, social science, and religion</li></ul>	

<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none"> <li>• Students use properties of operations to generate equivalent expressions</li> <li>• By applying the properties of operations, 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.</li> <li>• Students understand the significance of making predictions, estimating, and checking answers to ascertain reasonableness and precision.</li> </ul>	<ul style="list-style-type: none"> <li>• Since we see negative numbers in everyday contexts, what happens when you add, subtract, multiply, and divide integers?</li> <li>• Why are estimating and checking your answer important?</li> <li>• How can mental math help you make generalized predictions?</li> </ul>

Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: 3

**Assessment Item:**

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**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT




**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

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**Power Standard #5:**

**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. 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, identifying the sequence of the operations used in each approach. b. 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.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"> <li>● Variables</li> <li>● Linear Expressions</li> <li>● Four Operations</li> <li>● Distributive Property</li> <li>● Properties of Operations</li> <li>● Coefficients</li> <li>● Inequalities</li> <li>● Equations</li> <li>● Rational numbers</li> <li>● Sequence</li> <li>● Graphing</li> <li>● Solution set</li> <li>● Like terms</li> <li>● Constants</li> <li>● Order of operations</li> </ul>	<ul style="list-style-type: none"> <li>● Understand the meaning of a variable</li> <li>● Knowing new terms such as like terms, coefficients, constants</li> <li>● Identify and combine like terms</li> <li>● Know the different inverse properties</li> <li>● Solve ratio word problems</li> <li>● Model equations</li> <li>● Solve equations</li> <li>● Solve two step equations</li> <li>● Prove solutions by replacing the variable with found answer</li> <li>● Identify inequalities in real-world applications</li> <li>● Graph inequalities on the number line</li> <li>● Compare solutions of equations</li> <li>● Understand the graph and what it represents</li> </ul>
<p><u>Topics</u></p> <ul style="list-style-type: none"> <li>● Real life problems that arise in literature, social science, and religion</li> </ul>	

<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
<ul style="list-style-type: none"> <li>Students use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>How can you use numbers and symbols to represent mathematical ideas and everyday situations?</li> <li>What does it mean to say that two quantities are equal?</li> </ul>

Bloom's Taxonomy Level: Analyze
Depth of Knowledge Level: 3

**Assessment Item:**

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**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

**Power Standard #6:**

**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.

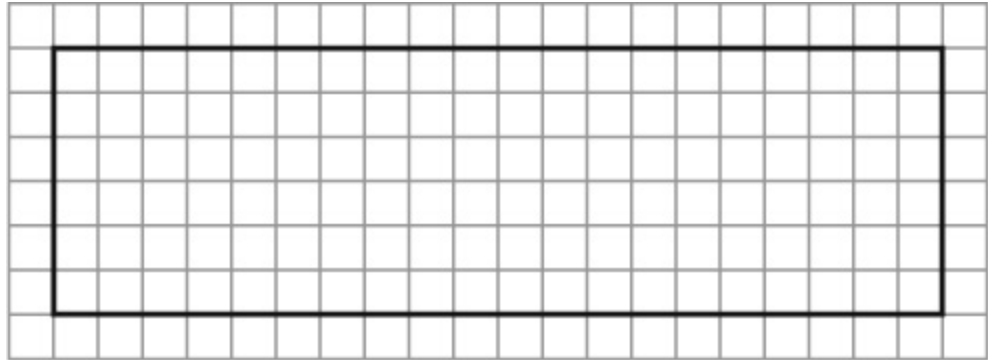
<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"><li>● Ratios</li><li>● Geometric figures</li><li>● Length</li><li>● Scale drawings</li><li>● Conversion</li></ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"><li>● Use ratios and proportions to solve scale drawing problems</li><li>● Determine if shapes are similar or congruent</li><li>● Calculate the side lengths and angle measures</li><li>● Understanding the difference between similar and congruent</li><li>● Construct scale drawings</li></ul>
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● Art connection</li><li>● Science - constructing an experiment or model</li></ul>	

<p style="text-align: center;"><b><u>Big Ideas</u></b></p> <ul style="list-style-type: none"><li>● 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.</li><li>● 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.</li></ul>	<p style="text-align: center;"><b><u>Essential Questions</u></b></p> <ul style="list-style-type: none"><li>● How can we use scale drawings to interpret designs and maps and describe real world objects?</li></ul>
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Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: 2

**Assessment Item:**

This is a scale drawing of an office building. The scale is 1 unit : 6 feet. If you redrew the office building using a scale of 1 unit : 4 feet, what would be the dimensions of the new drawing? Draw it on the grid.



**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
Using ratios and proportions to solve scale drawing problems.	3	2	1	
Calculate side lengths with different proportions.	3	2	1	

<b>Construct scale drawings.</b>	<b>3</b>	<b>2</b>	<b>1</b>	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

<b>EXPECTATION</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Using ratios and proportions to solve scale drawing problems.</b>	Shown usage of ratios and proportions in solving the problem.	Shown solving the problem without using ratios and proportions.	Did not show work.
<b>Calculate side lengths with different proportions.</b>	Both final side lengths are correct.	One side length is correct.	Neither side length is correct.
<b>Construct scale drawings.</b>	The drawing has the proper scale on the grid.	The drawing is proportionate, but not on the proper scale.	The drawing is not proportionate or the proper scale.

**Power Standard #7:**

**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

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"><li>● Area</li><li>● Circumference</li><li>● Ratio</li><li>● Diameter</li><li>● Radius</li><li>● Pi</li></ul>	<ul style="list-style-type: none"><li>● Understand that pi is an irrational number</li><li>● Identify the different parts of a circle</li><li>● Use a formula and input data to find a solution</li><li>● Understand the relationship between the circumference and area of a circle</li><li>● Understand the ratio between the circumference and the diameter of a circle</li><li>● Solve real-life and mathematical problems for the circumference</li><li>● Solve real-life and mathematical problems for the area of circles</li></ul>
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● Art and map design</li><li>● Science model construction</li></ul>	

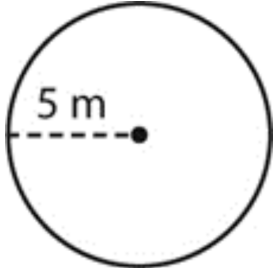


<u>Big Ideas</u>	<u>Essential Questions</u>
<ul style="list-style-type: none"> <li>Students continue their work with area from grade 6, solving problems involving the area and circumference of a circle</li> </ul>	<ul style="list-style-type: none"> <li>What is pi and how is it connected to circles?</li> <li>How can we use formulas to describe measurements of circles?</li> </ul>

Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: 1

**Assessment Item:**

Find the circumference of the circle.



**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

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**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
Use a formula and substitute in numbers correctly.				
Use parts of a circle to determine which number to put in the equation.				
Understand the relationship between the circumference and the diameter of the circle.				

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1
Use a formula and substitute in numbers correctly.	Use the $C=2\pi r$ formula correctly.	Use the $C=2\pi r$ formula incorrectly.	Do not use the correct formula.

<p><b>Use parts of a circle to determine which equation for circumference is needed.</b></p>	<p>Realize that the 5 m is the radius and has to be doubled before multiplying by pi.</p>	<p>Not doubling the 5 m before multiplying by pi.</p>	<p>Not using 5 at all in the equation.</p>
<p><b>Understand the relationship between the circumference and the diameter of the circle.</b></p>	<p>Change the radius into a diameter before multiplying by pi.</p>	<p>Don't change the radius into a diameter before multiplying by pi.</p>	<p>Not using the radius or diameter.</p>

**Power Standard #8:**

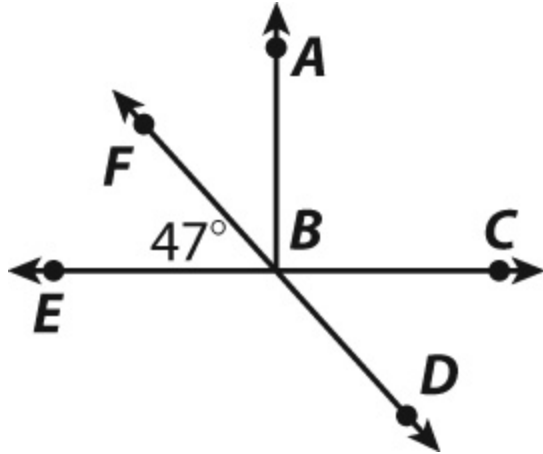
**7.G.5** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> <li>● Supplementary</li> <li>● Complementary</li> <li>● Vertical</li> <li>● Adjacent</li> <li>● Triangle</li> <li>● Right angles</li> <li>● Obtuse</li> <li>● Acute</li> </ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"> <li>● Classify angles</li> <li>● Identify adjacent and vertical angles</li> <li>● Understand that vertical angles are congruent</li> <li>● Write and solve equations for angle measure problems</li> <li>● Understand and use facts about supplementary, complementary, vertical, and adjacent angles to solve problems</li> <li>● Solve real life and mathematical problems involving angle measure including multi-step problems</li> </ul>
<p><u>Topics</u></p> <ul style="list-style-type: none"> <li>● Art and map design</li> <li>● Science model construction</li> </ul>	

<p style="text-align: center;"><b><u>Big Ideas</u></b></p> <ul style="list-style-type: none"> <li>● In preparation for work on congruence and similarity in grade 8, they gain familiarity with the relationships between angles formed by intersecting lines</li> <li>● Students see the overlap of geometry and algebra</li> </ul>	<p style="text-align: center;"><b><u>Essential Questions</u></b></p> <ul style="list-style-type: none"> <li>● How are the different angles created by intersecting lines related?</li> <li>● How can we use our knowledge of this relationship to measure and describe real-world objects?</li> </ul>
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Bloom's Taxonomy Level: Apply
Depth of Knowledge Level: 2

<b>Assessment Item:</b>



What is the measure of angle DBC?

**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
Understand that vertical angles are congruent.	3	2	1	
Write and solve equations for angle measure standards.	3	2	1	
Understand and use facts about	3	2	1	

<b>supplementary, complementary, vertical, and adjacent angles to solve problems</b>				
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\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

<b>EXPECTATION</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Understand that vertical angles are congruent.</b>			
<b>Write and solve equations for angle measure standards.</b>			
<b>Understand and use facts about supplementary, complementary, vertical, and adjacent angles to solve problems</b>			

**Power Standard #9:**

**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.

<u>Concepts</u>	<u>Skills</u>
<ul style="list-style-type: none"> <li>● Area</li> <li>● Volume</li> <li>● Surface Area</li> <li>● Prisms</li> <li>● Pyramids</li> <li>● Polygons</li> <li>● Cubes</li> <li>● 3D figures/objects</li> </ul>	<ul style="list-style-type: none"> <li>● Identify different 2D and 3D figures</li> <li>● Understand the different measurements of 2D and 3D figures</li> <li>● Understand the exponents and units associated with area and volume measurements</li> <li>● Know the different formulas for area and volume</li> <li>● Understand the relationship between surface area and volume of 3D objects</li> <li>● Find the area of composite figures</li> <li>● Find the volume of prisms and cubes</li> <li>● Compute the surface area of 3D prisms</li> <li>● Solve real-life and mathematical problems for the area of two-dimensional objects composed of polygons</li> <li>● Solve real-life and mathematical problems for the volume of 3D objects composed of prisms and cubes</li> </ul>
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"> <li>● Art and map design</li> </ul>	

- Science model construction

<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
<ul style="list-style-type: none"> <li>• Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• How can we use formulas to calculate measurements of real-world objects?</li> </ul>

Bloom's Taxonomy Level: Apply

Depth of Knowledge Level: 1

**Assessment Item:**

**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT




**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1


**Power Standard #10:**

**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.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> <li>● Biased and unbiased samples</li> <li>● Data</li> <li>● Populations</li> <li>● Validity</li> <li>● Predictions</li> </ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"> <li>● Understand the basis of statistics</li> <li>● Understand the difference between valid and invalid, biased and unbiased samples</li> <li>● Understand random sampling and other types of valid sampling</li> <li>● Understand how generalizations about a population can be made</li> </ul>
<p><u>Topics</u></p> <ul style="list-style-type: none"> <li>● Marketing and business connections</li> <li>● Social science connections</li> <li>● History - looking at trends in populations</li> </ul>	

<p style="text-align: center;"><b><u>Big Ideas</u></b></p> <ul style="list-style-type: none"> <li>● Students build on their previous work with single data distributions to</li> </ul>	<p style="text-align: center;"><b><u>Essential Questions</u></b></p> <ul style="list-style-type: none"> <li>● Why is it important to analyze a sampling set or population?</li> </ul>
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<p>address questions about differences between populations.</p> <ul style="list-style-type: none"> <li>• They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.</li> <li>• Students use their understanding of biased and unbiased data sets and populations to ascertain validity.</li> </ul>	<ul style="list-style-type: none"> <li>• Can a display be biased and why is it important to be able to identify invalid data sets?</li> <li>• How do we create sample sets that are unbiased?</li> <li>• How can valid populations and data sets help us make predictions?</li> </ul>
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Bloom's Taxonomy Level: Understand
Depth of Knowledge Level: 2

**Assessment Item:**

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**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT
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	<b>3</b>	<b>2</b>	<b>1</b>	
	<b>3</b>	<b>2</b>	<b>1</b>	
	<b>3</b>	<b>2</b>	<b>1</b>	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

<b>EXPECTATION</b>	<b>3</b>	<b>2</b>	<b>1</b>

**Power Standard #11:**

**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.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"><li>● Median</li><li>● Mean</li><li>● Mode</li><li>● Range</li><li>● Quartile</li><li>● IQR</li><li>● Mean Absolute Deviation</li><li>● Inferences</li><li>● Populations</li><li>● Outlier</li></ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"><li>● Draw informal inferences about populations</li><li>● Compute median, mean, mode, range, quartiles, IQR, and M.A.D.</li><li>● Use measures of center tendencies</li><li>● Use measures of variability</li><li>● Interpret different data sets: graphs, dot plots, box plots, tables</li><li>● Create different data displays</li></ul>
<p style="text-align: center;"><u>Topics</u></p> <ul style="list-style-type: none"><li>● History - making connections about populations and trends</li><li>● Science - measuring and making inferences on data</li></ul>	

<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
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<ul style="list-style-type: none"> <li>• Students build on their previous work with single data distributions to compare two data distributions.</li> <li>• Students can make accurate generalizations about data.</li> <li>• Students can understand and create different representations to display data.</li> <li>• They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.</li> </ul>	<ul style="list-style-type: none"> <li>• What do measures of center and variability tell us about a data set?</li> <li>• How do you know which display is best for a data set?</li> </ul>
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Bloom's Taxonomy Level: Analyze

Depth of Knowledge Level: 3

**Assessment Item:**

**Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT	TEACHER ASSESSMENT

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1

**Power Standard #12:**

**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. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

<p style="text-align: center;"><u>Concepts</u></p> <ul style="list-style-type: none"> <li>● Probability</li> <li>● Frequency</li> <li>● Model</li> <li>● Outcomes</li> <li>● Tree diagrams</li> <li>● Permutations</li> <li>● Independent and dependent events</li> <li>● Theoretical</li> <li>● Experimental</li> <li>● Compound events</li> <li>● Simulations</li> <li>● Fundamental Counting Principle</li> </ul>	<p style="text-align: center;"><u>Skills</u></p> <ul style="list-style-type: none"> <li>● Calculate the probabilities of events</li> <li>● Understand discrepancies found in events</li> <li>● Analyze probabilities models</li> <li>● Create simulations and probability model</li> <li>● Understand the difference between theoretical and experimental probabilities</li> <li>● Compute permutations</li> <li>● Compute using the fundamental counting principle</li> </ul>
<p><u>Topics</u></p> <ul style="list-style-type: none"> <li>● PE - keeping games fair</li> <li>● History - looking at chance events and seeing trends</li> </ul>	



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<b><u>Big Ideas</u></b>	<b><u>Essential Questions</u></b>
<ul style="list-style-type: none"><li>• Students investigate chance processes and develop, use, and evaluate probability models to make predictions</li></ul>	<ul style="list-style-type: none"><li>• How can you predict the outcome of future events?</li></ul>

Bloom's Taxonomy Level: Create
Depth of Knowledge Level: 4

**Assessment Item:**

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**Three-Column Rubric**

<b>EXPECTATION</b>	<b>STUDENT SELF-ASSESSMENT</b>	<b>TEACHER ASSESSMENT</b>

**Point Value Three-Column Rubric**

EXPECTATION	STUDENT SELF-ASSESSMENT			TEACHER ASSESSMENT
	3	2	1	
	3	2	1	
	3	2	1	
	3	2	1	

\*If using point values, create explicit expectations for student performance under each point value for each specific standard expectation.

EXPECTATION	3	2	1