Pojoaque Valley Schools

Mathematics CCSS Pacing Guide

8th Grade

**Skills adapted from*
Kentucky Department of Education
Math Deconstructed Standards
*** Evidence of attainment/assessment, Vocabulary, Knowledge, Skills and Essential Elements adapted from Wisconsin Department of Education and Standards Insights Computer-Based Program*

Version 3 2015-2016

Pojoaque Valley Schools
Math Common Core Pacing Guide Introduction

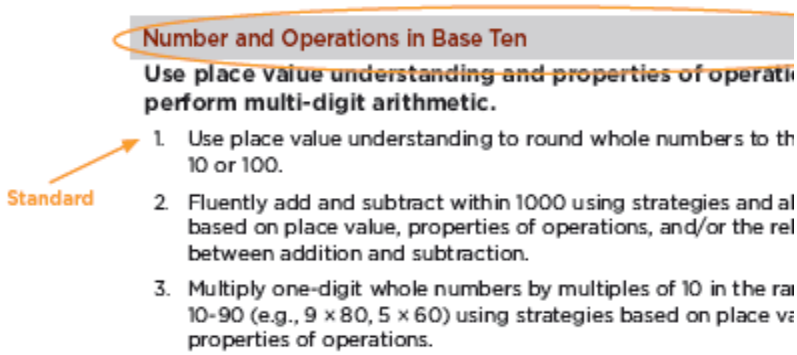
The New Mexico Public Education Department published the Assessment B with those standards clearly identified that are measured. While students in PARCC for reading, math and science are not required to take an End-of-Co graduation requirement), the blueprints outline those standards and provide r pacing guide, standards that are identified as being measured are highlighted

The Pojoaque Valley Schools pacing guide documents are intended to guide State Standards (CCSS) over the course of an instructional school year. The **by quarter.** Teachers should understand that the **focus standards** emphasiz timeframe. However, because a certain quarter does not address specific star previously taught standards should be reinforced while working on the focus quarter. Some standards will **recur** across all quarters due to their importanc ongoing basis.

The Math pacing guides are grounded in four key components: the key fluen level, the critical areas designated in the CCSS Math Standards, the Commo and the integration of the Standards for Mathematical Practice. In planning i teachers incorporate the 8 mathematical practices for mathematics to ensure are mastered by all students.

The Math CCSS pacing guides contain the following elements:

- **Grade Level:** Identify the grade level of the intended standard
- **Standard with code:** Defines the knowledge and skills for students. domain and standard number.
- **Domain:** Larger groups of related standards**.** Standards from differer closely related.
- **Cluster:** Summarize groups of related standards.
- **Skills and Knowledge:** Identified as subsets of the standard and app the skills and knowledge embedded in the standard to meet the full ir



Version 2 of the Pojoaque Valley School District Pacing guides for Reading Language Arts and Mathematics are based on the done by staff and teachers of the school district using the Kentucky model, and a synthesis of the excellent work done by Wisconsin Cooperative Educational Service Agency 7 (CESA 7) School Improvement Services, Green Bay, WI. (2010), *Standards Insight project.*

> *Standards Insight* was developed to give educators a tool for in depth investigation of the Common Core State Standards (CCSS). The CCSS are "unpacked" or dissected, identifying specific knowledge, skills, vocabulary, understandings, and evidence of student attainment for each standard. *Standards Insight* may be used by educators to gain a thorough grasp of the CCSS or as a powerful collaborative tool supporting educator teams through the essential conversations necessary for developing shared responsibility for student attainment of all CCSS. . . . serves as a high-powered vehicle to help educators examine the standards in a variety of ways.

The Version 2 Pojoaque Valley School District Pacing guides present the standard with levels of detail and then the necessary skills by quarter based on the Kentucky model. On the second page for each standard, the synthesis of the *Standards Insight* project is presented in a way that further defines and refines the standard such that teachers may use the information to refine their teaching practices.

Based on this synthesis of work and the purpose for the unpacking, the following fields were selected as most helpful to aid in understanding of the Common Core Standards that will lead to shifts in instruction:

1. Evidence of Student Attainment: "What could students do to show attainment of the standard?"

2. Vocabulary: "What are key terms in the standard that are essential for interpretation and understanding in order for students to learn the content?"

3. Knowledge: "What does the student need to know in order to aid in attainment of this standard?"

4. Skills and Understanding: "What procedural skill(s) does the student need to demonstrate for attainment of this standard?", and "What will students understand to attain the standard?"

The following fields are included in Version 2:

Evidence of Student Attainment: This field describes what the standard may look like in student work. Specific expectations are listed in performance terms showing what students will say or do to demonstrate attainment of the standard.

Standards Vocabulary: This field lists words and phrases specific to each standard. Shared interpretation and in depth understanding of standards vocabulary are essential for consistent instruction across and within grade levels and content areas.

Knowledge: The knowledge field lists what students will need to know in order to master each standard (facts, vocabulary, and definitions).

Skills and Understanding: The skills field identifies the procedural knowledge students apply in order to master each standard (actions, applications, strategies), as well as the overarching understanding that connects

the standard, knowledge, and skills. Understandings included in *Standards Insight* synthesize ideas and have lasting value.

Instructional Achievement Level Descriptors: This field lists, by level what a teacher can expect to see in a student who achieves at a particular level. Additionally teachers can use this filed to differentiate instruction to provide further growth for student's in moving from one level to another. This field can be used to provide specific teaching approaches to the standard in question.

A Note About High School Standards: The high school standards are listed in conceptual categories. Conceptual categories portray a coherent view of high school instruction that crosses traditional course boundaries. We have done everything possible, with teacher input, to link individual standards to the appropriate pacing guides,

References to Tables: References to tables within the standards in the *Standards Insight* tool refer to Tables 1-5 found in the glossary of the Mathematics Common Core State Standards document found at www.corestandards.org.

PVMS 8th Grade
Math Year-at-a-Glance
Completed 1-14-14

Quarter 1	Quarter 2	Quarter 3	Quarter 4
8.NS.1 **8.NS.2** **8.EE.1** **8.EE.2** **8.EE.3** **8.EE.4**	**8.EE.5** **8.EE.6** **8.EE.7** **8.EE.8**	**8.F.1** **8.F.2** **8.F.3** **8.F.4** **8.F.5** **8.SP.1** **8.SP.2** **8.SP.3** **8.SP.4**	**8.G.1** **8.G.2** **8.G.3** **8.G.4** **8.G.5** **8.G.6** **8.G.7** **8.G.8** **8.G.9**

Quarterly View of Standards **8th Grade Mathematics Pacing Guide** **Quarter**	**1**	**2**	**3**	**4**
8.NS.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	**X**			
8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2). *For example, by truncating the decimal expansion of* √2, *show that* √2 *is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	**X**			
8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, 32 × 3–5 = 3–3 = 1/33 = 1/27.*	**X**			
8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form *x2 = p* and *x3 = p,* where *p* is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	**X**			
8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.*	**X**			
8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	**X**			
8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*		**X**		
8.EE.6 Use similar triangles to explain why the slope *m* is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation *y = mx* for a line through the origin and the equation *y = mx + b* for a line intercepting the vertical axis at *b.*		**X**		
8.EE.7a Solve linear equations in one variable. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form *x = a, a = a,* or *a = b* results (where *a* and *b* are different numbers).		**X**		
8.EE.7b Solve linear equations in one variable. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.		**X**		
8.EE.8a Analyze and solve pairs of simultaneous linear equations. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.		**X**		

Quarter	1	2	3	4
8.EE.8bc Analyze and solve pairs of simultaneous linear equations. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.* Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*		**X**		
8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1			**X**	
8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*			**X**	
8.F.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*			**X**	
8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, *y)* values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.			**X**	
8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.			**X**	
8.G.1abc Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines				**X**
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.				**X**
8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.				**X**
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.				**X**
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.*				**X**
8.G.6 Explain a proof of the Pythagorean Theorem and its converse.				**X**
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.				**X**
8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.				**X**

Quarter	1	2	3	4
8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.				**X**
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.			**X**	
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.			**X**	
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.*			**X**	
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?*			**X**	

CCSS Math Pacing Guide
Grade 8

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<tr><td colspan="2">Quarter 1:
Define irrational numbers
Sho
w that the decimal expansion of rational numbers repeats eventually.

Convert a decimal expansion which repeats eventually into a rational number.

Show informally that every number has a decimal expansion.</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of numbers, Categorize the numbers as rational and irrational and defend the placement. Given a rational number in fraction form, Provide the decimal representation showing the repeating nature of the decimal expansion. Given a repeating decimal expansion, Produce the rational representation in the form a/b.	Rational Irrational Repeats eventually	Students know: The decimal representation of a rational number in the form a/b may be found using the long division algorithm, Strategies for creating the rational representation in the form a/b, when given a repeating decimal.	Students understand that/are able to: Accurately perform the long division algorithm to produce decimal expansions of rational numbers, Produce a rational form of a repeating decimal by using regularities in the form of repeating decimals and properties of equality. Every number has a decimal representation, If a number is not rational (its decimal expansion does not repeat) then it must be irrational.	**EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than or equal to one.	**Level IV Students will:** **EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends that may be greater than one. Ex. Subtract two fractions with like denominators with models or numbers. Ex. If I have 1 3/4 and I take 1/4 away, how many wholes and fourths are left? **Level III Students will:** **EE8.NS.1.** Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than or equal to one. Ex. Use fraction bars or fraction circles to add and match a numerical representation to the model so the answer is less than or equal to one. Ex. Given 3/4, take 1/4 away and tell or show how many fourths are left. Ex. Given 7/10, recognize that 3/10 are needed to make a whole. (Connect to money – 10 dimes = one whole dollar) **Level II Students will:** **EE8.NS.1.** Use models to subtract halves, thirds, and fourths. Ex. Given a whole divided into thirds, tell me how many times they can take a third out of the whole. Ex. Presented a rectangle with 1/3 of the whole shaded, tell how many thirds are left.* **Level I Students will:** **EE8.NS.1.** Use models to identify the whole and find the missing pieces of a whole using halves. Ex. Presented an object with a piece missing and a whole object, identify the whole. Ex. Given 1/2 of a pizza, identify the missing part (concrete model or touch board). Ex. Given a whole with 1/2 shaded, identify the missing part.* ***Refer to the Common Core Essential Elements document for diagram.**

CCSS Math Pacing Guide
Grade 8

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<tr><td colspan="2">Domain: The Number System</td><td colspan="6">Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.</td></tr>
<tr><td colspan="2">Quarter 1:

Approximate irrational numbers as rational numbers.

Approximately locate irrational numbers on a number line.

Estimate the value of expressions involving irrational numbers using rational approximations. (For example, by truncating the decimal expansion of√2 , show that 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.)</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Place irrational numbers on a number line by using known relationships about the number to approximate the size of an irrational number by manipulating (dividing, multiplying, squaring) numbers until the desired approximation is determined, strategically using technology when appropriate.		Students know: Techniques for approximating irrational numbers to a desired level of accuracy for example, finding the square root of two by placing it between 1 and 2, then between 1.4 and 1.5, etc. by using the inverse relationship between squaring and square root.	Students understand that/are able to: Approximate square roots by using the inverse relationship between squaring and square root, Accurately place rational numbers on a number line, Strategically select the appropriate form of computation (mental, paper/pencil, calculator). All irrational numbers may be approximated with rational numbers to any desired number of decimal places, The number of decimal places used to approximate an irrational number is determined by the problem context, Inverse relationships such as squaring and square roots on rational numbers may used to approximate irrational numbers.	**EE8.NS.2.** Represent different forms and values of decimal numbers using fractions with numerators that are multiples of five and a denominator of 100.	**Level IV Students will:** **EE8.NS.2.** Represent different forms and values of decimal numbers to the hundreds place (decimal, fraction, hundreds grid, and money representation). Ex. Given a hundreds grid, shade in an approximation to a given decimal or fraction. Ex. Given a picture of a shaded hundreds grid, determine the decimal or fractional part. Ex. When given coins representing 60 cents, write the decimal amount as $0.60. **Level III Students will:** **EE8.NS.2.** Represent different forms and values of decimal numbers using fractions with numerators that are multiples of five and a denominator of 100. Ex. Given a hundreds grid with one fourth shaded-in, identify the correct decimal representation from choices 25/100, 10/100, or 100/100. Ex. When given coins representing 50 cents, write the decimal value as $0.50. **Level II Students will:** **EE8.NS.2.** Distinguish between a part represented by a decimal and a whole number without decimals. Ex. Given a dollar and two quarters, identify which represents the whole (dollar) and the decimal part (two quarters). Ex. Given a fully shaded-in hundreds grid and a partially shaded-in hundreds grid, identify which represents the whole and which represents the decimal (part of a whole). **Level I Students will:** **EE8.NS.2.** Identify a part of a whole in concrete real-world objects. Ex. When shown an apple with a missing piece, identify the part that is missing. Ex. When given a student's schedule for the day with one activity missing, identify what activity is missing from their schedule. Ex. Show which piece is missing from a familiar object.

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<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Work with radicals and integer exponents.</td></tr>
<tr><td colspan="2">Quarter 1:
Explain the properties of integer exponents to generate equivalent numerical expressions. For example,
$3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27.$

Apply the properties of integer exponents to produce equivalent numerical expressions.</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given exponential expressions with integer exponents, Produce equivalent expressions that are useful for different mathematical situations, Justify, through application, the equivalence of exponential expressions using properties of exponents.	Integer exponents Equivalent Numerical expressions	Students know: Properties of exponents.	Students understand that/are able to: Use properties of exponents to produce equivalent forms of the same expression, Justify the equivalence of exponential expressions. The properties of exponents are true regardless of the type of numbers being used, Properties of exponents are generalizations that are formed from the meanings of exponents, and are used to write equivalent forms of exponential expressions, Equivalent exponential expressions are interchanged based on which form is most efficient for the context.	**EE8.EE.1-4.** Compose and decompose numbers to three digits.	**Level IV Students will:** **EE8.EE.1-4.** Use powers of 10 to compose and decompose numbers. Ex. Recognize 3 x 102 = 300 as another way to state 3 x 100 = 300. Ex. 5 x 101 = ___. **Level III Students will:** **EE8.EE.1-4.** Compose and decompose numbers to three digits. Ex. 300 + 50 + 7 = _____. Ex. 57 = _____ + _____. Ex. Show that twelve is one 10 and two ones, or 12 ones, or seven ones and five ones, etc. **Level II Students will:** **EE8.EE.1-4.** Use models to represent the composition of numbers. Ex. Illustrate a number using models. Ex. Show that 12 is one 10 and two ones. Ex. Compose numbers to five. Ex. Compose numbers to 10. Ex. Model numbers using base ten blocks. Ex. Distinguish the value of the digits in 134 (e.g., 1 = 100, 3 = 30, and 4 = 1). Ex. Given two nickels, show the correct number to represent that value. **Level I Students will:** **EE8.EE.1-4.** Recognize the specific value a number represents. Ex. Recognize a number using pictorial representations. Ex. Match a numerical value with a pictorial representation or concrete objects. Ex. Look at a model and determine the numeric value. Ex. Given a jig or a model with 10 spaces, put one object per space and assemble a group of 10. Ex. Given three bears, select the number three card.

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Grade Level: 8th							
Standard with code: 8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form *x2 = p* and *x3 = p,* where *p* is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.							
Domain: Expressions and Equations		**Cluster: Work with radicals and integer exponents.**					
Quarter 1: 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. Evaluate cube roots of small perfect cubes. Know that the square root of 2 is irrational.		**Quarter 2:**		**Quarter 3:**		**Quarter 4:**	
Make sense of problems and persevere in solving them.	**Reason abstractly and quantitatively.**	**Construct viable arguments and critique the reasoning of others.**	**Model with mathematics.**	**Use appropriate tools strategically.**	**Attend to precision.**	**Look for and make use of structure.**	**Look for and express regularity in repeated reasoning.**

Evidence of Student Attainment	**Vocabulary**	**Knowledge**	**Skills**	**Common Core Essential Elements**	**Instructional Achievement Level Descriptors**
Students: When presented with an equation of the form $x^2 = p$, Translate this to the form *x = plus or minus square root p* and evaluate the expression when *p* is a perfect square.	Square root Cube root Irrational Perfect squares Perfect cubes	Students know: Characteristics of rational and irrational numbers, Strategies for powering,	Students understand that/are able to: Fluently determine the square roots of small perfect squares and cube roots of small perfect cubes,	**EE8.EE.1-4.** Compose and decompose numbers to three digits.	**Level IV Students will:** **EE8.EE.1-4.** Use powers of 10 to compose and decompose numbers. Ex. Recognize 3 x 102 = 300 as another way to state 3 x 100 = 300. Ex. 5 x 101 = ___. **Level III Students will:** **EE8.EE.1-4.** Compose and decompose numbers to three digits. Ex. 300 + 50 + 7 = _____. Ex. 57 = _____ + _____.

When presented an equation in the form $x^3 = p$, Translate this into the form *X = cube root p* and evaluate the expression when *p* is a perfect cube, Critique why the following (or other proof) means √2 must be irrational: *If the square root of 2 is rational it may be written as square root 2 = p/q. This means that* $2 = p^2/q^2$ *and therefore* $2q^2 = p$. *Since* p^2 *has as its prime factorization two sets of factors of p, it has an even number of factors. The same is true of* q^2. *Therefore,* $2q^2$ *has an odd number of prime factors. It is impossible for an even number of prime factors to equal an odd number of prime factors. Therefore, square root 2 cannot equal p/q and cannot be rational.*		Strategies for finding and estimating square and cube roots.	Translate equations in the form $x^2 = p$ to the form x = plus or minus square root p in order to find solutions, Translate equations in the form $x^3 = p$ to the form x = cube root p in order to find solutions, Use logical mathematical reasoning to critique a proof of the √2 as an irrational number. Powering and finding corresponding roots are inverse operations, Square roots and cube roots can be determined by the relationship with the inverse operations of squaring and cubing, If a number is not rational (its decimal expansion does not repeat) then it must be irrational.		Ex. Show that twelve is one 10 and two ones, or 12 ones, or seven ones and five ones, etc. **Level II Students will:** **EE8.EE.1-4.** Use models to represent the composition of numbers. Ex. Illustrate a number using models. Ex. Show that 12 is one 10 and two ones. Ex. Compose numbers to five. Ex. Compose numbers to 10. Ex. Model numbers using base ten blocks. Ex. Distinguish the value of the digits in 134 (e.g., 1 = 100, 3 = 30, and 4 = 1). Ex. Given two nickels, show the correct number to represent that value. **Level I Students will:** **EE8.EE.1-4.** Recognize the specific value a number represents. Ex. Recognize a number using pictorial representations. Ex. Match a numerical value with a pictorial representation or concrete objects. Ex. Look at a model and determine the numeric value. Ex. Given a jig or a model with 10 spaces, put one object per space and assemble a group of 10. Ex. Given three bears, select the number three card.

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<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Work with radicals and integer exponents.</td></tr>
<tr><td colspan="2">Quarter 1:
Express numbers as a single digit times an integer power of 10.

Use scientific notation to estimate very large and/or very small quantities.

Compare quantities to express how much larger one is compared to the other.</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given real-world or mathematical contexts, Estimate very small or very large quantities from the contexts as a single digit times a whole-number power of 10. Given two very small or very large related quantities in the form of a single digit times a whole-number power of 10, Determine the relative size of each number and approximate how many times as much one is than the other using power of ten representations.	Whole-number power of ten	Students know: Place value representations as powers of 10, Structure of place value representations as powers of 10.	Students understand that/are able to: Choose and apply appropriate and compatible representations (decimal and scientific notation) of very small or very large numbers for computing solutions to contextual problems, Rewrite very large or very small numbers in contextual situations in the form of single digit multiples of powers of ten, Rewrite very large or very small numbers in the form of single digit multiples of ten as single numbers, Compare two related numbers written in the form of single digit multiples of ten by reporting the number of times one	**EE8.EE.1-4.** Compose and decompose numbers to three digits.	**Level IV Students will:** **EE8.EE.1-4.** Use powers of 10 to compose and decompose numbers. Ex. Recognize 3 x 102 = 300 as another way to state 3 x 100 = 300. Ex. 5 x 101 = ___. **Level III Students will:** **EE8.EE.1-4.** Compose and decompose numbers to three digits. Ex. 300 + 50 + 7 = _____. Ex. 57 = _____ + _____. Ex. Show that twelve is one 10 and two ones, or 12 ones, or seven ones and five ones, etc. **Level II Students will:** **EE8.EE.1-4.** Use models to represent the composition of numbers. Ex. Illustrate a number using models. Ex. Show that 12 is one 10 and two ones. Ex. Compose numbers to five. Ex. Compose numbers to 10. Ex. Model numbers using base ten blocks. Ex. Distinguish the value of the digits in 134 (e.g., 1 = 100, 3 = 30, and 4 = 1). Ex. Given two nickels, show the correct number to represent that value. **Level I Students will:** **EE8.EE.1-4.** Recognize the specific value a number represents. Ex. Recognize a number using pictorial representations. Ex. Match a numerical value with a pictorial representation or concrete objects. Ex. Look at a model and determine the numeric value. Ex. Given a jig or a model with 10 spaces, put one object per space and assemble a group of 10. Ex. Given three bears, select the number three card.

			is larger or smaller than the other, Use knowledge of the structure of place value representations of powers of 10 to justify the result of comparing two very large or very small numbers. When very large or very small numbers are written in the form, digit times a power of ten, both the multiple and the power must be considered when determining the relative size of the numbers, Different representations of the same number are useful to resolve or interpret different contextual problems.		

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Work with radicals and integer exponents.</td></tr>
<tr><td colspan="2">Quarter 1:
Perform operations using numbers expressed in scientific notations.

Use scientific notation to express very large and very small quantities.

Interpret scientific notation that has been generated by technology.

Choose appropriate units of measure when using scientific notation.</td><td colspan="3">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Interpret scientific notation that has been generated by technology. Given any context where scientific notation is present including situations where both scientific and decimal notation are present, Add, subtract, multiply, and divide these numbers expressing numerical answers with a degree of precision appropriate for the problem context (including choice of units) and explain the meaningfulness of the results related to the original context.	Scientific notation Decimal notation	Students know: Procedures for converting between decimal and scientific notation, Procedures for operating on numbers written in scientific notation.	Students understand that/are able to: Choose and apply appropriate and compatible representations (decimal and scientific notation) of very small or very large numbers for computing solutions to contextual problems, Justify choice of unit and degree of precision when computing with very large and very small numbers, Convert between decimal and scientific notation, Operate on numbers written in scientific notation, Interpret scientific notation that has been generated by technology. When operating on	**EE8.EE.1-4.** Compose and decompose numbers to three digits.	**Level IV Students will:** **EE8.EE.1-4.** Use powers of 10 to compose and decompose numbers. Ex. Recognize 3 x 102 = 300 as another way to state 3 x 100 = 300. Ex. 5 x 101 = ___. **Level III Students will:** **EE8.EE.1-4.** Compose and decompose numbers to three digits. Ex. 300 + 50 + 7 = _____. Ex. 57 = _____ + _____. Ex. Show that twelve is one 10 and two ones, or 12 ones, or seven ones and five ones, etc. **Level II Students will:** **EE8.EE.1-4.** Use models to represent the composition of numbers. Ex. Illustrate a number using models. Ex. Show that 12 is one 10 and two ones. Ex. Compose numbers to five. Ex. Compose numbers to 10. Ex. Model numbers using base ten blocks. Ex. Distinguish the value of the digits in 134 (e.g., 1 = 100, 3 = 30, and 4 = 1). Ex. Given two nickels, show the correct number to represent that value. **Level I Students will:** **EE8.EE.1-4.** Recognize the specific value a number represents. Ex. Recognize a number using pictorial representations. Ex. Match a numerical value with a pictorial representation or concrete objects. Ex. Look at a model and determine the numeric value. Ex. Given a jig or a model with 10 spaces, put one object per space and assemble a group of 10. Ex. Given three bears, select the number three card.

			numbers written in scientific notation both the multiplier and the exponent of 10 must be considered, Different representations of the same number (decimal and scientific notation) are useful to resolve or interpret different contextual problems.		

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Understand the connections between proportional relationships, lines, and linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:
Graph proportional relationships

Compare two different proportional relationships represented in different ways. (For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.)

Interpret the unit rate of proportional relationships as the slope of the graph.</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given real-world or mathematical contexts involving proportional relationships, Graph the relationships from the contexts and use mathematical language to explain the connection between the slope of the line and the unit rate for the proportion. Given contextual situation involving two different proportional relationships represented in different ways, (e.g., one graph and one table), Use the common concept of unit rate to make comparisons between the two different proportional relationships.	Proportional relationships Unit rate Slope	Students know: Relationships between graphs, tables and equations, The role of unit rate in representations of a proportional relationship.	Students understand that/are able to: Interpret contexts in order to produce graphs, tables, and the related equations, Communicate the relationships between graphs, tables, and equations in order to answer questions about contextual situations, Compare unit rates from graphs, equations, and tables. The constant of proportionality (unit rate) in a relationship communicates the rate of change for one variable with respect to the other (slope) regardless of how the proportional relationship is represented,	**EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1.	**Level IV Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and expand on the ratio by two or more points. Ex. Given a ratio 2:1 (there are two balloons for every child), graph the linear equation on a graph labeled x axis and the y axis. This equation would have a slope of 2. Ex. Given there is one boy for every one girl, graph points for the ratio of 1:1 (this linear equation will have a slope of 1). Ex. Given two plotted data points, plot a third point using pictures. Ex. Given a ratio of 3:1 indicating that each student needs three items, convert the ratio to fraction form (2/1) and plot on a pre-labeled graph this point and two additional points that are functions of the original ratio (3:1, 6:2, 9:3). **Level III Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1. Ex. Given two pieces of data, place on a graph. Ex. Given a ratio of 3:1 indicating that each student needs three items, guide student in converting ratio to fraction form (2/1) and plot on a pre-labeled graph. **Level II Students will:** **EE8.EE.5-6.** Identify a specific data point when given the coordinates. Ex. Read and plot coordinates on a map. Ex. Given three widespread data points and coordinates, identify named point. Ex. Given a standard multiplication chart, find the product of two numbers using coordinate skills. Ex. Indicate with coordinates what data points mean or the data revealed by the specify point. **Level I Students will:** **EE8.EE.5-6.** Place or locate data on a simple two-category graph. Ex. Use distance landmark to tell if something is close or far away. Ex. Finds objects after movement (searches a small area comprehensively). Ex. Locate objects on a map (with or without coordinates).

			Patterns and relationships in mathematical contexts can be represented in a variety of ways in order to solve problems, including understanding that a variety of representations of proportional relationships can be used to solve and interpret mathematical contexts.		

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Understand the connections between proportional relationships, lines, and linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="3">Quarter 2:
Identify characteristics of similar triangles.

Find the slope of a line.

Determine the y-intercept of a line.

(Interpreting unit rate as the slope of the graph is included in 8.EE.)

Analyze patterns for points on a line through the origin.

Derive an equation of the form y = mx for a line through the origin.

Analyze patterns for points on a line that do not pass through or include the origin.

Derive an equation of the form y=mx + b for a line intercepting the vertical axis at b (the y-intercept).

Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Create two different slope triangles (the triangle formed by the segment defined by the two points, the vertical segment from the first point to the horizontal line through the second, and the horizontal line segment from this point to the second point) for the same line, conjecture about the ratio of the vertical change to the horizontal change when such triangles are created, and justify this conjecture through the relationship of proportional sides in similar triangles, Justify the relationship that all slope triangles formed on the same line are similar in order to derive the equations y = mx for a line going through a point (x,y) and the point (0,0), and y = mx + b for a line through (x, y) and the point (0,b), having y-intercept b.	Similar triangles Coordinate plane Origin	Students know: Properties of similar triangles, Properties of equality (Table 4).	Students understand that/are able to: Justify that two triangles are similar, Use relationships of sides in similar figures to determine the scale factor for the dilation producing the similarity. The graph of a linear relationship can be modeled by an equation when we know the slope of the line and the point where the line crosses the y-axis, Two triangles are similar when one is a dilation of the other, All corresponding sides of similar triangles are multiplied by the same scale factor in the dilation that produces the similarity, and therefore the ratios of corresponding sides	**EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1.	**Level IV Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and expand on the ratio by two or more points. Ex. Given a ratio 2:1 (there are two balloons for every child), graph the linear equation on a graph labeled x axis and the y axis. This equation would have a slope of 2. Ex. Given there is one boy for every one girl, graph points for the ratio of 1:1 (this linear equation will have a slope of 1). Ex. Given two plotted data points, plot a third point using pictures. Ex. Given a ratio of 3:1 indicating that each student needs three items, convert the ratio to fraction form (2/1) and plot on a pre-labeled graph this point and two additional points that are functions of the original ratio (3:1, 6:2, 9:3). **Level III Students will:** **EE8.EE.5-6.** Graph a simple ratio using the x and y axis points when given the ratio in standard form (2:1) and convert to 2/1. Ex. Given two pieces of data, place on a graph. Ex. Given a ratio of 3:1 indicating that each student needs three items, guide student in converting ratio to fraction form (2/1) and plot on a pre-labeled graph. **Level II Students will:** **EE8.EE.5-6.** Identify a specific data point when given the coordinates. Ex. Read and plot coordinates on a map. Ex. Given three widespread data points and coordinates, identify named point. Ex. Given a standard multiplication chart, find the product of two numbers using coordinate skills. Ex. Indicate with coordinates what data points mean or the data revealed by the specify point. **Level I Students will:** **EE8.EE.5-6.** Place or locate data on a simple two-category graph. Ex. Use distance landmark to tell if something is close or far away. Ex. Finds objects after movement (searches a small area comprehensively). Ex. Locate objects on a map (with or without coordinates).

			are equal, The scale factor for the dilation that produces the similarity for two slope triangles for the same line is the slope of that line.		

<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.7a Solve linear equations in one variable.

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:
Give examples of linear equations in one variable with one solution and show that the given example equation has one solution by successively transforming the equation into an equivalent
equation of the form x = a.

Give examples of linear equations in one variable with infinitely many solutions and show that the given example has infinitely many solutions by successively transforming the equation into an equivalent equation of the form a = a.

Give examples of linear equations in one variable with no solution and show that the given example has no solution by successively transforming the equation into an equivalent equation of the form b
= a, where a and b are different numbers.</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Solve linear equations in one variable including when manipulation of the expressions in the equation becomes necessary to obtain a solution, if one exists, Provide examples of linear equations which have one solution, infinitely many solutions, or no solutions and use these to describe the characteristics of such equations.	Linear equation	Students know: The properties of operations and equality (Tables 3 and 4) and their appropriate application, The meaning of an equation having no solutions or an infinite number of solutions.	Students understand that/are able to: Accurately perform algebraic manipulation on equations and justify that each manipulation was allowed by the properties of the operations and equality (Tables 3 and 4). Linear relationships are characterized by a constant rate of change, When algebraic manipulations are done on linear equations in one variable, the result may be x = a, a = a, or a = b, and each of these results means something different, The solutions arrived at through algebraic manipulations on an equation, should make the original equation true.	**EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction.	**Level IV Students will:** **8.EE.7.** Solve algebraic expressions using two-digit addition and subtraction. Ex. Solve 20 + x, when x =25. Ex. Solve 35 – x, when x = 12. **Level III Students will:** **EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction. Ex. Mark had 10 dollars and needs 15. How many more dollars does he need? Ex. Given a set of basketballs, some in a bag and five outside of the bag, solve for find the total number of basketballs in the set when the bag contains two basketballs. Ex. Find the difference when given the total and the solution (e.g., A student has 10 chocolate chips and a bag of chocolate chips. Solve for the amount the bag contains when the total is 25.) **Level II Students will:** **EE8.EE.7.** Solve simple addition and subtraction problems. Ex. Playing a game, roll two dice and add up the dots (dice with dots or dice with numerals). Ex. Using a pictorial representation of numbers, solve the addition and subtraction problems (i.e. three balloons minus one balloon). **Level I Students will:** **EE8.EE.7.** Distinguish between a letter and a number. Ex. When asked to write their home address, identify between the letters and numbers in the address. Ex. When a book is read to them, identify the page number. Ex. When looking in a telephone book identify the telephone number vs. the name.

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.7b Solve linear equations in one variable.

b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:
Solve linear equations with rational number coefficients.

Solve equations whose solutions require expanding expressions using the distributive property and/ or collecting like terms.</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Solve linear equations in one variable including when manipulation of the expressions in the equation becomes necessary to obtain a solution, if one exists, Provide examples of linear equations which have one solution, infinitely many solutions, or no solutions and use these to describe the characteristics of such equations.	Linear equation	Students know: The properties of operations and equality (Tables 3 and 4) and their appropriate application, The meaning of an equation having no solutions or an infinite number of solutions.	Students understand that/are able to: Accurately perform algebraic manipulation on equations and justify that each manipulation was allowed by the properties of the operations and equality (Tables 3 and 4). Linear relationships are characterized by a constant rate of change, When algebraic manipulations are done on linear equations in one variable, the result may be x = a, a = a, or a = b, and each of these results means something different, The solutions arrived at through algebraic manipulations on an equation, should make the original equation true.	**EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction.	**Level IV Students will:** **8.EE.7.** Solve algebraic expressions using two-digit addition and subtraction. Ex. Solve 20 + x, when x =25. Ex. Solve 35 – x, when x = 12. **Level III Students will:** **EE8.EE.7.** Solve algebraic expressions using simple addition and subtraction. Ex. Mark had 10 dollars and needs 15. How many more dollars does he need? Ex. Given a set of basketballs, some in a bag and five outside of the bag, solve for find the total number of basketballs in the set when the bag contains two basketballs. Ex. Find the difference when given the total and the solution (e.g., A student has 10 chocolate chips and a bag of chocolate chips. Solve for the amount the bag contains when the total is 25.) **Level II Students will:** **EE8.EE.7.** Solve simple addition and subtraction problems. Ex. Playing a game, roll two dice and add up the dots (dice with dots or dice with numerals). Ex. Using a pictorial representation of numbers, solve the addition and subtraction problems (i.e. three balloons minus one balloon). **Level I Students will:** **EE8.EE.7.** Distinguish between a letter and a number. Ex. When asked to write their home address, identify between the letters and numbers in the address. Ex. When a book is read to them, identify the page number. Ex. When looking in a telephone book identify the telephone number vs. the name.

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.8a Analyze and solve pairs of simultaneous linear equations.

a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:
Identify the solution(s) to a system of two linear equations in two variables as the point(s) of intersection of their graphs.

Describe the point(s) of intersection between two lines as points that satisfy both equations simultaneously</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given two linear equations in graphical or algebraic form, Produce the coordinates of the point of intersection of the two lines and explain the relationship of this point to the two equations when taken simultaneously. Given a real world or mathematical situation involving two linear relationships, Model the situation with linear equations, find the intersection point of the two lines, and interpret this point in terms of the original context.	Simultaneous linear equations	Students know: The properties of operations and equality (Tables 3 and 4) and their appropriate application, Graphing techniques for linear equations (using points, using slope-intercept form, using technology), Substitution and addition/subtraction techniques for algebraically finding the solution to simultaneous linear equations.	Students understand that/are able to: Accurately graph linear equations on coordinate axes (using points, slope-intercept form, or technology), Accurately solve systems of two linear equations algebraically for their common point. Any point on a line when substituted into the equation of the line, makes the equation true and therefore, the intersection point of two lines must make both equations true, Graphs and equations of linear relationships are different representations of the same relationships, but reveal different information useful in solving problems, and allow different solution strategies leading to the same solutions.	**EE8.EE.8.** N/A (See EE.8.EE.5-6)	**EE8.EE.8.** N/A (See EE.8.EE.5-6)

<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.EE.8bc Analyze and solve pairs of simultaneous linear equations.
b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.
c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</td></tr>
<tr><td colspan="2">Domain: Expressions and Equations</td><td colspan="6">Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:
Define “inspection”.

Identify cases in which a system of two equations in two unknowns has no solution

Identify cases in which a system of two equations in two unknowns has an infinite number of solutions.

Solve a system of two equations (linear) in two unknowns algebraically.

Solve simple cases of systems of two linear equations in two variables by inspection.

Estimate the point(s) of intersection for a system of two equations in two unknowns by graphing the equations

Solve real-world problems of two linear equations in two variables</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given two linear equations in graphical or algebraic form, Produce the coordinates of the point of intersection of the two lines and explain the relationship of this point to the two equations when taken simultaneously. Given a real world or mathematical situation involving two linear relationships, Model the situation with linear equations, find the intersection point of the two lines, and interpret this point in terms of the original context.	Simultaneous linear equations	Students know: The properties of operations and equality (Tables 3 and 4) and their appropriate application, Graphing techniques for linear equations (using points, using slope-intercept form, using technology), Substitution and addition/subtraction techniques for algebraically finding the solution to simultaneous linear equations.	Students understand that/are able to: Accurately graph linear equations on coordinate axes (using points, slope-intercept form, or technology), Accurately solve systems of two linear equations algebraically for their common point. Any point on a line when substituted into the equation of the line, makes the equation true and therefore, the intersection point of two lines must make both equations true, Graphs and equations of linear relationships are different representations of the same relationships, but reveal different information useful in solving problems, and allow different solution strategies leading to the same solutions.	**EE8.EE.8.** N/A (See EE.8.EE.5-6)	**EE8.EE.8.** N/A (See EE.8.EE.5-6)

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1</td></tr>
<tr><td colspan="2">Domain: Functions</td><td colspan="6">Cluster: Define, evaluate, and compare functions.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Identify the domain and range of a relation.

Identify functions from equations, graphs and tables/ordered pairs.

Represent a function in the form of ordered pairs, mapping, graphs or listing.

Graph functions on a coordinate plane.

Read inputs and outputs from a graph of a function on a coordinate plane.</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given input/output relations between two variables in graphical form, verbal description, set of ordered pairs, or an algebraic model, Distinguish between those that are functions and non-functions.	Function Relation Input Output	Students know: Distinguishing characteristics of a function.	Students understand that/are able to: Convert among a contextual situation involving a functional relationship, the graph of that relationship, and the equation for that relationship. Functions are relationships between two variables that have a unique characteristic, that being, for each input there exists exactly one output.	**EE8.F.1-3.** Given a function table, identify the missing number.	**Level IV Students will:** **EE8.F.1-3.** Given a function table, identify the rule and express the rule for the missing variable (e.g., n times 2). Ex. Given a function table, identify the rule to find the missing number.* Ex. Given a function table, identify the rule to find the missing number.* **Level III Students will:** **EE8.F.1-3.** Given a function table, identify the missing number. Ex.* **Level II Students will:** **EE8.F.1-3.** Identify the relationship between two numbers. Ex. Given choices, tell the relationship between two numbers (e.g., How much more is five than three? Five is two more than three.). Ex. Identify the relationship between two given numbers (e.g., If you double four, you have eight). **Level I Students will:** **EE8.F.1-3.** Given a sequence, match the element of a sequence. Ex. Given the sequence 1, 2, 1, 2 and a 1, match to number 1. Ex. Given a sequence of triangle, circle, triangle, circle and a circle, match the circle. ***Refer to the Common Core Essential Elements document for diagram.**

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</td></tr>
<tr><td colspan="2">Domain: Functions</td><td colspan="6">Cluster: Define, evaluate, and compare functions.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="3">Quarter 2:</td><td colspan="2">Quarter 3:
Identify functions algebraically including slope and y intercept.

Identify functions using graphs.

Identify functions using tables.

Identify functions using verbal Descriptions

Compare and Contrast 2 functions with different representations.

Draw conclusions based on different representations of functions.</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given two functions in a contextual situation that are represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions), Use logical reasoning and mathematical vocabulary to interpret the context and compare and contrast the properties of the functions, (e.g., rate of change or slope).	Function	Students know: Relationships between graphs, tables and equations, The role of unit rate in functional representations.	Students understand that/are able to: Convert among a contextual situation involving a functional relationship, the graph of that relationship, and the equation for that relationship. Functions are relationships between two variables that have a unique characteristic, that being, for each input there exists exactly one output, Functions can be represented in a variety of ways (graphs, tables and equations), each of which provides unique perspectives of the relationship between the variables.	**EE8.F.1-3.** Given a function table, identify the missing number.	**Level IV Students will:** **EE8.F.1-3.** Given a function table, identify the rule and express the rule for the missing variable (e.g., n times 2). Ex. Given a function table, identify the rule to find the missing number.* Ex. Given a function table, identify the rule to find the missing number.* **Level III Students will:** **EE8.F.1-3.** Given a function table, identify the missing number. Ex.* **Level II Students will:** **EE8.F.1-3.** Identify the relationship between two numbers. Ex. Given choices, tell the relationship between two numbers (e.g., How much more is five than three? Five is two more than three.). Ex. Identify the relationship between two given numbers (e.g., If you double four, you have eight). **Level I Students will:** **EE8.F.1-3.** Given a sequence, match the element of a sequence. Ex. Given the sequence 1, 2, 1, 2 and a 1, match to number 1. Ex. Given a sequence of triangle, circle, triangle, circle and a circle, match the circle. ***Refer to the Common Core Essential Elements document for diagram.**

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<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.F.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</td></tr>
<tr><td colspan="2">Domain: Functions</td><td colspan="6">Cluster: Define, evaluate, and compare functions.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Recognize that a linear function is graphed as a straight line.

Recognize the equation y = mx+b is the equation of a function whose graph is a straight line where m is the slope and b is the y-intercept.

Provide examples of nonlinear functions using multiple representations.</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of functions in equation form, Use logical reasoning to justify their classification as linear or non-linear by interpreting the relationships in the expressions.	Linear functions Non-linear functions	Students know: Characteristics of linear and nonlinear functions, Distinguishing characteristics of a function.	Students understand that/are able to: Convert among a functional relationship, the graph of that relationship, and the equation for that relationship, Compare functions based on their properties. Functions are relationships between two variables that have a unique characteristic, that being, for each input there exists exactly one output, Functions can be represented in a variety of ways (graphs, tables, and equations), each of which provides unique perspectives of the relationship between the variables, Linear functions have a defining characteristic of a unit rate or slope that other non-linear functions do not have.	**EE8.F.1-3.** Given a function table, identify the missing number.	**Level IV Students will:** **EE8.F.1-3.** Given a function table, identify the rule and express the rule for the missing variable (e.g., n times 2). Ex. Given a function table, identify the rule to find the missing number.* Ex. Given a function table, identify the rule to find the missing number.* **Level III Students will:** **EE8.F.1-3.** Given a function table, identify the missing number. Ex.* **Level II Students will:** **EE8.F.1-3.** Identify the relationship between two numbers. Ex. Given choices, tell the relationship between two numbers (e.g., How much more is five than three? Five is two more than three.). Ex. Identify the relationship between two given numbers (e.g., If you double four, you have eight). **Level I Students will:** **EE8.F.1-3.** Given a sequence, match the element of a sequence. Ex. Given the sequence 1, 2, 1, 2 and a 1, match to number 1. Ex. Given a sequence of triangle, circle, triangle, circle and a circle, match the circle. ***Refer to the Common Core Essential Elements document for diagram.**

<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</td></tr>
<tr><td colspan="2">Domain: Functions</td><td colspan="6">Cluster: Use functions to model relationships between quantities.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Recognize that slope is determined by the constant rate of change.

Recognize that the y-intercept is the initial value where x=0.

Determine the rate of change from two (x,y) values, a verbal description, values in a table, or graph.

Determine the initial value from two (x,y) values, a verbal description, values in a table, or graph.

Construct a function to model a linear relationship between two quantities.

Relate the rate of change and initial value to real world quantities in a linear function in terms of the situation modeled and in terms of its graph or a table of values.</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given representations of functions in non-equation form, Interpret the properties of the relationship from the representation and use the interpretation to represent the function in algebraic form, Communicate the relationships among the representations (tables, graphs, and equations) including the rate of change and initial value.	Function Linear relationships Rate of change Initial value of the function	Students know: Characteristics of representations for functions in equation form, Relationships among representations (graphs, tables, and equations) of functions (and their properties).	Students understand that/are able to: Communicate the relationships among the representations (tables, graphs, and equations),including the rate of change and initial value, Represent a linear function as an equation. Functions are relationships between two variables that have a unique characteristic, that being for each input there exists exactly one output, Functions can be represented in a variety of ways (graphs, tables, and equations), each of which provides unique perspectives of the relationship between the variables, Linear functions have a defining characteristic of a unit rate or slope that other non-linear functions do not have.	**EE8.F.4.** Determine the values or rule of a function using a graph or a table.	**Level IV Students will:** **EE8.F.4.** Given the input values and a rule, complete the output. Ex. Complete the table by adding three to each input value.* **Level III Students will:** **EE8.F.4.** Determine the values or rule of a function using a graph or a table. Ex. Given a table, determine rule applied.* Ex. Given a table, determine increase or decrease.* **Level II Students will:** **EE8.F.4.** Navigate, read, use, or apply a graph or table. Ex. Given a set of coordinates, locate on a graph. Ex. Given a location, identify coordinates. Ex. Using a basic map of town, identify two streets over. **Level I Students will:** **EE8.F.4.** Identify the different parts of a graph or a table. Ex. Recognize more or less. Ex. Recognize a graph. Ex. Recognize a table. Ex. Identify rows/columns. ***Refer to the Common Core Essential Elements document for diagram.**

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</td></tr>
<tr><td colspan="2">Domain: Functions</td><td colspan="6">Cluster: Use functions to model relationships between quantities.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Analyze a graph and describe the functional relationship between two quantities using the qualities of the graph.

Sketch a graph given a verbal description of its qualitative features.

Interpret the relationship between x and y values by analyzing a graph.</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given graphical representations of functions, Use mathematical reasoning to analyze the graphs and describe the functional relationships between the quantities. Given verbal descriptions of functions, Use mathematical reasoning and understandings of functions to sketch graphs that exhibit the features from the descriptions.	Functional relationship Qualitative features	Students know: Characteristics of representations for functions in graphic form.	Students understand that/are able to: Fluently translate among representations of functions, Use mathematical vocabulary and understanding of functions to describe relationships among representations of functions. Functions can be represented in a variety of ways, each of which provides unique perspectives of the relationship between the variables, Graphs of functions are useful to compare characteristics of different relationships.	**EE8.F.5.** Describe how a graph represents a relationship between two quantities.	**Level IV Students will:** **EE8.F.5.** Describe how a graph represents a relationship between two quantities and use the graph to answer questions using that relationship. Ex. Given a chart showing the numbers of each colored disk in a bag, show how the graph relates color to number (e.g., Point to the axis that tells you the number and to the axis that tells you the color and point to the bar that shows the color with the highest number.). Ex. Given a line graph showing days of consecutive snowfall and inches of accumulated snow, show how the graph relates number of days to amount of accumulated snow (e.g., Say the name of the axis that shows inches of snow and the axis that show consecutive days of snowfall and then tell which point on the graph shows the most snow and most consecutive days of snowfall.). **Level III Students will:** **EE8.F.5.** Describe how a graph represents a relationship between two quantities. Ex. Given a chart showing the numbers of each colored disk in a bag, show how the graph relates color to number (e.g., Point to the axis that tells you the number and to the axis that tells you the color.). Ex. Given a line graph showing days of consecutive snowfall and inches of accumulated snow, show how the graph relates number of days to amount of accumulated snow (e.g., say the name of the axis that shows inches of snow and the axis that shows consecutive days of snowfall). **Level II Students will:** **EE8.F.5.** Answer questions about data from a graph. Ex. Given a chart of colors in an M & M bag, answer a question about the information on the graph (e.g., Which is the most common color?). Ex. Given a bar graph representing numbers of colored disks found in a bag, answer a question about the information (e.g., A bag of colored discs contains 15 red, 12 blue, eight green, and five yellow. Which bar shows how many red discs are in the bag?). Ex. Given a picture graph showing a five-day forecast showing snow showers for all days, identify which point shows how much snow is expected to fall on the fifth day. **Level I Students will:** **EE8.F.5.** Place data in a graph. Ex. Place stickers of the same type (e.g., color, animal) on the same bar in a graph? Ex. Group data into categories and place on a graph (e.g., types of music, types of food).

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Grade Level: 8th

Standard with code: 8.G.1abc Verify experimentally the properties of rotations, reflections, and translations:

d. Lines are taken to lines, and line segments to line segments of the same length.
e. Angles are taken to angles of the same measure.
f. Parallel lines are taken to parallel lines.

Domain: Geometry		**Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.**					
Quarter 1:		**Quarter 2:**		**Quarter 3:**		**Quarter 4:** Define & identify rotations, reflections, and translations. Identify corresponding sides & corresponding angles. Understand prime notation to describe an image after a translation, reflection, or rotation. Identify center of rotation. Identify direction and degree of rotation. Identify line of reflection Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (i.e. Lines are taken to lines and line segments to line segments of the same length, angles are taken to angles of the same measure, & parallel lines are taken to parallel lines.)	
Make sense of problems and persevere in solving them.	**Reason abstractly and quantitatively.**	**Construct viable arguments and critique the reasoning of others.**	**Model with mathematics.**	**Use appropriate tools strategically.**	**Attend to precision.**	**Look for and make use of structure.**	**Look for and express regularity in repeated reasoning.**

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given geometric constructions, (e.g., lines, line segments, angles, parallel lines) and possible rotations, reflections, and translations, Use logical reasoning to conjecture about the effects of rotations, reflections, and translations on the shapes, Test conjectures using a variety of models, (e.g., physical models, replications on transparency sheets, or replications on geometry software), Use the results of model manipulation to generalize properties of rotations, reflections, and translations.	Rotations Reflections Translations	Students know: Meaning of geometric vocabulary including lines, line segments, angle, parallel lines, rotation, reflection, and translation, Strategies for modeling the effects of transformational geometry (translations, rotations, and reflections).	Students understand that/are able to: Conjecture about the effects of rotation, reflections, and translations, Accurately construct the effect of given translations, rotations, and reflections, Create generalizations concerning properties of transformational geometry. Geometric constructions resulting from the effects of rotations, reflections, and/or translations has the same properties as the original construction.	**EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations.	**Level IV Students will:** **EE8.G.1-3.** N/A **Level III Students will:** **EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations. Ex. Match an angle in one shape with the same angle in another shape with manipulatives or pictures. Ex. Given different size shapes, find the two shapes that are similar and tell why. Ex. Given a picture of a shape, match that picture to the congruent object on the table. Ex. Using a picture of a door at a 45 or 90-degree angle adjust the classroom door to the same angle. **Level II Students will:** **EE8.G.1-3.** Match similar shapes. Ex. Match a square to a square. Ex. Match a large square with a large square. Ex. Given shapes, find the two shapes that are similar and tell why. **Level I Students will:** **EE8.G.1-3.** Match shapes using a three-dimensional object. Ex. Overlay the outline of a shape with a three-dimensional object using angles in the outline as guides (e.g., building with blocks). Ex. Tell, which socks match in color, shape, and size. Ex. If a sock is upside down and another sock is right side up, can you make them match?

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Define congruency.

Identify symbols for congruency.

Apply the concept of congruency to write congruent statements.

Reason that a 2-D figure is congruent to another if the second can be obtained by a sequence of rotations, reflections, translation.

Describe the sequence of rotations, reflections, translations that exhibits the congruence between 2-D figures using words.</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of 2-D shapes, Identify congruent shapes, Prove the congruence of two shapes by modeling the sequence of translations, rotations and reflections, necessary to map one object to the other.	Rotations Reflections Translations Congruent	Students know: The effects of rotations, reflections, and translations on 2-D figures.	Students understand that/are able to: Accurately perform rotations, reflections, and transformations on 2-D figures, Communicate precisely the sequence of reflections, rotations, and translations necessary for proving that two, 2-D shapes are congruent. Congruence on objects is unaffected by translations, reflections, and rotations. Shapes can be manipulated through a series of transformations so that one object can be mapped on to another in order to prove congruency.	**EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations.	**Level IV Students will:** **EE8.G.1-3.** N/A **Level III Students will:** **EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations. Ex. Match an angle in one shape with the same angle in another shape with manipulatives or pictures. Ex. Given different size shapes, find the two shapes that are similar and tell why. Ex. Given a picture of a shape, match that picture to the congruent object on the table. Ex. Using a picture of a door at a 45 or 90-degree angle adjust the classroom door to the same angle. **Level II Students will:** **EE8.G.1-3.** Match similar shapes. Ex. Match a square to a square. Ex. Match a large square with a large square. Ex. Given shapes, find the two shapes that are similar and tell why. **Level I Students will:** **EE8.G.1-3.** Match shapes using a three-dimensional object. Ex. Overlay the outline of a shape with a three-dimensional object using angles in the outline as guides (e.g., building with blocks). Ex. Tell, which socks match in color, shape, and size. Ex. If a sock is upside down and another sock is right side up, can you make them match?

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<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Define dilations as a reduction or enlargement of a figure.

Identify scale factor of the dilation.

Describe the effects of dilations, translations, rotations, & reflections on 2-D figures using coordinates.</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of sequences of dilations, translations, rotations, and reflections, Use a coordinate plane to model and describe the effects of the transformational geometry sequences on given shapes and the corresponding coordinates, Compare the properties of the original figure to the newly created figures to determine similarity and congruence.	Translations Rotations Reflections Coordinates Dilations	Students know: Methods of modeling the effects of rotations, reflections, and translations of 2-D figures on coordinate planes.	Students understand that/are able to: Accurately perform dilations, rotations, reflections, and transformations on objects in the coordinate plane, Communicate the results of transformational geometry on objects and their corresponding coordinates in the coordinate plane. The x,y coordinates will be directly affected by the dilations, rotations, reflections, and translations that map one object on to another.	**EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations.	**Level IV Students will:** **EE8.G.1-3.** N/A **Level III Students will:** **EE8.G.1-3.** Identify similarity and congruence (same) in objects and shapes containing angles without translations. Ex. Match an angle in one shape with the same angle in another shape with manipulatives or pictures. Ex. Given different size shapes, find the two shapes that are similar and tell why. Ex. Given a picture of a shape, match that picture to the congruent object on the table. Ex. Using a picture of a door at a 45 or 90-degree angle adjust the classroom door to the same angle. **Level II Students will:** **EE8.G.1-3.** Match similar shapes. Ex. Match a square to a square. Ex. Match a large square with a large square. Ex. Given shapes, find the two shapes that are similar and tell why. **Level I Students will:** **EE8.G.1-3.** Match shapes using a three-dimensional object. Ex. Overlay the outline of a shape with a three-dimensional object using angles in the outline as guides (e.g., building with blocks). Ex. Tell, which socks match in color, shape, and size. Ex. If a sock is upside down and another sock is right side up, can you make them match?

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<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Define similar figures as corresponding angles are congruent and corresponding sides are proportional.

Recognize symbol for similar.

Apply the concept of similarity to write similarity statements.

Reason that a 2-D figure is similar to another if the second can be obtained by a sequence of rotations, reflections, translation, or dilation.

Describe the sequence of rotations, reflections, translations, or dilations that exhibits the similarity between 2-D figures using words and/or symbols.</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
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Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of 2-D shapes, Identify similar shapes, Prove the similarity of two shapes by modeling the sequence of rotations, reflections, translations, and dilations necessary to map one object to the other.	Dilations Similar	Students know: The effects of rotations, reflections, dilations, and translations on 2-D figures.	Students understand that/are able to: Accurately perform dilations, rotations, reflections, and transformations on 2-D figures, Communicate precisely the sequence of reflections, rotations, and translations necessary for proving that 2-D shapes are congruent. Shapes can be manipulated through a series of transformations and dilations so that one given shape can be mapped on to another given shape in order to prove similarity	**EE8.G.4.** Identify similar shapes with and without rotation.	**Level IV Students will:** **EE8.G.4.** Determine if geometric shapes are similar with rotations or reflections. Ex. Sort shapes into groups of similar shapes with rotation and similar shapes with reflections. Ex. Matches combinations of similar shapes to each other (e.g., match similar shapes with rotations to each other and match similar shapes with reflections to each other). **Level III Students will:** **EE8.G.4.** Identify similar shapes with and without rotation. Ex. Given a shape find its similar rotation. Ex. Compare shapes in the environment to find a similar shape that is rotated. Ex. When given a group of triangles, select two that are similar when one is rotated. Ex. Select the shape that is not similar from a group of three shapes. **Level II Students will:** **EE8.G.4.** Identify similar geometric shapes. Ex. Sort regular polygons into groups of similar shapes. Ex. When given a shape, select a similar shape. Ex. Match the shape of one small square to the shape of a large square. **Level I Students will:** **EE8.G.4.** Recognize geometric shapes. Ex. Same thing comparer – compare to shapes to see if they are the same. Ex. Select the named shape. Ex. When shown a shape, name the shape. Ex. Point to a triangle when shown a circle and a triangle. Ex. Trace around a geometric shape.

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<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="3">Quarter 2:</td><td colspan="2">Quarter 3:</td><td>Quarter 4:
Define similar triangles

Define and identify transversals

Identify angles created when parallel line is cut by transversal (alternate interior, alternate exterior, corresponding, vertical, adjacent, etc.)

Justify that the sum of interior angles equals 180. (For example, arrange three copies of the same triangle so that the three angles appear to form a line.)

Justify that the exterior angle of a triangle is equal to the sum of the two remote interior angles.

Use Angle-Angle Criterion to prove similarity among triangles. (Give an argument in terms of transversals why this is so.)</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Use knowledge of straight angles and mathematical reasoning to, Create informal arguments concerning: facts about the angle sum and exterior angle of triangles, facts about the angles created when parallel lines are cut by a transversal, and angle-angle criterion for similarity of triangles.	Informal arguments Angle sum Exterior angles Parallel lines Transversal Angle-angle criterion for similarity of triangles	Students know: Straight angles = 180 degrees, Definitions for supplementary angles and complementary angles, Geometric representation of parallel lines cut by a transversal.	Students understand that/are able to: Use prior knowledge of angles, angle measurement, and mathematical reasoning to create informal arguments concerning facts about angles of triangles, similarity of triangles, and angles created when a transversal cuts parallel lines. Angle measure is additive, The sum of the interior angles in a triangle is 180 degrees.	**EE8.G.5.** Compare measures of angles to a right angle (greater than, less than, or equal to).	**Level IV Students will:** **EE8.G.5.** Compare measures of angles formed by intersecting lines. Ex. Given intersecting lines, identify linear pair angles. Ex. Given a pair of parallel lines intersected by a third line, identify angles that are the same measure. **Level III Students will:** **EE8.G.5.** Compare measures of angles to a right angle (greater than, less than, or equal to). Ex. Locate an angle with a measure greater than the measure of a right angle. Ex. Use a right-angle tool (square corner - corner of a note card), to find right angles. **Level II Students will:** **EE8.G.5.** Recognize a right angle. Ex. Identify a right angle in the school environment. Ex. Which of these is a right angle? Ex. Teacher creates on a geoboard. Is this a right angle? **Level I Students will:** **EE8.G.5.** Recognize an angle. Ex. Find angles in given shapes. Ex. Find a corner in the classroom (e.g., corner of the room or a table).

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.G.6 Explain a proof of the Pythagorean Theorem and its converse.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand and apply the Pythagorean Theorem.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Define key vocabulary: square root, Pythagorean Theorem, right triangle, legs a & b, hypotenuse, sides, right angle, converse, base, height, proof.

Be able to identify the legs and hypotenuse of a right triangle.

Explain a proof of the Pythagorean Theorem.

Explain a proof of the converse of the Pythagorean Theorem.</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a proof of the Pythagorean Theorem, Use mathematical reasoning and vocabulary to verbally explain the theorem and its converse.	Pythagorean Theorem Converse	Students know: Pythagorean Theorem	Students understand that/are able to: Use mathematical reasoning and vocabulary to verbally explain a proof of the Pythagorean Theorem and its converse. Theorems represent generalizations about geometric relationships that are used to solve problems.	**EE8.G.6-8.** N/A	**EE8.G.6-8.** N/A

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand and apply the Pythagorean Theorem.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Recall the Pythagorean theorem and its converse.

Solve basic mathematical Pythagorean Theorem problems and its converse to find missing lengths of sides of triangles in two and three-dimensions.

Apply Pythagorean Theorem in solving real-world problems dealing with two- and three dimensional shapes</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given real-world and mathematical problems in two and three dimensions, Apply the Pythagorean Theorem in order to solve problems and justify solutions and solution paths for finding side lengths in right triangles within the problem contexts.	Pythagorean Theorem	Students know: Pythagorean Theorem, Appropriate labeling of a right triangle, (leg and hypotenuse).	Students understand that/are able to: Solve equations involving one variable and square root, Represent real-world and mathematical contexts involving right triangles in a variety of formats (e.g., drawings, equations), Justify solutions and solution paths using conceptual understandings and vocabulary related to the Pythagorean Theorem (e.g., right angle, hypotenuse). The properties of right triangles can be used to solve problems.	**EE8.G.6-8.** N/A	**EE8.G.6-8.** N/A

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Understand and apply the Pythagorean Theorem.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="3">Quarter 2:</td><td colspan="2">Quarter 3:</td><td colspan="2">Quarter 4:
Recall the Pythagorean Theorem and its converse.

Determine how to create a right triangle from two points on a coordinate graph.

Use the Pythagorean Theorem to solve for the distance between the two points.</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given real-world and mathematical problems that can be represented on a coordinate plane, Apply the Pythagorean Theorem in order to solve problems and justify solutions and solution paths for finding side lengths (distances between points) in right triangles within the problem contexts.	Pythagorean Theorem	Students know: Pythagorean Theorem, Operations and labeling within a coordinate system.	Students understand that/are able to: Solve equations involving one variable and square root, Represent real-world and mathematical contexts involving right triangles in a variety of formats (e.g., drawings on coordinate planes, equations), Justify solutions and solution paths using conceptual understandings and vocabulary related to the Pythagorean Theorem (right angle, hypotenuse). The properties of right triangles can be used to solve problems, Theorems represent general relationships that are true for all	**EE8.G.6-8.** N/A	**EE8.G.6-8.** N/A

			shapes that fit certain criteria.		

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</td></tr>
<tr><td colspan="2">Domain: Geometry</td><td colspan="6">Cluster: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="3">Quarter 2:</td><td colspan="2">Quarter 3:</td><td>Quarter 4:
Identify and define vocabulary: cone, cylinder, sphere, radius, diameter, circumference, area, volume, pi, base, height

Know formulas for volume of cones, cylinders, and spheres

Compare the volume of cones, cylinders, and spheres.

Determine and apply appropriate volume formulas in order to solve mathematical and real-world problems for the given shape.

Given the volume of a cone, cylinder, or sphere, find the radii, height, or approximate for π</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given real-world and mathematical problems involving volumes of cones, cylinders, and spheres, Choose and apply appropriate formulas for finding volume, Use mathematical language to communicate the relationship between the formula chosen and the problem context.	Cone Cylinder Sphere	Students know: Measurable attributes of objects, specifically volume, Units of measurement, specifically unit cubes, Strategies for determining volume, Formulas for volume of cones, cylinders, and spheres (or where to find them or how to recreate them), Numerical estimation of the value of π, Exponential notation.	Students understand that/are able to: Communicate the relationships between models of volume and multiplication problems (formulas), Solve equations with one variable, square root, or cube roots, Strategically choose and apply volume formulas to solve real-world and mathematical problems involving cones, cylinders, and spheres, Strategies for finding/estimating square and cube roots (including technology). The volume of a solid object is measured by the number of same-size cubes that exactly fill the interior space of the object, Generalized formulas for determining area and volume of shapes can be applied regardless of the level of accuracy of the shape's measurements (base, height, and radius).	**EE8.G.9.** Identify volume of common measures (cups, pints, quarts, gallons, etc.).	**Level IV Students will:** **EE8.G.9.** Apply knowledge of volume. Ex. Use simple units to fill a container with accurate counting. Ex. Uses cubes to fill a small container and estimate the number of cubes it took by mathematical reasoning (addition or multiplication of row/column). Ex. Select appropriate tool to fill a pitcher (e.g., tsp., cup, bucket). Ex. Select appropriate tool to measure flour for a cake – cup or bucket. Ex. Convert – how many cups in a pint? **Level III Students will:** **EE8.G.9.** Identify volume of common measures (cups, pints, gallons, etc.). Ex. Tell which holds more when using cubes to fill two boxes (e.g., count the cubes that fit in one box as compared to another). Ex. Identify which is a cup when given a cup, teaspoon, and a gallon container. Ex. Show which is a gallon when given a teaspoon, ball, and a gallon container. Ex. Given a gallon, tell if it will take longer to fill the gallon with cups or with pints? **Level II Students will:** **EE8.G.9.** Identify which is more or less? Ex. Compares two containers using a third for transitive reasoning – pours one container into two others to see which holds more because one may overflow and one may not become full. Ex. Which container has more marbles in it? Ex. Which container has less marbles in it? **Level I Students will:** **EE8.G.9.** Experience volume. Ex. Compare two containers – which holds more? Ex. Point to the empty cup. Ex. Point to the full container.

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Statistics and Probability</td><td colspan="6">Cluster: Investigate patterns of association in bivariate data.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association

Construct scatter plots for bivariate measurement data

Interpret scatter plots for bivariate (two different variables such as distance and time) measurement data to investigate patterns of association between two quantities</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given sets of bivariate measurement data or contextual situations in which bivariate measurement data must be collected, Construct and interpret scatter plots, Describe visual patterns observed, (e.g., clustering, outliers, positive or negative association, linear, and non-linear association).	Scatter plots Bivariate measurement data Clustering Outliers Positive and negative association Linear and non-linear association	Students know: Representations for bivariate data and techniques for constructing each (e.g., tables, scatter plots).	Students understand that/are able to: Construct a scatter plot to represent a set of bivariate data, Use mathematical vocabulary to describe and interpret patterns in bivariate data. Using different representations and descriptors of a data set can be useful in seeing important features of the situation being investigated, Negative association in bivariate data can be a very strong association but is an inverse relationship.	**EE8.SP.1-3.** N/A	**EE8.SP.1-3.** N/A

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Statistics and Probability</td><td colspan="6">Cluster: Investigate patterns of association in bivariate data.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Know straight lines are used to model relationships between two quantitative variables

Informally assess the model fit by judging the closeness of the data points to the line.

Fit a straight line within the plotted data</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a variety of scatterplots representing bivariate data, Determine if the plots which suggest a linear relationship, and informally fit a straight line to the data, assess the model fit by judging the closeness of the data points to the line.	Scatter plot Linear association Quantitative variable	Students know: Patterns found on scatterplots of bivariate data, (e.g., linear/non-linear, positive/negative), Strategies for informally fitting straight lines to bivariate data with a linear relationship, Methods for finding the distance between two points on a coordinate plane and between a point and a line.	Students understand that/are able to: Construct a scatter plot to represent a set of bivariate data, Use mathematical vocabulary to describe and interpret patterns in bivariate data, Use logical reasoning and appropriate strategies to draw a straight line to fit data that suggest a linear association, Use mathematical vocabulary, logical reasoning, and closeness of data points to a line to judge the fit of the line to the data. Using different representations and descriptors of a data set can be useful in seeing important	**EE8.SP.1-3.** N/A	**EE8.SP.1-3.** N/A

			features of the situation being investigated, When visual examination of a scatter plot suggests a linear association in the data, fitting a straight line to the data can aid in interpretation and prediction.		

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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.</td></tr>
<tr><td colspan="2">Domain: Statistics and Probability</td><td colspan="6">Cluster: Investigate patterns of association in bivariate data.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Find the slope and intercept of a linear equation.

Interpret the meaning of the slope and intercept of a linear equation in terms of the situation. (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.)

Solve problems using the equation of a linear model</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a contextual or mathematical situation involving bivariate measurement data, Represent the situation graphically and algebraically, describe the relationship between the two models, and interpret the slope and/or the intercept of the line in order to find answers to questions.	Linear model Bivariate measurement data Slope Intercept	Students know: Strategies for determining slope and intercepts of a linear model.	Students understand that/are able to: Represent contextual and mathematical situations involving bivariate measurement data with a linear relationship algebraically and graphically, Use mathematical vocabulary to describe and interpret slopes and intercepts of lines which represent contextual situations involving bivariate data. Modeling bivariate data with scatter plots and fitting a straight line to the data can aid in interpretation of the data and predictions about unobserved data.	**EE8.SP.1-3.** N/A	**EE8.SP.1-3.** N/A

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<table>
<tr><td colspan="8">Grade Level: 8th</td></tr>
<tr><td colspan="8">Standard with code: 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?</td></tr>
<tr><td colspan="2">Domain: Statistics and Probability</td><td colspan="6">Cluster: Investigate patterns of association in bivariate data.</td></tr>
<tr><td colspan="2">Quarter 1:</td><td colspan="2">Quarter 2:</td><td colspan="2">Quarter 3:
Recognize patterns shown in comparison of two sets of data.

Know how to construct a two-way table

Interpret the data in the two-way table to recognize patterns. (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?)

Use relative frequencies of the data to describe relationships (positive, negative, or no correlation)</td><td colspan="2">Quarter 4:</td></tr>
<tr><td>Make sense of problems and persevere in solving them.</td><td>Reason abstractly and quantitatively.</td><td>Construct viable arguments and critique the reasoning of others.</td><td>Model with mathematics.</td><td>Use appropriate tools strategically.</td><td>Attend to precision.</td><td>Look for and make use of structure.</td><td>Look for and express regularity in repeated reasoning.</td></tr>
</table>

Evidence of Student Attainment	Vocabulary	Knowledge	Skills	Common Core Essential Elements	Instructional Achievement Level Descriptors
Students: Given a contextual or mathematical situation involving bivariate categorical data, 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.	Bivariate categorical data Frequencies Relative frequencies Categorical variables	Students know: Characteristics of data sets that distinguish categorical data from measurement data.	Students understand that/are able to: Construct two-way tables for categorical data, Find relative frequencies for cells in the two-way tables, Conjecture about patterns of association in the two-way tables and explain the reasoning that leads to the conjecture. Organizing categorical data in two-way tables can aid in identifying patterns of association in the data, Relative frequencies, rather than just absolute frequencies, need to be calculated from two-way tables to identify patterns of	**EE8.SP.4.** Construct a graph or table from given categorical data and compare data categorized in the graph or table.	**Level IV Students will:** **EE8.SP.4.** Conduct an experiment, collect data, and construct a graph or table. Ex. Conduct an experiment to find if plants grow faster in the sun or in the shade. Graph plant height over time and make a conclusion. Ex. Ask 10 people how many hours of TV they watch a day. Put the findings into a table. **Level III Students will:** **EE8.SP.4.** Construct a graph or table from given categorical data and compare data categorized in the graph or table. Ex. Given data about boys' and girls' favorite games, create a bar graph and compare the preferences of boys and girls. Ex. Given two graphs (hours of TV watched by boys and hours of TV watched by girls), answer questions to compare the habits of each. **Level II Students will:** **EE8.SP.4.** Collect and organize data. Ex. Organize objects into groups (teddy bears, balls, crayons). Ex. Examine a basic bus route schedule in table form and highlight which buses run at 5:00 p.m. Ex. Given five students, organize them shortest to tallest. **Level I Students will:** **EE8.SP.4.** Organize data into groups. Ex. Survey five people and ask if they like hamburgers or pizza better. Keep track of the findings. Ex. Organize disks by color and count how many of each. Which is most and which is least? Ex. Organize clothing by type (e.g., shirt, pants, socks) and count how many of each. Which is most and which is least?

			association.		