



2017–2018 School Year

# Oklahoma Correlation

Oklahoma Academic Standards for Mathematics

# Table of Contents



Percent Correlation .....	3
Grade 3.....	8
Grade 4 .....	15
Grade 5.....	21
Grade 6 .....	27
Grade 7.....	35
Pre-Algebra .....	41
Algebra I.....	47
Geometry .....	53
Algebra II.....	59

# Percent Correlation

Oklahoma Academic Standards for  
Mathematics

## Percent Correlation to Oklahoma Academic Standards for Mathematics

### Grade 3

**Standards not addressed:**

3.N.1.3	Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.
3.N.4.1	Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.
3.N.4.2	Select the fewest number of coins for a given amount of money up to one dollar.
3.A.1.3	Explore and develop visual representations of growing geometric patterns and construct the next steps.
3.A.2.1	Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.
3.GM.1.3	Classify angles as acute, right, obtuse, and straight.
3.GM.2.3	Choose an appropriate measurement instrument and measure the length of objects to the nearest whole centimeter or meter.
3.GM.2.4	Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.
3.GM.2.5	Using common benchmarks, estimate the lengths (customary and metric) of a variety of objects.
3.GM.2.6	Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.
3.GM.2.7	Count cubes systematically to identify number of cubes needed to pack the whole or half of a three-dimensional structure.
3.GM.3.1	Read and write time to the nearest 5-minute (analog and digital).
3.GM.3.2	Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.

### Grade 4

**Standards not addressed:**

4.N.1.4	Estimate products of 3-digit by 1-digit or 2-digit by 2-digit whole numbers using rounding, benchmarks and place value to assess the reasonableness of results. Explore larger numbers using technology to investigate patterns.
4.N.2.8	Compare benchmark fractions ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ ) and decimals (0.25, 0.50, 0.75) in real-world and mathematical situations.
4.A.1.3	Create growth patterns involving geometric shapes and define the single operation rule of the pattern.
4.GM.1.3	Given two three-dimensional shapes, identify similarities, and differences.

4.GM.2.1	Measure angles in geometric figures and real-world objects with a protractor or angle ruler.
4.GM.2.3	Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with whole-number edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as $\text{cm}^3$ .
4.GM.2.4	Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or quarter-inch.
4.GM.3.2	Solve problems involving the conversion of one measure of time to another.
4.D.1.2	Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include benchmark fractions or decimals ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ , 0.25, 0.50, 0.75).

### Grade 5

#### Standards not addressed:

5.N.1.1	Estimate solutions to division problems in order to assess the reasonableness of results.
5.N.3.4	Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a number. Find 0.001 more than a number and 0.001 less than a number.
5.GM.1.3	Recognize and draw a net for a three-dimensional figure (e.g., cubes, rectangular prisms, pyramids).
5.GM.2.2	Recognize that the surface area of a three-dimensional figure with rectangular faces with whole numbered edges can be found by finding the area of each component of the net of that figure. Know that three-dimensional shapes of different dimensions can have the same surface area.
5.GM.3.2	Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or $\frac{1}{16}$ -inch.
5.GM.3.3	Recognize and use the relationship between inches, feet, and yards to measure and compare objects.
5.GM.3.4	Recognize and use the relationship between millimeters, centimeters, and meters to measure and compare objects.

### Grade 6

#### Standards not addressed:

6.N.2.1	Estimate solutions to addition and subtraction of integers problems in order to assess the reasonableness of results.
6.GM.2.2	Develop and use the fact that the sum of the interior angles of a triangle is $180^\circ$ to determine missing angle measures in a triangle.
6.GM.3.1	Estimate weights, capacities and geometric measurements using benchmarks in customary and metric measurement systems with appropriate units.
6.D.1.2	Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.
6.D.2.1	Represent possible outcomes using a probability continuum from impossible to certain.
6.D.2.3	Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results.

### Grade 7

**Standards not addressed:**

7.N.2.1	Estimate solutions to multiplication and division of integers in order to assess the reasonableness of results.
7.A.2.4	Use proportional reasoning to assess the reasonableness of solutions.
7.A.4.2	Apply understanding of order of operations and grouping symbols when using calculators and other technologies.
7.GM.1.1	Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism with rational-valued edge lengths can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements such as $\text{cm}^2$ .

### Pre-Algebra

**Standards not addressed:**

PA.A.3.2	Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.
PA.D.2.1	Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.
PA.D.2.3	Compare and contrast dependent and independent events.

### Algebra I

**Standards not addressed:**

A1.N.1.1	Write square roots and cube roots of monomial algebraic expressions in simplest radical form.
A1.N.1.2	Add, subtract, multiply, and simplify square roots of monomial algebraic expressions and divide square roots of whole numbers, rationalizing the denominator when necessary.
A1.A.1.2	Solve absolute value equations and interpret the solutions in the original context.
A1.A.2.2	Represent relationships in various contexts with compound and absolute value inequalities and solve the resulting inequalities by graphing and interpreting the solutions on a number line.
A1.A.3.4	Evaluate linear, absolute value, rational, and radical expressions. Include applying a nonstandard operation such as $a \odot b = 2a + b$ .
A1.F.1.4	Given a graph modeling a real-world situation, read and interpret the linear piecewise function (excluding step functions).
A1.D.1.3	Interpret graphs as being discrete or continuous.

## Geometry

### Standards not addressed:

G.RT.1.2	Verify and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems using algebraic and logical reasoning.
----------	---

## Algebra II

### Standards not addressed:

A2.N.1.3	Use matrices to organize and represent data. Identify the order (dimension) of a matrix, add and subtract matrices of appropriate dimensions, and multiply a matrix by a scalar to create a new matrix to solve problems.
A2.A.1.4	Solve polynomial equations with real roots using various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators or other appropriate technology.
A2.F.2.2	Combine functions by composition and recognize that $g(x) = f^{-1}(x)$ , the inverse function of $f(x)$ , if and only if $f(g(x)) = g(f(x)) = x$ .
A2.D.1.1	Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve).
A2.D.1.2	Collect data and use scatterplots to analyze patterns and describe linear, exponential or quadratic relationships between two variables. Using graphing calculators or other appropriate technology, determine regression equation and correlation coefficients; use regression equations to make predictions and correlation coefficients to assess the reliability of those predictions.
A2.D.1.3	Based upon a real-world context, recognize whether a discrete or continuous graphical representation is appropriate and then create the graph.
A2.D.2.2	Identify and explain misleading uses of data. Recognize when arguments based on data confuse correlation and causation.

# Grade 3

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Grade 3		Unit	Lesson
<b>Number &amp; Operations (N)</b>			
3.N.1 Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.			
3.N.1.1	Read, write, discuss, and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives.	Number and Operations in Base Ten	Rounding to the Nearest Ten and Hundred
3.N.1.2	Use place value to describe whole numbers between 1,000 and 100,000 in terms of ten thousands, thousands, hundreds, tens and ones, including expanded form.	Number and Operations in Base Ten	Place Value Concepts
3.N.1.3	Find 10,000 more or 10,000 less than a given five-digit number. Find 1,000 more or 1,000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.	Standard not addressed	
3.N.1.4	Use place value to compare and order whole numbers up to 100,000, using comparative language, numbers, and symbols.	Number and Operations in Base Ten	Using Place Value Concepts to Compare Whole Numbers
3.N.2 Add and subtract multi-digit whole numbers; multiply with factors up to 10; represent multiplication and division in various ways; Solve real-world and mathematical problems through the representation of related operations.			
3.N.2.1	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting.	Operations and Algebraic Thinking	Concept of Multiplication - Arrays Concept of Multiplication - Grouping Concept of Multiplication - Word Problems Developing Fluency Using 2 as a Factor Developing Fluency Using 5 or 10 as a Factor Multiplication and Division Word Problems - Visual Models Using Halves and Doubles to Solve Multiplication Problems

Mathematics Standards of Learning		Imagine Math	
Grade 3		Unit	Lesson
3.N.2.2	Demonstrate fluency of multiplication facts with factors up to 10.	Operations and Algebraic Thinking	Developing Fluency Using 2 as a Factor Developing Fluency Using 5 or 10 as a Factor Multiplication and Division Fact Families Using Halves and Doubles to Solve Multiplication Problems
3.N.2.3	Use strategies and algorithms based on knowledge of place value and equality to fluently add and subtract multi-digit numbers.	Number and Operations in Base Ten	Adding Whole Numbers Adding and Subtracting with the Standard Algorithm Addition and Subtraction Strategies I Addition and Subtraction Strategies II Reasoning About Addition and Subtraction Within 1,000 Structuring Within 1,000
3.N.2.4	Recognize when to round numbers and apply understanding to round numbers to the nearest ten thousand, thousand, hundred, and ten and use compatible numbers to estimate sums and differences.	Number and Operations in Base Ten	Estimating Solutions to Multistep Word Problems Reasoning About Place Value and Rounding Rounding to the Nearest Ten and Hundred Rounding Whole Numbers Using Rounding in Problem Solving
		Operations and Algebraic Thinking	Estimating Sums and Differences - Application
3.N.2.5	Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.	Number and Operations in Base Ten	Adding and Subtracting with the Standard Algorithm Adding Whole Numbers Addition and Subtraction Strategies I Addition and Subtraction Strategies II
3.N.2.6	Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups.	Operations and Algebraic Thinking	Concept of Division Constructing Division Problems

Mathematics Standards of Learning		Imagine Math	
Grade 3		Unit	Lesson
3.N.2.7	Recognize the relationship between multiplication and division to represent and solve real-world problems.	Operations and Algebraic Thinking	Interpreting Division Problems Multiplication and Division Fact Families Multiplication and Division Word Problems - Equations Multiplication and Division Word Problems - Solutions Relationship Between Multiplication and Division
3.N.2.8	Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two-digit number by a one-digit number.	Number and Operations in Base Ten	Multiplying by Multiples of Ten
3.N.3 Understand meanings and uses of fractions in real-world and mathematical situations.			
3.N.3.1	Read and write fractions with words and symbols.	Number and Operations- Fractions	Understanding Fractions - Notation
3.N.3.2	Construct fractions using length, set, and area models.	Number and Operations- Fractions	Equivalent Fractions - Visual Models Fractions on the Number Line Generating Equivalent Fractions Understanding Fractions - Equal Areas Unit Fractions on the Number Line Whole Numbers as Fractions Whole Numbers as Fractions on the Number Line
3.N.3.3	Recognize unit fractions and use them to compose and decompose fractions related to the same whole. Use the numerator to describe the number of parts and the denominator to describe the number of partitions.	Number and Operations- Fractions	Fractions on the Number Line
3.N.3.4	Use models and number lines to order and compare fractions that are related to the same whole.	Number and Operations- Fractions	Comparing Fractions with the Same Numerator or Denominator Equivalent Fractions - Visual Models Generating Equivalent Fractions Identifying and Comparing Fractions - Visual Models Visual Models of Equivalent Fractions

Mathematics Standards of Learning		Imagine Math	
Grade 3		Unit	Lesson
3.N.4 Determine the value of a set of coins or bills.			
3.N.4.1	Use addition to determine the value of a collection of coins up to one dollar using the cent symbol and a collection of bills up to twenty dollars.	Standard not addressed	
3.N.4.2	Select the fewest number of coins for a given amount of money up to one dollar.	Standard not addressed	
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
3.A.1 Describe and create representations of numerical and geometric patterns.			
3.A.1.1	Create, describe, and extend patterns involving addition, subtraction, or multiplication to solve problems in a variety of contexts.	Operations and Algebraic Thinking	Additive and Multiplicative Patterns
3.A.1.2	Describe the rule (single operation) for a pattern from an input/output table or function machine involving addition, subtraction, or multiplication.	Operations and Algebraic Thinking	Input-Output Tables Introduction to Input-Output Tables
3.A.1.3	Explore and develop visual representations of growing geometric patterns and construct the next steps.	Standard not addressed	
3.A.2 Use number sentences involving multiplication and unknowns to represent and solve real-world and mathematical problems.			
3.A.2.1	Find unknowns represented by symbols in arithmetic problems by solving one-step open sentences (equations) and other problems involving addition, subtraction, and multiplication. Generate real-world situations to represent number sentences.	Standard not addressed	
3.A.2.2	Recognize, represent and apply the number properties (commutative, identity, and associative properties of addition and multiplication) using models and manipulatives to solve problems.	Operations and Algebraic Thinking	Properties of Addition and Multiplication

Mathematics Standards of Learning		Imagine Math	
Grade 3		Unit	Lesson
<b>Geometry &amp; Measurement (GM)</b>			
3.GM.1 Use geometric attributes to describe and create shapes in various contexts.			
3.GM.1.1	Sort three-dimensional shapes based on attributes.	Geometry	Introduction to 3-Dimensional Figures
3.GM.1.2	Build a three-dimensional figure using unit cubes when picture/shape is shown.	Geometry	Introduction to 3-Dimensional Figures
3.GM.1.3	Classify angles as acute, right, obtuse, and straight.	Standard not addressed	
3.GM.2 Understand measurable attributes of real-world and mathematical objects using various tools.			
3.GM.2.1	Find perimeter of polygon, given whole number lengths of the sides, in real-world and mathematical situations.	Measurement and Data	Area and Perimeter of Rectangles Perimeter
3.GM.2.2	Develop and use formulas to determine the area of rectangles. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.	Measurement and Data	Area and Perimeter of Rectangles Area of Rectangles Concept of Area
		Operations and Algebraic Thinking	Using Visual Models to Understand the Distributive Property
3.GM.2.3	Choose an appropriate measurement instrument and measure the length of objects to the nearest whole centimeter or meter.	Standard not addressed	
3.GM.2.4	Choose an appropriate measurement instrument and measure the length of objects to the nearest whole yard, whole foot, or half inch.	Standard not addressed	
3.GM.2.5	Using common benchmarks, estimate the lengths (customary and metric) of a variety of objects.	Standard not addressed	
3.GM.2.6	Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.	Standard not addressed	
3.GM.2.7	Count cubes systematically to identify number of cubes needed to pack the whole or half of a three-dimensional structure.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
<i>Grade 3</i>		<i>Unit</i>	<i>Lesson</i>
3.GM.2.8	Find the area of two-dimensional figures by counting total number of same size unit squares that fill the shape without gaps or overlaps.	Measurement and Data	Area of Rectangles Concept of Area Recognizing Area as Additive Unit Squares Adding Time
3.GM.3 Solve problems by telling time to the nearest 5 minutes.			
3.GM.3.1	Read and write time to the nearest 5-minute (analog and digital).	Standard not addressed	
3.GM.3.2	Determine the solutions to problems involving addition and subtraction of time in intervals of 5 minutes, up to one hour, using pictorial models, number line diagrams, or other tools.	Standard not addressed	
<b>Data &amp; Probability (D)</b>			
3.D.1 Summarize, construct, and analyze data.			
3.D.1.1	Summarize and construct a data set with multiple categories using a frequency table, line plot, pictograph, and/or bar graph with scaled intervals.	Measurement and Data	Introduction to Data Displays
3.D.1.2	Solve one- and two-step problems using categorical data represented with a frequency table, pictograph, or bar graph with scaled intervals.	Measurement and Data	Introduction to Data Displays

# Grade 4

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Grade 4		Unit	Lesson
<b>Number &amp; Operations (N)</b>			
4.N.1 Solve real-world and mathematical problems using multiplication and division.			
4.N.1.1	Demonstrate fluency with multiplication and division facts with factors up to 12.	Operations and Algebraic Thinking	Division as an Unknown-Factor Problem Interpreting Remainders
4.N.1.2	Use an understanding of place value to multiply or divide a number by 10, 100 and 1,000.	Number and Operations in Base Ten	Multiplying and Dividing by Powers of Ten Multiplying by Powers of Ten Understanding Place Value Relationships
4.N.1.3	Multiply 3-digit by 1-digit or a 2-digit by 2-digit whole numbers, using efficient and generalizable procedures and strategies, based on knowledge of place value, including but not limited to standard algorithms.	Number and Operations in Base Ten	Multiplying 2-Digit Numbers by 2-Digit Numbers Multiplying Whole Numbers Multiplying Whole Numbers - Standard Algorithm
4.N.1.4	Estimate products of 3-digit by 1-digit or 2-digit by 2-digit whole numbers using rounding, benchmarks and place value to assess the reasonableness of results. Explore larger numbers using technology to investigate patterns.	Standard not addressed	
4.N.1.5	Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results.	Operations and Algebraic Thinking	Modeling and Solving Two-Step Word Problems Solving Two-Step Word Problems
4.N.1.6	Use strategies and algorithms based on knowledge of place value, equality and properties of operations to divide 3-digit dividend by 1-digit whole number divisors. (e.g., mental strategies, standard algorithms, partial quotients, repeated subtraction, the commutative, associative, and distributive properties).	Number and Operations in Base Ten	Dividing Multiples of Ten Dividing Whole Numbers - One-Digit Divisors

Mathematics Standards of Learning		Imagine Math	
Grade 4		Unit	Lesson
4.N.1.7	Determine the unknown addend(s) or factor(s) in equivalent and non-equivalent expressions. (e.g., $5 + 6 = 4 + \square$ , $3 \times 8 < 3 \times \square$ ).	Operations and Algebraic Thinking	Solving Equations with Addition, Subtraction, and Multiplication
4.N.2 Represent and compare fractions and decimals in real-world and mathematical situations; use place value to understand how decimals represent quantities.			
4.N.2.1	Represent and rename equivalent fractions using fraction models (e.g. parts of a set, area models, fraction strips, number lines).	Number and Operations- Fractions	Generating Equivalent Fractions Modeling Equivalent Fractions Modeling Equivalent Fractions with Number Lines Reducing Fractions Understanding Fractions - Relationship Between Numerator and Denominator
4.N.2.2	Use benchmark fractions (0, $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ , 1) to locate additional fractions on a number line. Use models to order and compare whole numbers and fractions less than and greater than one using comparative language and symbols.	Number and Operations- Fractions	Comparing Fractions - Visual Models
4.N.2.3	Decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ ).	Number and Operations- Fractions	Decomposing Fractions and Mixed Numbers
4.N.2.4	Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations.	Number and Operations- Fractions	Adding and Subtracting Fractions with Like Denominators Adding and Subtracting Fractions with Like Denominators in Real-World Situations
4.N.2.5	Represent tenths and hundredths with concrete models, making connections between fractions and decimals.	Number and Operations- Fractions	Comparing Decimal Fractions Understanding Fractions with Denominators of 10 and 100
		Number and Operations in Base Ten	Comparing and Ordering Decimal Fractions Decimal Notation I Decimal Notation II

Mathematics Standards of Learning		Imagine Math	
Grade 4		Unit	Lesson
4.N.2.6	Represent, read and write decimals up to at least the hundredths place in a variety of contexts including money.	Number and Operations- Fractions	Decimals to Hundredths
4.N.2.7	Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.	Number and Operations- Fractions	Recognizing Valid Decimal Comparisons
		Number and Operations in Base Ten	Comparing Decimals to Hundredths Introduction to Comparing Decimals to Hundredths
4.N.2.8	Compare benchmark fractions ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ ) and decimals (0.25, 0.50, 0.75) in real-world and mathematical situations.	Standard not addressed	
4.N.3 Determine the value of coins in order to solve monetary transactions.			
4.N.3.1	Given a total cost (whole dollars up to \$20 or coins) and amount paid (whole dollars up to \$20 or coins), find the change required in a variety of ways. Limited to whole dollars up to \$20 or sets of coins.	Measurement and Data	Money Sense
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
4.A.1 Use multiple representations of patterns to solve real-world and mathematical problems.			
4.A.1.1	Create an input/output chart or table to represent or extend a numerical pattern.	Operations and Algebraic Thinking	Generating and Describing Number Patterns
4.A.1.2	Describe the single operation rule for a pattern from an input/output table or function machine involving any operation of a whole number.	Operations and Algebraic Thinking	Generating and Describing Number Patterns
4.A.1.3	Create growth patterns involving geometric shapes and define the single operation rule of the pattern.	Standard not addressed	
4.A.2 Use multiplication and division with unknowns to create number sentences representing a given problem situation.			
4.A.2.1	Use number sense, properties of multiplication and the relationship between multiplication and division to solve problems and find values for the unknowns represented by letters and symbols that make number sentences true.	Operations and Algebraic Thinking	Division as an Unknown-Factor Problem Solving Multiplication and Division Equations

Mathematics Standards of Learning		Imagine Math	
Grade 4		Unit	Lesson
4.A.2.2	Solve for unknowns in problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, or division with whole numbers. Use real-world situations to represent number sentences and vice versa.	Operations and Algebraic Thinking	Solving Equations with Addition, Subtraction, and Multiplication Solving Multiplication and Division Equations
<b>Geometry &amp; Measurement (GM)</b>			
4.GM.1 Name, describe, classify and construct polygons, and three-dimensional figures.			
4.GM.1.1	Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.	Geometry	Identifying and Classifying Lines, Rays, and Segments
4.GM.1.2	Describe, classify, and sketch quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms, and kites. Recognize quadrilaterals in various contexts.	Geometry	Classifying 2-Dimensional Figures Classifying Quadrilaterals I Classifying Quadrilaterals II
4.GM.1.3	Given two three-dimensional shapes, identify similarities, and differences.	Standard not addressed	
4.GM.2	Understand angle, length, and area as measurable attributes of real-world and mathematical objects. Use various tools to measure angles, length, area, and volume.	Measurement and Data	Angles 0 to 180
4.GM.2.1	Measure angles in geometric figures and real-world objects with a protractor or angle ruler.	Standard not addressed	
4.GM.2.2	Find the area of polygons that can be decomposed into rectangles.	Measurement and Data	Area of Basic Composite Figures
4.GM.2.3	Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with whole-number edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as $\text{cm}^3$ .	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
Grade 4		Unit	Lesson
4.GM.2.4	Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or quarter-inch.	Standard not addressed	
4.GM.2.5	Solve problems that deal with measurements of length, when to use liquid volumes, when to use mass, temperatures above zero and money using addition, subtraction, multiplication, or division as appropriate (customary and metric).	Measurement and Data	Money Sense
4.GM.3 Determine elapsed time and convert between units of time.			
4.GM.3.1	Determine elapsed time.	Measurement and Data	Adding and Subtracting Time
4.GM.3.2	Solve problems involving the conversion of one measure of time to another.	Standard not addressed	
<b>Data &amp; Probability (D)</b>			
4.D.1 Collect, organize, and analyze data.			
4.D.1.1	Represent data on a frequency table or line plot marked with whole numbers and fractions using appropriate titles, labels, and units.	Measurement and Data	Line Plots
4.D.1.2	Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include benchmark fractions or decimals ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ , 0.25, 0.50, 0.75).	Standard not addressed	
4.D.1.3	Solve one- and two-step problems using data in whole number, decimal, or fraction form in a frequency table and line plot.	Measurement and Data	Line Plots

# Grade 5

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Grade 5		Unit	Lesson
<b>Number &amp; Operations (N)</b>			
5.N.1 Divide multi-digit numbers and solve real-world and mathematical problems using arithmetic.			
5.N.1.1	Estimate solutions to division problems in order to assess the reasonableness of results.	Standard not addressed	
5.N.1.2	Divide multi-digit numbers, by one- and two-digit divisors, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.	Number and Operations in Base Ten	Dividing Whole Numbers - Standard Algorithm Dividing Whole Numbers - Two-Digit Divisors
5.N.1.3	Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal and consider the context in which a problem is situated to select and interpret the most useful form of the quotient for the solution.	Number and Operations- Fractions	Understanding Fractions as Division
		Number and Operations in Base Ten	Dividing Whole Numbers - Standard Algorithm Dividing Whole Numbers - Two-Digit Divisors
5.N.1.4	Solve real-world and mathematical problems requiring addition, subtraction, multiplication, and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.	Number and Operations in Base Ten	Operations with Whole Numbers - Mixed Practice
5.N.2 Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.			
5.N.2.1	Represent decimal fractions (e.g., $\frac{1}{10}$ , $\frac{1}{100}$ ) using a variety of models (e.g., 10 by 10 grids, rational number wheel, base-ten blocks, meter stick) and make connections between fractions and decimals.	Number and Operations- Fractions	Adding Fractions with Denominators of 10 or 100 Understanding Fractions with Denominators of 10 and 100
5.N.2.2	Represent, read and write decimals using place value to describe decimal numbers including fractional numbers as small as thousandths and whole numbers as large as millions.	Number and Operations in Base Ten	Decimals to Thousandths Place Value Relationships Within Whole Numbers and Decimals

Mathematics Standards of Learning		Imagine Math	
Grade 5		Unit	Lesson
5.N.2.3	Compare and order fractions and decimals, including mixed numbers and fractions less than one, and locate on a number line.	Number and Operations- Fractions	Comparing Fractions with Different Numerators and Different Denominators Recognizing Valid Fraction Comparisons II
		Number and Operations in Base Ten	Comparing Decimals to Thousandths
5.N.2.4	Recognize and generate equivalent decimals, fractions, mixed numbers, and fractions less than one in various contexts.	Number and Operations- Fractions	Adding and Subtracting Mixed Numbers with Like Denominators Adding and Subtracting Mixed Numbers with Like Denominators - Conceptual Strategies Writing Fractions as Mixed Numbers and Mixed Numbers as Fractions
		Number and Operations in Base Ten	Adding and Subtracting Decimals Fraction and Decimal Equivalents
5.N.3 Add and subtract fractions with like and unlike denominators, mixed numbers and decimals to solve real-world and mathematical problems.			
5.N.3.1	Estimate sums and differences of fractions with like and unlike denominators, mixed numbers, and decimals to assess the reasonableness of the results.	Number and Operations- Fractions	Adding Fractions - Estimation Strategies Subtracting Fractions - Estimation Strategies
5.N.3.2	Illustrate addition and subtraction of fractions with like and unlike denominators, mixed numbers, and decimals using a variety of representations (e.g., fraction strips, area models, number lines, fraction rods).	Number and Operations- Fractions	Adding Fractions with Denominators of 10 or 100
5.N.3.3	Add and subtract fractions with like and unlike denominators, mixed numbers, and decimals, using efficient and generalizable procedures, including but not limited to standard algorithms in order to solve real-world and mathematical problems including those involving money, measurement, geometry, and data.	Number and Operations- Fractions	Adding and Subtracting Fractions Adding and Subtracting Fractions - Multistep Word Problems Adding and Subtracting Mixed Numbers with Like Denominators Adding and Subtracting Mixed Numbers with Like Denominators - Conceptual Strategies Adding Fractions Subtracting Fractions
		Number and Operations in Base Ten	Adding and Subtracting Decimals Adding and Subtracting Decimals in Real-World Situations

Mathematics Standards of Learning		Imagine Math	
Grade 5		Unit	Lesson
5.N.3.4	Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a number. Find 0.001 more than a number and 0.001 less than a number.	Standard not addressed	
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
5.A.1 Describe and graph patterns of change created through numerical patterns.			
5.A.1.1	Use tables and rules of up to two operations to describe patterns of change and make predictions and generalizations about real-world and mathematical problems.	Operations and Algebraic Thinking	Generating and Describing Number Patterns
5.A.1.2	Use a rule or table to represent ordered pairs of whole numbers and graph these ordered pairs on a coordinate plane, identifying the origin and axes in relation to the coordinates.	Geometry	Representing Real-World Quantities in the First Quadrant
5.A.2 Understand and interpret expressions, equations, and inequalities involving variables and whole numbers, and use them to represent and evaluate real-world and mathematical problems.			
5.A.2.1	Generate equivalent numerical expressions and solve problems involving whole numbers by applying the commutative, associative, and distributive properties and order of operations (no exponents).	Expressions and Equations	Evaluating Simple Expressions
		Operations and Algebraic Thinking	Writing and Interpreting Simple Expressions Writing Simple Expressions
5.A.2.2	Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.	Operations and Algebraic Thinking	Using Equations to Model and Solve Multi-step Problems
5.A.2.3	Evaluate expressions involving variables when values for the variables are given.	Expressions and Equations	Evaluating Simple Expressions

Mathematics Standards of Learning		Imagine Math	
Grade 5		Unit	Lesson
<b>Geometry &amp; Measurement (GM)</b>			
5.GM.1 Describe, classify, and draw representations of two- and three-dimensional figures.			
5.GM.1.1	Describe, classify and construct triangles, including equilateral, right, scalene, and isosceles triangles. Recognize triangles in various contexts.	Geometry	Classifying Triangles
5.GM.1.2	Describe and classify three-dimensional figures including cubes, rectangular prisms, and pyramids by the number of edges, faces or vertices as well as the shapes of faces.	Geometry	Classifying 3-Dimensional Figures
5.GM.1.3	Recognize and draw a net for a three-dimensional figure (e.g., cubes, rectangular prisms, pyramids).	Standard not addressed	
5.GM.2 Understand how the volume of rectangular prisms and surface area of shapes with polygonal faces are determined by the dimensions of the object and that shapes with varying dimensions can have equivalent values of surface area or volume.			
5.GM.2.1	Recognize that the volume of rectangular prisms can be determined by the number of cubes ( $n$ ) and by the product of the dimensions of the prism ( $a \times b \times c = n$ ). Know that rectangular prisms of different dimensions ( $p$ , $q$ , and $r$ ) can have the same volume if $a \times b \times c = p \times q \times r = n$ .	Measurement and Data	Volume of Rectangular Prisms I
5.GM.2.2	Recognize that the surface area of a three-dimensional figure with rectangular faces with whole numbered edges can be found by finding the area of each component of the net of that figure. Know that three-dimensional shapes of different dimensions can have the same surface area.	Standard not addressed	
5.GM.2.3	Find the perimeter of polygons and create arguments for reasonable values for the perimeter of shapes that include curves.	Measurement and Data	Perimeter

Mathematics Standards of Learning		Imagine Math	
Grade 5		Unit	Lesson
5.GM.3	Understand angle and length as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and lengths.	Measurement and Data	Angles 0 to 180
5.GM.3.1	Measure and compare angles according to size.	Measurement and Data	Identifying and Comparing Angles
5.GM.3.2	Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or 1/16-inch.	Standard not addressed	
5.GM.3.3	Recognize and use the relationship between inches, feet, and yards to measure and compare objects.	Standard not addressed	
5.GM.3.4	Recognize and use the relationship between millimeters, centimeters, and meters to measure and compare objects.	Standard not addressed	
<b>Data &amp; Probability (D)</b>			
5.D.1 Display and analyze data to find the range and measures of central tendency (mean, median, and mode).			
5.D.1.1	Find the measures of central tendency (mean, median, or mode) and range of a set of data. Understand that the mean is a “leveling out” or central balance point of the data.	Statistics and Probability	Measures of Center - Mean Measures of Center - Median Measures of Spread - Range
5.D.1.2	Create and analyze line and double-bar graphs with whole numbers, fractions, and decimals increments.	Statistics and Probability	Bar Graphs and Histograms

# Grade 6

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
<b>Number &amp; Operations (N)</b>			
6.N.1 Read, write, and represent integers and rational numbers expressed as fractions, decimals, percents, and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.			
6.N.1.1	Represent integers with counters and on a number line and rational numbers on a number line, recognizing the concepts of opposites, direction, and magnitude; use integers and rational numbers in real-world and mathematical situations, explaining the meaning of 0 in each situation.	The Number System	Integer Concepts Integer Concepts with a Number Line
6.N.1.2	Compare and order positive rational numbers, represented in various forms, or integers using the symbols $<$ , $>$ , and $=$ .	Number and Operations in Base Ten	Comparing Decimals to Thousandths Comparing Fractions and Decimals
6.N.1.3	Explain that a percent represents parts “out of 100” and ratios “to 100.”	Ratios and Proportional Relationships	Percent Concepts
6.N.1.4	Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.	Expressions and Equations	Fraction, Decimal, and Percent Equivalents
6.N.1.5	Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents.	The Number System	Greatest Common Factor
6.N.1.6	Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions, and express the sum of two-digit numbers with a common factor using the distributive property.	The Number System	Greatest Common Factor Greatest Common Factor - Applications Least Common Multiple
6.N.2 Add and subtract integers in order to solve real-world and mathematical problems.			
6.N.2.1	Estimate solutions to addition and subtraction of integers problems in order to assess the reasonableness of results.	Standard not addressed	
6.N.2.2	Illustrate addition and subtraction of integers using a variety of representations.	The Number System	Adding and Subtracting Rational Numbers I

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
6.N.2.3	Add and subtract integers; use efficient and generalizable procedures including but not limited to standard algorithms.	The Number System	Adding and Subtracting Rational Numbers I
6.N.3 Understand the concept of ratio and its relationship to fractions and percents and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.			
6.N.3.1	Identify and use ratios to compare quantities. Recognize that multiplicative comparison and additive comparison are different.	Ratios and Proportional Relationships	Concept of Ratios and Rates Identifying Ratios Ratios
6.N.3.2	Determine the unit rate for ratios.	Ratios and Proportional Relationships	Identifying Unit Rates Solving Problems with Unit Rates
6.N.3.3	Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixture and concentrations.	Ratios and Proportional Relationships	Calculations with Percent Reasoning with Percents
6.N.3.4	Use multiplicative reasoning and representations to solve ratio and unit rate problems.	Ratios and Proportional Relationships	Concept of Ratios and Rates Distance, Rate, and Time Ratios Using Ratios to Solve Problems
6.N.4 Multiply and divide decimals, fractions, and mixed numbers; solve real-world and mathematical problems with rational numbers.			
6.N.4.1	Estimate solutions to problems with whole numbers, decimals, fractions, and mixed numbers and use the estimates to assess the reasonableness of results in the context of the problem.	Number and Operations- Fractions	Word Problems with Fractions and Mixed Numbers - Estimation
		Number and Operations in Base Ten	Using Reasoning and Estimation to Calculate with Decimals
6.N.4.2	Illustrate multiplication and division of fractions and decimals to show connections to fractions, whole number multiplication, and inverse relationships.	Number and Operations- Fractions	Dividing Unit Fractions by Whole Numbers Multiplying Fractions by Fractions
		Number and Operations in Base Ten	Dividing Decimals to Hundredths Multiplying Decimals to Hundredths
		The Number System	Dividing Fractions by Fractions

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
6.N.4.3	Multiply and divide fractions and decimals using efficient and generalizable procedures.	Number and Operations- Fractions	Dividing Unit Fractions by Whole Numbers Multiplying with Fractions and Mixed Numbers Understanding Products with Fractions
		Number and Operations in Base Ten	Dividing Decimals to Hundredths
		The Number System	Dividing Fractions by Fractions Operations with Fractions - Mixed Practice Using Division of Fractions to Represent and Solve Problems Using the Relationship Between Multiplication and Division to Divide Fractions
6.N.4.4	Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions and mixed numbers.	Number and Operations- Fractions	Dividing Unit Fractions by Whole Numbers Multiplying Fractions by Fractions Understanding Products with Fractions Word Problems with Fractions and Mixed Numbers - Visual Models
		Number and Operations in Base Ten	Calculating with Decimals Dividing Decimals to Hundredths
		The Number System	Dividing Fractions by Fractions Operations with Fractions - Mixed Practice
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
6.A.1 Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.			
6.A.1.1	Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs.	The Number System	Integers in the Coordinate Plane I Integers in the Coordinate Plane II Rational Numbers in the Coordinate Plane I Rational Numbers in the Coordinate Plane II

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
6.A.1.2	Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables; translate between any two of these representations.	Expressions and Equations	Independent and Dependent Quantities
6.A.1.3	Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false.	Expressions and Equations	Distinguishing Between Expressions and Equations Evaluating Expressions with Two Operations Identifying and Generating Equivalent Expressions
6.A.2 Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers.			
6.A.2.1	Generate equivalent expressions and evaluate expressions involving positive rational numbers by applying the commutative, associative, and distributive properties and order of operations to solve real-world and mathematical problems.	Expressions and Equations	Evaluating Expressions with Real Numbers Evaluating Expressions with the Distributive Property Evaluating Expressions with Two Operations Identifying and Generating Equivalent Expressions Using the Distributive Property to Represent Real-World Situations
6.A.3 Use equations and inequalities to represent real-world and mathematical problems and use the idea of maintaining equality to solve equations. Interpret solutions in the original context.			
6.A.3.1	Represent real-world or mathematical situations using expressions, equations and inequalities involving variables and rational numbers.	Expressions and Equations	Concept of Inequalities I Introduction to Solving Word Problems with Algebra Introduction to the Language of Algebra
6.A.3.2	Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x + p = q$ and $px = q$ , where $x$ , $p$ , and $q$ are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.	Expressions and Equations	Reasoning About One-Step Equations Writing and Solving One-Step Equations

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
<b>Geometry &amp; Measurement (GM)</b>			
6.GM.1 Calculate area of squares, parallelograms, and triangles to solve real-world and mathematical problems.			
6.GM.1.1	Develop and use formulas for the area of squares and parallelograms using a variety of methods including but not limited to the standard algorithm.	Geometry	Area of Parallelograms
6.GM.1.2	Develop and use formulas to determine the area of triangles.	Geometry	Area of Triangles
6.GM.1.3	Find the area of right triangles, other triangles, special quadrilaterals, and polygons that can be decomposed into triangles and other shapes to solve real-world and mathematical problems.	Geometry	Area of Parallelograms Area of Triangles
6.GM.2 Understand and use relationships between angles in geometric figures.			
6.GM.2.1	Solve problems using the relationships between the angles (vertical, complementary, and supplementary) formed by intersecting lines.	Geometry	Angle Pairs
6.GM.2.2	Develop and use the fact that the sum of the interior angles of a triangle is 180 to determine missing angle measures in a triangle.	Standard not addressed	
6.GM.3 Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.			
6.GM.3.1	Estimate weights, capacities and geometric measurements using benchmarks in customary and metric measurement systems with appropriate units.	Standard not addressed	
6.GM.3.2	Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurement systems using appropriate units.	Ratios and Proportional Relationships	Converting Units of Measure I Converting Units of Measure II

Mathematics Standards of Learning		Imagine Math	
Grade 6		Unit	Lesson
6.GM.4 Use translations, reflections, and rotations to establish congruency and understand symmetries.			
6.GM.4.1	Predict, describe, and apply translations (slides), reflections (flips), and rotations (turns) to a two-dimensional figure.	Geometry	Reflections Rotations Translations
6.GM.4.2	Recognize that translations, reflections, and rotations preserve congruency and use them to show that two figures are congruent.	Geometry	Congruence
6.GM.4.3	Use distances between two points that are either vertical or horizontal to each other (not requiring the distance formula) to solve real-world and mathematical problems about congruent two-dimensional figures.	Geometry	Distance on the Coordinate Plane I
6.GM.4.4	Identify and describe the line(s) of symmetry in two-dimensional shapes.	Geometry	Symmetry
<b>Data &amp; Probability (D)</b>			
6.D.1 Display and analyze data.			
6.D.1.1	Calculate the mean, median, and mode for a set of real-world data.	Statistics and Probability	Measures of Center - Mean Measures of Center - Median
6.D.1.2	Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.	Standard not addressed	
6.D.1.3	Create and analyze box and whisker plots observing how each segment contains one quarter of the data.	Statistics and Probability	Box Plots Quartiles
6.D.2 Use probability to solve real-world and mathematical problems; represent probabilities using fractions and decimals.			
6.D.2.1	Represent possible outcomes using a probability continuum from impossible to certain.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
<i>Grade 6</i>		<i>Unit</i>	<i>Lesson</i>
6.D.2.2	Determine the sample space for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.	Statistics and Probability	Probability and Sample Spaces Using the Fundamental Counting Principle
6.D.2.3	Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results.	Standard not addressed	

# Grade 7

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Grade 7		Unit	Lesson
<b>Number &amp; Operations (N)</b>			
7.N.1 Read, write, represent, and compare rational numbers, expressed as integers, fractions, and decimals.			
7.N.1.1	Know that every rational number can be written as the ratio of two integers or as a terminating or repeating decimal.	The Number System	Classifying and Ordering Real Numbers
7.N.1.2	Compare and order rational numbers expressed in various forms using the symbols $<$ , $>$ , and $=$ .	The Number System	Comparing Rational Numbers I Comparing Rational Numbers II
7.N.1.3	Recognize and generate equivalent representations of rational numbers, including equivalent fractions.	Number and Operations- Fractions	Using Division to Write Fractions as Decimals
7.N.2 Calculate with integers and rational numbers, with and without positive integer exponents, to solve real-world and mathematical problems; explain the relationship between absolute value of a rational number and the distance of that number from zero.			
7.N.2.1	Estimate solutions to multiplication and division of integers in order to assess the reasonableness of results.	Standard not addressed	
7.N.2.2	Illustrate multiplication and division of integers using a variety of representations.	The Number System	Multiplying and Dividing Rational Numbers
7.N.2.3	Solve real-world and mathematical problems involving addition, subtraction, multiplication and division of rational numbers; use efficient and generalizable procedures including but not limited to standard algorithms.	Number and Operations- Fractions	Understanding and Multiplying with Negative Mixed Numbers
		The Number System	Operations with Rational Numbers II Writing and Interpreting Expressions with Rational Numbers
7.N.2.4	Raise integers to positive integer exponents.	Expressions and Equations	Evaluating Expressions and Equations with Exponents Understanding Exponents
7.N.2.5	Solve real-world and mathematical problems involving calculations with rational numbers and positive integer exponents.	Expressions and Equations	Evaluating Expressions and Equations with Exponents
		The Number System	Adding and Subtracting Rational Numbers II Operations with Rational Numbers I
7.N.2.6	Explain the relationship between the absolute value of a rational number and the distance of that number from zero on a number line. Use the symbol for absolute value.	The Number System	Absolute Value I Absolute Value II

Mathematics Standards of Learning		Imagine Math	
Grade 7		Unit	Lesson
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
7.A.1 Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships.			
7.A.1.1	Describe that the relationship between two variables, $x$ and $y$ , is proportional if it can be expressed in the form $y/x = k$ or $y = kx$ ; distinguish proportional relationships from other relationships, including inversely proportional relationships ( $xy = k$ or $y = k/y$ ).	Building Functions	Direct Variation
		Ratios and Proportional Relationships	Proportional Relationships in Tables and Equations
7.A.1.2	Recognize that the graph of a proportional relationship is a line through the origin and the coordinate $(1, r)$ , where both $r$ and the slope are the unit rate (constant of proportionality, $k$ ).	Ratios and Proportional Relationships	Interpreting Unit Rates on Graphs Proportion Concepts
7.A.2 Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols, and graphs; solve problems involving proportional relationships and interpret results in the original context.			
7.A.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations.	Expressions and Equations	Solving Word Problems with Algebra
		Ratios and Proportional Relationships	Interpreting Points on Graphs of Proportional Relationships Proportion Concepts Proportional Relationships in Tables and Equations
7.A.2.2	Solve multi-step problems involving proportional relationships involving distance-time, percent increase or decrease, discounts, tips, unit pricing, similar figures, and other real-world and mathematical situations.	Ratios and Proportional Relationships	Interpreting Unit Rates on Graphs Percent and Percent Change Percent and Percent Error Simple Interest Using Similar Figures to Solve Problems
7.A.2.3	Use proportional reasoning to solve real-world and mathematical problems involving ratios.	Ratios and Proportional Relationships	Interpreting Unit Rates on Graphs Using Proportions to Solve Problems
7.A.2.4	Use proportional reasoning to assess the reasonableness of solutions.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
Grade 7		Unit	Lesson
7.A.3 Represent and solve linear equations and inequalities.			
7.A.3.1	Write and solve problems leading to linear equations with one variable in the form $px + q = r$ and $p(x + q) = r$ , where $p$ , $q$ , and $r$ are rational numbers.	Expressions and Equations	Solving and Modeling Two-Step Problems Solving Two-Step Equations Solving Word Problems with Algebra
7.A.3.2	Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $x + p > q$ and $x + p < q$ , where $p$ , and $q$ are nonnegative rational numbers.	Expressions and Equations	Concept of Inequalities II
7.A.3.3	Represent real-world or mathematical situations using equations and inequalities involving variables and rational numbers.	Expressions and Equations	Concept of Inequalities II Solving and Modeling Two-Step Problems Solving Equations with the Distributive Property in Context
7.A.4 Use order of operations and properties of operations to generate equivalent numerical and algebraic expressions containing rational numbers and grouping symbols; evaluate such expressions.			
7.A.4.1	Use properties of operations (limited to associative, commutative, and distributive) to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents.	Expressions and Equations	Combining Like Terms Common Factors in Polynomials Solving Equations with the Distributive Property
7.A.4.2	Apply understanding of order of operations and grouping symbols when using calculators and other technologies.	Standard not addressed	
<b>Geometry &amp; Measurement (GM)</b>			
7.GM.1 Develop and understand the concept of surface area and volume of rectangular prisms.			
7.GM.1.1	Using a variety of tools and strategies, develop the concept that surface area of a rectangular prism with rational-valued edge lengths can be found by wrapping the figure with same-sized square units without gaps or overlap. Use appropriate measurements such as $\text{cm}^2$ .	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
Grade 7		Unit	Lesson
7.GM.1.2	Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with rational-valued edge lengths can be found by counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as $\text{cm}^3$ .	Measurement and Data	Volume of Rectangular Prisms II
7.GM.2 Determine the area of trapezoids and area and perimeter of composite figures.			
7.GM.2.1	Develop and use the formula to determine the area of a trapezoid to solve problems.	Geometry	Area of Trapezoids and Composite Figures
7.GM.2.2	Find the area and perimeter of composite figures to solve real-world and mathematical problems.	Geometry	Area of Complex Composite Figures Area of Trapezoids and Composite Figures
7.GM.3 Use reasoning with proportions and ratios to determine measurements, justify formulas, and solve real-world and mathematical problems involving circles and related geometric figures.			
7.GM.3.1	Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is $\pi$ and can be approximated by rational numbers such as $22/7$ and $3.14$ .	Geometry	Circumference
7.GM.3.2	Calculate the circumference and area of circles to solve problems in various contexts, in terms of $\pi$ and using approximations for $\pi$ .	Geometry	Area of Circles Circumference
7.GM.4 Analyze the effect of dilations, translations, and reflections on the attributes of two-dimensional figures on and off the coordinate plane.			
7.GM.4.1	Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors resulting from dilations.	Ratios and Proportional Relationships	Introduction to Similar Figures Similarity
7.GM.4.2	Apply proportions, ratios, and scale factors to solve problems involving scale drawings and determine side lengths and areas of similar triangles and rectangles.	Geometry	Dilations
		Ratios and Proportional Relationships	Proportions in Scale Drawings

Mathematics Standards of Learning		Imagine Math	
Grade 7		Unit	Lesson
7.GM.4.3	Graph and describe translations and reflections of figures on a coordinate plane and determine the coordinates of the vertices of the figure after the transformation.	Geometry	Composition of Transformations Dilations in the Coordinate Plane Reflections Translations
<b>Geometry &amp; Measurement (GM)</b>			
7.D.1	Display and analyze data in a variety of ways.	Statistics and Probability	Comparing Data
7.D.1.1	Design simple experiments, collect data and calculate measures of central tendency (mean, median, and mode) and spread (range). Use these quantities to draw conclusions about the data collected and make predictions.	Statistics and Probability	Summarizing Data
7.D.1.2	Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology.	Statistics and Probability	Circle Graphs
7.D.2 Calculate probabilities and reason about probabilities using proportions to solve real-world and mathematical problems.			
7.D.2.1	Determine the theoretical probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1.	Statistics and Probability	Compound Probability Simple Probability
7.D.2.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.	Conditional Probability and the Rules of Probability	Using Area Models for Compound Probability
		Statistics and Probability	Compound Probability Simple Probability
7.D.2.3	Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.	Statistics and Probability	Making Predictions

# Pre-Algebra

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
<i>Pre-Algebra</i>		<i>Unit</i>	<i>Lesson</i>
<b>Number &amp; Operations (N)</b>			
PA.N.1 Read, write, compare, classify, and represent real numbers and use them to solve problems in various contexts.			
PA.N.1.1	Develop and apply the properties of integer exponents, including $a^0 = 1$ (with $a \neq 0$ ), to generate equivalent numerical and algebraic expressions.	Expressions and Equations	Applying Properties of Integer Exponents Understanding Properties of Integer Exponents
PA.N.1.2	Express and compare approximations of very large and very small numbers using scientific notation.	Expressions and Equations	Interpreting Numbers Written in Scientific Notation Operations with Numbers in Scientific Notation
PA.N.1.3	Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation.	Expressions and Equations	Operations with Numbers in Scientific Notation
PA.N.1.4	Classify real numbers as rational or irrational. Explain why the rational number system is closed under addition and multiplication and why the irrational system is not. Explain why the sum of a rational number and an irrational number is irrational; and the product of a non-zero rational number and an irrational number is irrational.	The Number System	Classifying and Ordering Real Numbers
		The Real Number System	Products and Sums with Rational and Irrational Numbers
PA.N.1.5	Compare real numbers; locate real numbers on a number line. Identify the square root of a perfect square to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers.	Expressions and Equations	Understanding Square and Cube Roots
		The Number System	Approximating Values of Irrational Numbers Classifying and Ordering Real Numbers
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
PA.A.1 Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.			
PA.A.1.1	Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable.	Interpreting Functions	Function Notation II
PA.A.1.2	Use linear functions to represent and explain real-world and mathematical situations.	Expressions and Equations	Solving Equations with the Variable on Both Sides

Mathematics Standards of Learning		Imagine Math	
<i>Pre-Algebra</i>		<i>Unit</i>	<i>Lesson</i>
PA.A.1.3	Identify a function as linear if it can be expressed in the form $y = mx + b$ or if its graph is a straight line.	Functions	Slope-Intercept Form
PA.A.2 Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols, and graphs; solve problems involving linear functions and interpret results in the original context.			
PA.A.2.1	Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.	Functions	Introduction to Sketching Graphs of Real-World Situations Point-Slope Form
PA.A.2.2	Identify, describe, and analyze linear relationships between two variables.	Functions	Introduction to Sketching Graphs of Real-World Situations Point-Slope Form Slope-Intercept Form
PA.A.2.3	Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.	Expressions and Equations	Interpreting Slope Slope
PA.A.2.4	Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects.	Expressions and Equations	Interpreting Slope
PA.A.2.5	Solve problems involving linear functions and interpret results in the original context.	Expressions and Equations	Interpreting Slope
		Functions	Point-Slope Form
PA.A.3 Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.			
PA.A.3.1	Use substitution to simplify and evaluate algebraic expressions.	Expressions and Equations	Evaluating Expressions and Equations with Exponents
PA.A.3.2	Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
Pre-Algebra		Unit	Lesson
PA.A.4 Represent real-world and mathematical problems using equations and inequalities involving linear expressions. Solve and graph equations and inequalities symbolically and graphically. Interpret solutions in the original context.			
PA.A.4.1	Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.	Expressions and Equations	Analyzing Solution Sets to Linear Equations with the Variable on Both Sides Solving Equations with the Variable on Both Sides
		Reasoning with Equations and Inequalities	Solving Linear Equations in One Variable as a Reasoning Process
PA.A.4.2	Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $px + q > r$ and $px + q < r$ , where $p$ , $q$ , and $r$ are rational numbers.	Creating Equations	Writing Linear Inequalities in One Variable
		Expressions and Equations	Modeling, Evaluating, and Graphing Two-Step Inequalities in One Variable
		Reasoning with Equations and Inequalities	Solving Linear Inequalities in One Variable
PA.A.4.3	Represent real-world situations using equations and inequalities involving one variable.	Creating Equations	Writing Linear Inequalities in One Variable
		Expressions and Equations	Modeling, Evaluating, and Graphing Two-Step Inequalities in One Variable
<b>Geometry &amp; Measurement (GM)</b>			
PA.GM.1 Solve problems involving right triangles using the Pythagorean Theorem.			
PA.GM.1.1	Informally justify the Pythagorean Theorem using measurements, diagrams, or dynamic software and use the Pythagorean Theorem to solve problems in two and three dimensions involving right triangles.	Geometry	Pythagorean Theorem - Hypotenuse Pythagorean Theorem - Legs Pythagorean Theorem - Mixed Problems Understanding the Pythagorean Theorem
PA.GM.1.2	Use the Pythagorean Theorem to find the distance between any two points in a coordinate plane.	Geometry	Pythagorean Theorem - Distance Formula
PA.GM.2 Calculate surface area and volume of three-dimensional figures.			
PA.GM.2.1	Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate measurements such as $\text{cm}^2$ .	Geometry	Surface Area and Volume of Rectangular Prisms

Mathematics Standards of Learning		Imagine Math	
Pre-Algebra		Unit	Lesson
PA.GM.2.2	Calculate the surface area of a cylinder, in terms of $\pi$ and using approximations for $\pi$ , using decomposition or nets. Use appropriate measurements such as $\text{cm}^2$ .	Geometry	Surface Area of Cylinders
PA.GM.2.3	Develop and use the formulas $V = lwh$ and $V = Bh$ to determine the volume of rectangular prisms. Justify why base area ( $B$ ) and height ( $h$ ) are multiplied to find the volume of a rectangular prism. Use appropriate measurements such as $\text{cm}^3$ .	Geometry	Surface Area and Volume of Rectangular Prisms
PA.GM.2.4	Develop and use the formulas $V = \pi r^2 h$ and $V = Bh$ to determine the volume of right cylinders, in terms of $\pi$ and using approximations for $\pi$ . Justify why base area ( $B$ ) and height ( $h$ ) are multiplied to find the volume of a right cylinder. Use appropriate measurements such as $\text{cm}^3$ .	Geometry	Volume of Cylinders
<b>Data &amp; Probability (D)</b>			
PA.D.1 Display and interpret data in a variety of ways, including using scatterplots and approximate lines of best fit. Use line of best fit and average rate of change to make predictions and draw conclusions about data.			
PA.D.1.1	Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet and use a calculator to examine this impact.	Statistics and Probability	Understanding the Effects of Outliers on Mean and Median
PA.D.1.2	Explain how outliers affect measures of central tendency.	Statistics and Probability	Understanding the Effects of Outliers on Mean and Median
PA.D.1.3	Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit, make statements about average rate of change, and make predictions about values not in the original data set. Use appropriate titles, labels and units.	Interpreting Categorical and Quantitative Data	Fitting Functions to Data
		Statistics and Probability	Comparing Linear and Nonlinear Data

Mathematics Standards of Learning		Imagine Math	
<i>Pre-Algebra</i>		<i>Unit</i>	<i>Lesson</i>
PA.D.2 Calculate experimental probabilities and reason about probabilities to solve real-world and mathematical problems.			
PA.D.2.1	Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.	Standard not addressed	
PA.D.2.2	Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population.	Statistics and Probability	Sampling
PA.D.2.3	Compare and contrast dependent and independent events.	Standard not addressed	

# Algebra I

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
<i>Algebra I</i>		<i>Unit</i>	<i>Lesson</i>
<b>Number &amp; Operations (N)</b>			
A1.N.1 Extend the understanding of number and operations to include square roots and cube roots.			
A1.N.1.1	Write square roots and cube roots of monomial algebraic expressions in simplest radical form.	Standard not addressed	
A1.N.1.2	Add, subtract, multiply, and simplify square roots of monomial algebraic expressions and divide square roots of whole numbers, rationalizing the denominator when necessary.	Standard not addressed	
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
A1.A.1 Represent and solve mathematical and real-world problems using linear equations, absolute value equations, and systems of equations; interpret solutions in the original context.			
A1.A.1.1	Use knowledge of solving equations with rational values to represent and solve mathematical and real-world problems (e.g., angle measures, geometric formulas, science, or statistics) and interpret the solutions in the original context.	Creating Equations	Writing and Solving Linear Equations in One Variable
A1.A.1.2	Solve absolute value equations and interpret the solutions in the original context.	Standard not addressed	
A1.A.1.3	Analyze and solve real-world and mathematical problems involving systems of linear equations with a maximum of two variables by graphing (may include graphing calculator or other appropriate technology), substitution, and elimination. Interpret the solutions in the original context.	Expressions and Equations	Solving a System of Linear Equations - Applications Solving a System of Linear Equations Algebraically Solving a System of Linear Equations Graphically
		Reasoning with Equations and Inequalities	Solving a System of Linear and Quadratic Equations Solving Systems of Linear Equations
A1.A.2 Represent and solve real-world and mathematical problems using linear inequalities, compound inequalities and systems of linear inequalities; interpret solutions in the original context.			
A1.A.2.1	Represent relationships in various contexts with linear inequalities; solve the resulting inequalities, graph on a coordinate plane, and interpret the solutions.	Reasoning with Equations and Inequalities	Graphing Linear Inequalities and Systems of Linear Inequalities in Real-World Situations

Mathematics Standards of Learning		Imagine Math	
<i>Algebra I</i>		<i>Unit</i>	<i>Lesson</i>
A1.A.2.2	Represent relationships in various contexts with compound and absolute value inequalities and solve the resulting inequalities by graphing and interpreting the solutions on a number line.	Standard not addressed	
A1.A.2.3	Solve systems of linear inequalities with a maximum of two variables; graph and interpret the solutions on a coordinate plane.	Reasoning with Equations and Inequalities	Graphing Linear Inequalities and Systems of Linear Inequalities in Real-World Situations
A1.A.3 Generate equivalent algebraic expressions and use algebraic properties to evaluate expressions and arithmetic and geometric sequences.			
A1.A.3.1	Solve equations involving several variables for one variable in terms of the others.	Creating Equations	Solving Literal Equations
A1.A.3.2	Simplify polynomial expressions by adding, subtracting, or multiplying.	Arithmetic with Polynomials and Rational Expressions	Adding and Subtracting Polynomials Multiplying and Dividing Monomials Multiplying Polynomials
A1.A.3.3	Factor common monomial factors from polynomial expressions and factor quadratic expressions with a leading coefficient of 1.	Seeing Structure in Expressions	Factoring Expressions
A1.A.3.4	Evaluate linear, absolute value, rational, and radical expressions. Include applying a nonstandard operation such as $a \odot b = 2a + b$ .	Standard not addressed	Standard not addressed
A1.A.3.5	Recognize that arithmetic sequences are linear using equations, tables, graphs, and verbal descriptions. Use the pattern, find the next term.	Building Functions	Writing Arithmetic Sequences Explicitly and Recursively
		Interpreting Functions	Sequences as Functions
A1.A.3.6	Recognize that geometric sequences are exponential using equations, tables, graphs and verbal descriptions. Given the formula $f(x) = a(r)^x$ , find the next term and define the meaning of $a$ and $r$ within the context of the problem.	Building Functions	Writing Geometric Sequences Recursively Writing Geometric Sequences Using an Explicit Formula
		Interpreting Functions	Sequences as Functions

Mathematics Standards of Learning		Imagine Math	
<i>Algebra I</i>		<i>Unit</i>	<i>Lesson</i>
A1.A.4 Analyze mathematical change involving linear equations in real-world and mathematical problems.			
A1.A.4.1	Calculate and interpret slope and the x- and y-intercepts of a line using a graph, an equation, two points, or a set of data points to solve real-world and mathematical problems.	Interpreting Functions	Sketching Graphs of Linear Functions from Symbolic Representations
A1.A.4.2	Solve mathematical and real-world problems involving lines that are parallel, perpendicular, horizontal, or vertical.	Creating Equations	Equations of Parallel and Perpendicular Lines
A1.A.4.3	Express linear equations in slope-intercept, point-slope, and standard forms and convert between these forms. Given sufficient information (slope and y-intercept, slope and one-point on the line, two points on the line, x- and y-intercept, or a set of data points), write the equation of a line.	Functions	Point-Slope Form
A1.A.4.4	Translate between a graph and a situation described qualitatively.	Functions	Interpreting Graphs of Real-World Situations
		Interpreting Functions	Comparing Functions Using Different Representations Interpreting Graphs of Linear and Exponential Functions in Context
<b>Functions (F)</b>			
A1.F.1 Understand functions as descriptions of covariation (how related quantities vary together) in real-world and mathematical problems.			
A1.F.1.1	Distinguish between relations and functions.	Interpreting Functions	Function Notation II
A1.F.1.2	Identify the dependent and independent variables as well as the domain and range given a function, equation, or graph. Identify restrictions on the domain and range in real-world contexts.	Interpreting Functions	Understanding the Domain of a Function
A1.F.1.3	Write linear functions, using function notation, to model real-world and mathematical situations.	Interpreting Functions	Function Notation I Function Notation II

Mathematics Standards of Learning		Imagine Math	
<i>Algebra I</i>		<i>Unit</i>	<i>Lesson</i>
A1.F.1.4	Given a graph modeling a real-world situation, read and interpret the linear piecewise function (excluding step functions).	Standard not addressed	
A1.F.2 Recognize functions and understand that families of functions are characterized by their rate of change.			
A1.F.2.1	Distinguish between linear and nonlinear (including exponential) functions arising from real-world and mathematical situations that are represented in tables, graphs, and equations. Understand that linear functions grow by equal intervals and that exponential functions grow by equal factors over equal intervals.	Interpreting Functions	Rate of Change for Linear and Exponential Functions Sketching Graphs of Linear and Exponential Functions from a Context
		Linear, Quadratic, and Exponential Models	Distinguishing Between Linear and Exponential Relationships Introduction to Nonlinear Models
A1.F.2.2	Recognize the graph of the functions $f(x) = x$ and $f(x) =  x $ and predict the effects of transformations [ $f(x + c)$ and $f(x) + c$ , where $c$ is a positive or negative constant] algebraically and graphically using various methods and tools that may include graphing calculators.	Building Functions	Transformations of Graphs of Linear Functions
A1.F.3 Represent functions in multiple ways and use the representation to interpret real-world and mathematical problems.			
A1.F.3.1	Identify and generate equivalent representations of linear equations, graphs, tables, and real-world situations.	Creating Equations	Writing and Graphing Linear Equations in Two or More Variables
		Interpreting Functions	Interpreting Graphs of Linear and Exponential Functions in Context
A1.F.3.2	Use function notation; evaluate a function, including nonlinear, at a given point in its domain algebraically and graphically. Interpret the results in terms of real-world and mathematical problems.	Interpreting Functions	Function Notation I Function Notation II
A1.F.3.3	Add, subtract, and multiply functions using function notation.	Building Functions	Composite Functions

Mathematics Standards of Learning		Imagine Math	
<i>Algebra I</i>		<i>Unit</i>	<i>Lesson</i>
<b>Data &amp; Probability (D)</b>			
A1.D.1 Display, describe, and compare data. For linear relationships, make predictions and assess the reliability of those predictions.			
A1.D.1.1	Describe a data set using data displays, describe and compare data sets using summary statistics, including measures of central tendency, location, and spread. Know how to use calculators, spreadsheets, or other appropriate technology to display data and calculate summary statistics.	Interpreting Categorical and Quantitative Data	Comparing the Shape, Center, and Spread of Data Sets
A1.D.1.2	Collect data and use scatterplots to analyze patterns and describe linear relationships between two variables. Using graphing technology, determine regression lines and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions.	Interpreting Categorical and Quantitative Data	Correlation Fitting Functions to Data
A1.D.1.3	Interpret graphs as being discrete or continuous.	Standard not addressed	
A1.D.2 Calculate probabilities and apply probability concepts.			
A1.D.2.1	Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.	Conditional Probability and the Rules of Probability	Organizing Possible Outcomes of Events
A1.D.2.2	Describe the concepts of intersections, unions, and complements using Venn diagrams to evaluate probabilities. Understand the relationships between these concepts and the words AND, OR, and NOT.	Conditional Probability and the Rules of Probability	Modeling Probability Situations Using Two-Way Frequency Tables Relating Probabilities of Unions and Intersections of Events Understanding Conditional Probability Understanding Independent and Dependent Events
A1.D.2.3	Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.	Statistics and Probability	Simulations of Simple and Compound Events
A1.D.2.4	Apply probability concepts to real-world situations to make informed decisions.	Conditional Probability and the Rules of Probability	Understanding Conditional Probability Understanding Independent and Dependent Events

# Geometry

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
Geometry		Unit	Lesson
<b>Geometry: Reasoning &amp; Logic (G.RL)</b>			
G.RL.1 Use appropriate tools and logic to evaluate mathematical arguments.			
G.RL.1.1	Understand the use of undefined terms, definitions, postulates, and theorems in logical arguments/proofs.	Congruence	Defining Basic Geometric Elements Proving Theorems About Congruent Triangles Proving Theorems About Lines and Angles Proving Theorems About Parallelograms Proving Theorems About Relationships in Triangles What Is Proof?
		Similarity, Right Triangles, and Trigonometry	Proving Theorems About Similar Triangles
G.RL.1.2	Analyze and draw conclusions based on a set of conditions using inductive and deductive reasoning. Recognize the logical relationships between a conditional statement and its inverse, converse, and contrapositive.	Congruence	Proving Theorems About Congruent Triangles Proving Theorems About Lines and Angles Proving Theorems About Parallelograms Proving Theorems About Relationships in Triangles What Is Proof?
		Similarity, Right Triangles, and Trigonometry	Proving Theorems About Similar Triangles
G.RL.1.3	Assess the validity of a logical argument and give counterexamples to disprove a statement.	Congruence	Defining Basic Geometric Elements What Is Proof?
<b>Geometry: Two-Dimensional Shapes (G.2D)</b>			
G.2D.1 Discover, evaluate and analyze the relationships between lines, angles, and polygons to solve real-world and mathematical problems; express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts, or illustrations.			
G.2D.1.1	Apply the properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve real-world and mathematical problems and determine if two lines are parallel, using algebraic reasoning and proofs.	Congruence	Proving Theorems About Lines and Angles
		Geometry	Parallel Lines and Transversals

Mathematics Standards of Learning		Imagine Math	
Geometry		Unit	Lesson
G.2D.1.2	Apply the properties of angles, including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve real-world and mathematical problems using algebraic reasoning and proofs.	Geometry	Parallel Lines and Transversals
G.2D.1.3	Apply theorems involving the interior and exterior angle sums of polygons and use them to solve real-world and mathematical problems using algebraic reasoning and proofs.	Congruence	Proving Theorems About Relationships in Triangles
G.2D.1.4	Apply the properties of special quadrilaterals (square, rectangle, trapezoid, isosceles trapezoid, rhombus, kite, parallelogram) and use them to solve real-world and mathematical problems involving angle measures and segment lengths using algebraic reasoning and proofs.	Expressing Geometric Properties with Equations	Problem Solving with Coordinates of Parallel and Perpendicular Lines
G.2D.1.5	Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints, and slopes of line segments.	Congruence	Proving Theorems About Parallelograms
		Expressing Geometric Properties with Equations	Dividing a Segment Proportionally Problem Solving with Coordinates of Parallel and Perpendicular Lines Using Coordinates to Find Perimeters and Areas
G.2D.1.6	Apply the properties of polygons to solve real-world and mathematical problems involving perimeter and area (e.g., triangles, special quadrilaterals, regular polygons up to 12 sides, composite figures).	Expressing Geometric Properties with Equations	Using Coordinates to Find Perimeters and Areas
G.2D.1.7	Apply the properties of congruent or similar polygons to solve real-world and mathematical problems using algebraic and logical reasoning.	Congruence	Rigid Motion and Congruence
		Similarity, Right Triangles, and Trigonometry	Problem Solving with Congruent Triangles Problem Solving with Transformations and Similarity Proving Theorems About Similar Triangles

Mathematics Standards of Learning		Imagine Math	
Geometry		Unit	Lesson
G.2D.1.8	Construct logical arguments to prove triangle congruence (SSS, SAS, ASA, AAS and HL) and triangle similarity (AA, SSS, SAS).	Congruence	Proving Theorems About Congruent Triangles
		Similarity, Right Triangles, and Trigonometry	Problem Solving with Congruent Triangles
G.2D.1.9	Use numeric, graphic and algebraic representations of transformations in two dimensions, such as reflections, translations, dilations, and rotations about the origin by multiples of $90^\circ$ , to solve problems involving figures on a coordinate plane and identify types of symmetry.	Congruence	Defining Transformations Representing Transformations with Algebra Rigid Motion and Congruence Rotational and Reflectional Symmetry
		Expressing Geometric Properties with Equations	Coordinates of Parallel and Perpendicular Lines
		Similarity, Right Triangles, and Trigonometry	Properties of Dilations I Properties of Dilations II Transformations and Similarity
<b>Geometry: Three-Dimensional Shapes (G.3D)</b>			
G.3D.1 Solve real-world and mathematical problems involving three-dimensional figures.			
G.3D.1.1	Solve real-world and mathematical problems using the surface area and volume of prisms, cylinders, pyramids, cones, spheres, and composites of these figures. Use nets, measuring devices, or formulas as appropriate.	Geometry	Surface Area of Composite Solids Surface Area of Cones Surface Area of Cylinders Surface Area of Pyramids Surface Area of Spheres Volume of Composite Solids Volume of Cylinders Volume of Pyramids and Cones Volume of Spheres
		Similarity, Right Triangles, and Trigonometry	Problem Solving with Similarity and Trigonometric Ratios

Mathematics Standards of Learning		Imagine Math	
Geometry		Unit	Lesson
G.3D.1.2	Use ratios derived from similar three-dimensional figures to make conjectures, generalize, and to solve for unknown values such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.	Modeling with Geometry	Using Geometric Relationships to Solve Design Problems
<b>Geometry: Circles (G.C)</b>			
G.C.1 Solve real-world and mathematical problems using the properties of circles.			
G.C.1.1	Apply the properties of circles to solve problems involving circumference and area, approximate values and in terms of $\pi$ , using algebraic and logical reasoning.	Geometric Measurement and Dimension	Understanding Formulas for Curved Figures
G.C.1.2	Apply the properties of circles and relationships among angles; arcs; and distances in a circle among radii, chords, secants and tangents to solve problems using algebraic and logical reasoning.	Circles	Quadrilaterals Inscribed in Circles Tangents, Chords, Radii, and Angles in Circles
G.C.1.3	Recognize and write the radius $r$ , center $(h, k)$ , and standard form of the equation of a circle $(x - h)^2 + (y - k)^2 = r^2$ with and without graphs.	Expressing Geometric Properties with Equations	Equation of a Circle Problem Solving with the Equation of a Circle
G.C.1.4	Apply the distance and midpoint formula, where appropriate, to develop the equation of a circle in standard form.	Expressing Geometric Properties with Equations	Equation of a Circle Problem Solving with the Equation of a Circle
<b>Geometry: Right Triangle Trigonometry (G.RT)</b>			
G.RT.1 Develop and verify mathematical relationships of right triangles and trigonometric ratios to solve real-world and mathematical problems.			
G.RT.1.1	Apply the distance formula and the Pythagorean Theorem and its converse to solve real-world and mathematical problems, as approximate and exact values, using algebraic and logical reasoning (include Pythagorean Triples).	Geometry	Pythagorean Theorem - Distance Formula Pythagorean Theorem - Hypotenuse Pythagorean Theorem - Legs Pythagorean Theorem - Mixed Problems
G.RT.1.2	Verify and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems using algebraic and logical reasoning.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
<i>Geometry</i>		<i>Unit</i>	<i>Lesson</i>
G.RT.1.3	Use the definition of the trigonometric functions to determine the sine, cosine, and tangent ratio of an acute angle in a right triangle. Apply the inverse trigonometric functions to find the measure of an acute angle in right triangles.	Similarity, Right Triangles, and Trigonometry	Similarity and Trigonometric Ratios Sine and Cosine of Complementary Angles
G.RT.1.4	Apply the trigonometric functions as ratios (sine, cosine, and tangent) to find side lengths in right triangles in real-world and mathematical problems.	Similarity, Right Triangles, and Trigonometry	Problem Solving with Similarity and Trigonometric Ratios

# Algebra II

Oklahoma Academic Standards for  
Mathematics

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
<b>Number &amp; Operations (N)</b>			
A2.N.1 Extend the understanding of number and operations to include complex numbers, matrices, radical expressions, and expressions written with rational exponents.			
A2.N.1.1	Find the value of $i^n$ for any whole number $n$ .	The Complex Number System	Complex Number Arithmetic
A2.N.1.2	Simplify, add, subtract, multiply, and divide complex numbers.	The Complex Number System	Complex Number Arithmetic
A2.N.1.3	Use matrices to organize and represent data. Identify the order (dimension) of a matrix, add and subtract matrices of appropriate dimensions, and multiply a matrix by a scalar to create a new matrix to solve problems.	Standard not addressed	
A2.N.1.4	Understand and apply the relationship of rational exponents to integer exponents and radicals to solve problems.	The Real Number System	Using Rational Exponents to Rewrite Expressions
<b>Algebraic Reasoning &amp; Algebra (A)</b>			
A2.A.1 Represent and solve mathematical and real-world problems using nonlinear equations and systems of linear equations; interpret the solutions in the original context.			
A2.A.1.1	Represent real-world or mathematical problems using quadratic equations and solve using various methods (including graphing calculator or other appropriate technology), factoring, completing the square, and the quadratic formula. Find non-real roots when they exist.	Building Functions	Writing Quadratic Functions from a Context
		Creating Equations	Modeling Quadratic Relationships with Equations, Inequalities, and Graphs
		Interpreting Functions	Sketching Graphs of Quadratic Functions in Context
		Reasoning with Equations and Inequalities	Problem Solving with Quadratic Functions Solving Quadratic Equations Graphically Solving Quadratic Equations with Real and Complex Roots - Completing the Square Solving Quadratic Equations with Real and Complex Roots - Using the Quadratic Formula
		Seeing Structure in Expressions	Interpreting the Structure of Quadratic Expressions and Expressions with Rational Exponents

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
A2.A.1.2	Represent real-world or mathematical problems using exponential equations, such as compound interest, depreciation, and population growth, and solve these equations graphically (including graphing calculator or other appropriate technology) or algebraically.	Building Functions	Writing Linear and Exponential Functions from a Context
		Creating Equations	Modeling Exponential Relationships with Equations, Inequalities, and Graphs
		Interpreting Functions	Rewriting and Interpreting Exponential Functions in Terms of Context
		Linear, Quadratic, and Exponential Models	Writing Linear and Exponential Functions Based on Different Representations
		Reasoning with Equations and Inequalities	Solving Exponential Equations Graphically
		Seeing Structure in Expressions	Interpreting the Structure of Linear and Exponential Expressions
A2.A.1.3	Solve one-variable rational equations and check for extraneous solutions.	Expressions and Equations	Solving Rational and Radical Equations II
A2.A.1.4	Solve polynomial equations with real roots using various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators or other appropriate technology.	Standard not addressed	
A2.A.1.5	Solve square root equations with one variable and check for extraneous solutions.	Expressions and Equations	Solving Rational and Radical Equations I
A2.A.1.6	Solve common and natural logarithmic equations using the properties of logarithms.	Interpreting Functions	Logarithmic Functions
A2.A.1.7	Solve real-world and mathematical problems that can be modeled using arithmetic or finite geometric sequences or series given the $n^{\text{th}}$ terms and sum formulas. Graphing calculators or other appropriate technology may be used.	Building Functions	Writing Arithmetic Sequences Explicitly and Recursively Writing Geometric Sequences Recursively Writing Geometric Sequences Using an Explicit Formula
		Interpreting Functions	Sequences as Functions
A2.A.1.8	Represent real-world or mathematical problems using systems of linear equations with a maximum of three variables and solve using various methods that may include substitution, elimination, and graphing (may include graphing calculators or other appropriate technology).	Expressions and Equations	Solving a System of Linear Equations - Applications Solving a System of Linear Equations Algebraically Solving a System of Linear Equations Graphically

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
A2.A.1.9	Solve systems of equations containing one linear equation and one quadratic equation using tools that may include graphing calculators or other appropriate technology	Reasoning with Equations and Inequalities	Solving a System of Linear and Quadratic Equations
A2.A.2 Represent and analyze mathematical situations and structures using algebraic symbols using various strategies to write equivalent forms of expressions.			
A2.A.2.1	Factor polynomial expressions including but not limited to trinomials, differences of squares, sum and difference of cubes, and factoring by grouping using a variety of tools and strategies.	Seeing Structure in Expressions	Factoring Quadratic Expressions
A2.A.2.2	Add, subtract, multiply, divide, and simplify polynomial and rational expressions.	Arithmetic with Polynomials and Rational Expressions	Adding and Subtracting Polynomials Adding and Subtracting Rational Expressions Simplifying, Multiplying, and Dividing Rational Expressions
A2.A.2.3	Recognize that a quadratic function has different equivalent representations [ $f(x) = ax^2 + bx + c$ , $f(x) = a(x - h)^2 + k$ , and $f(x) = (x - h)(x - k)$ ]. Identify and use the representation that is most appropriate to solve real-world and mathematical problems.	Interpreting Functions	Rewriting Quadratics to Reveal Their Structure
A2.A.2.4	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	The Real Number System	Using Rational Exponents to Rewrite Expressions
<b>Functions (F)</b>			
A2.F.1 Understand functions as descriptions of covariation (how related quantities vary together).			
A2.F.1.1	Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.	Interpreting Functions	Piecewise, Step, and Absolute Value Functions

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
A2.F.1.2	Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [ $f(x + c)$ , $f(x) + c$ , $f(cx)$ , and $cf(x)$ , where $c$ is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.	Building Functions	Transformations of Graphs of Linear and Exponential Functions
		Interpreting Functions	Radical Functions and Their Graphs Sketching and Transforming Graphs of Quadratic Functions from Symbolic Representations
A2.F.1.3	Graph a quadratic function. Identify the x- and y-intercepts, maximum or minimum value, axis of symmetry, and vertex using various methods and tools that may include a graphing calculator or appropriate technology.	Building Functions	Writing Quadratic Functions From Their Graphs
		Interpreting Functions	Rewriting Quadratics to Reveal Their Structure Sketching Graphs of Quadratic Functions in Context
A2.F.1.4	Graph exponential and logarithmic functions. Identify asymptotes and x- and y-intercepts using various methods and tools that may include graphing calculators or other appropriate technology. Recognize exponential decay and growth graphically and algebraically.	Interpreting Functions	Logarithmic Functions Sketching Graphs of Exponential Functions from Symbolic Representations
A2.F.1.5	Analyze the graph of a polynomial function by identifying the domain, range, intercepts, zeros, relative maxima, relative minima, and intervals of increase and decrease.	Interpreting Functions	Graphing Polynomial Functions
A2.F.1.6	Graph a rational function and identify the x- and y-intercepts, vertical and horizontal asymptotes, using various methods and tools that may include a graphing calculator or other appropriate technology. (Excluding slant or oblique asymptotes and holes.)	Interpreting Functions	Rational Functions and Their Graphs
A2.F.1.7	Graph a radical function (square root and cube root only) and identify the x- and y-intercepts using various methods and tools that may include a graphing calculator or other appropriate technology.	Interpreting Functions	Radical Functions and Their Graphs

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
A2.F.1.8	Graph piecewise functions with no more than three branches (including linear, quadratic, or exponential branches) and analyze the function by identifying the domain, range, intercepts, and intervals for which it is increasing, decreasing, and constant.	Interpreting Functions	Piecewise, Step, and Absolute Value Functions
A2.F.2 Analyze functions through algebraic combinations, compositions, and inverses, if they exist.			
A2.F.2.1	Add, subtract, multiply, and divide functions using function notation and recognize domain restrictions.	Building Functions	Composite Functions
A2.F.2.2	Combine functions by composition and recognize that $g(x) = f^{-1}(x)$ , the inverse function of $f(x)$ , if and only if $f(g(x)) = g(f(x)) = x$ .	Standard not addressed	
A2.F.2.3	Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function $f$ is the range of the inverse function $f^{-1}$ , and the range of the function $f$ is the domain of the inverse function $f^{-1}$ .	Building Functions	Writing Inverse Functions
A2.F.2.4	Apply the inverse relationship between exponential and logarithmic functions to convert from one form to another.	Interpreting Functions	Introduction to Logarithms
<b>Data &amp; Probability (D)</b>			
A2.D.1 Display, describe, and compare data. For linear and nonlinear relationships, make predictions and assess the reliability of those predictions.			
A2.D.1.1	Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve).	Standard not addressed	
A2.D.1.2	Collect data and use scatterplots to analyze patterns and describe linear, exponential or quadratic relationships between two variables. Using graphing calculators or other appropriate technology, determine regression equation and correlation coefficients; use regression equations to make predictions and correlation coefficients to assess the reliability of those predictions.	Standard not addressed	

Mathematics Standards of Learning		Imagine Math	
<i>Algebra II</i>		<i>Unit</i>	<i>Lesson</i>
A2.D.1.3	Based upon a real-world context, recognize whether a discrete or continuous graphical representation is appropriate and then create the graph.	Standard not addressed	
A2.D.2 Analyze statistical thinking to draw inferences, make predictions, and justify conclusions.			
A2.D.2.1	Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Given spreadsheets, tables, or graphs, recognize and analyze distortions in data displays. Show how graphs and data can be distorted to support different points of view.	Interpreting Categorical and Quantitative Data	Correlation
A2.D.2.2	Identify and explain misleading uses of data. Recognize when arguments based on data confuse correlation and causation.	Standard not addressed	

