DELAWARE VALLEY SCHOOL DISTRICT

PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Math 8

Curriculum Writing Committee:

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Grade Level: 8

Date of Board Approval: June 2025

DELAWARE VALLEY SCHOOL DISTRICT

Course Weighting: Math 8

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Chapter Tests	45%	45%	45%	45%
Quizzes	35%	35%	35%	35%
Homework/ Classwork	10%	10%	10%	10%
Graded Assignments	10%	10%	10%	10%
Total Percentage	100%	100%	100%	100%

Curriculum Map

Overview: This mathematics course provides a strong foundation in grade appropriate skills for further study in science and mathematics. All content is aligned for students to be successful on the Math 8 PSSA Exam and covers the prerequisite skills needed for success in a future Algebra 1 course. This course will cover the theoretical aspects of algebra, geometry, and the applications to real world scenarios. Topics include operations and properties of real numbers, linear equations and inequalities, linear functions, systems of equations, properties of exponents, transformational geometry and triangle relationships. All topics are aligned to the Pennsylvania mathematical standards for grade 8.

Time/Credit for the Course: Full academic year, 180 days, 1 period per day

Goals:

Marking Period 1- 45 days

Unit 1 Expressions and Number Sense- 25 Days

Understanding of:

- Reviewing Computation of Integers and Rational Numbers
- Ordering of Operations Involving Integers and Rational Numbers
- Classifying Real Numbers
- Simplifying Expressions
- Evaluating Expressions
- Combining Like Terms
- Using Distributive Property to Simplify Expressions
- Differentiating and Applying Concepts of Rational and Irrational Numbers
- Converting Fractions, Decimals, and Percents
- Simplifying Square and Cube Roots
- Estimating Square and Cube Roots
- Comparing and Ordering Rational and Irrational Numbers

Unit 2 Equations- 15 Days

Understanding of:

- Writing and Solving Linear Equations
- Solving One Step Equations with Rational Coefficients
- Solving Multi-Step Equations by Distributing and Combining Like Terms
- Identifying Equations with One Solution, No Solution, or Infinitely Many Solutions
- Solving Equations with Variables on Each Side
- Justifying Equations Using Algebraic Properties
- CDT

Unit 3 Linear Relationships- 5 Days

Understanding of:

- Finding Slope Given a Table of Values and Graph
- Identifying Slope and Y-Intercepts From Equations and Graphs

Marking Period 2- 45 days

Unit 3 Linear Relationships(continued)-7 Days

Understanding of:

- Finding Slope Given a Table of Values and Graph
- Identifying Slope and Y-Intercepts From Equations and Graphs
- Writing Equations in Slope Intercept, Standard and Point Slope Form
- Graphing in Slope Intercept Form and Point-Slope Form
- Converting Equations in Point Slope Form to Slope Intercept Form and to Standard Form
- Writing Equations in Point Slope, Standard or Slope Intercept Form From Real Life Applications

Unit 4 Systems of Equations- 9 Days

Understanding of:

- Solving System of Equations by Graphing
- Solving System of Equations with Substitution
- Solving System of Equations with Elimination
- Interpreting Real World Solutions

Unit 5 Functions- 29 Days

Understanding of:

- Analyzing Qualitative Graphs
- Expressing Relations in Graphs and Table of Values
- Identifying Domain and Range Given a Graph or Table of Values
- Determining Whether a Relation is a Function
- Classifying Linear and Nonlinear Functions
- Comparing Functions

Marking Period 3- 45 days

Unit 6 Exponents- 13 Days

Understanding of:

- Writing and Evaluating Exponents
- Evaluating Expressions with Absolute Value
- Multiplying and Dividing Monomials
- Finding Powers of Monomials
- Converting Positive and Negative Exponents
- Writing Numbers in Scientific and Standard Notation
- Adding, Subtracting, Multiplying, and Dividing Scientific Notation
- CDT

Unit 7 Pythagorean Theorem- 9 Days

Understanding of:

- Solving One Step Equations with Roots and Integer Exponents
- Understand the Properties of Angles and Intersecting Lines
- Identify and Find the Angle Measures When Two Parallel Lines are Cut by a Transversal

- Classifying Triangles
- Finding the Missing Measurement of a Right Triangle
- Determining if Side Measurements Form a Right Triangle
- Finding the Distance Between Two Points on the Coordinate Plane

Unit 8 Transformations- 16 Days
Understanding of:

- Graphing Geometric Translations on the Coordinate Plane
- Graphing Geometric Reflections Across the Y and X Axis
- Graphing Geometric Rotations on the Coordinate Plane
- Graphing and Describing Dilations
- Determining If Two Figures are Congruent by Transformations
- Determining If Two Figures are Similar by Transformations

Unit 9 Volume- 5 Days
Understanding of:

- Finding the Volume of a Cylinder, Cone, Sphere, Prism, and/or Pyramid
- Finding the Measurement of a Missing Length
- Finding the Surface Area of Cylinders, Cones, Spheres, Prisms, and/or Pyramids

Unit 10 Scatterplots and Two Way Tables- 2 Days
Understanding of:

- Constructing a Scatter Plot Given a Table of Values
- Identifying Types of Associations and Patterns of Scatter Plots

Marking Period 4- 45 days

Unit 10 Scatterplots and Two Way Tables(continued)- 19 Days
Understanding of:

- Identifying a Line of Best Fit Given a Scatter Plot
- Writing an Equation for the Line of Best Fit
- Constructing and Interpreting Two Way Tables
- PSSA Review

Unit 11 Introduction to Algebra- 26 Days
Understanding of:

- Simplifying Expressions that Require Distributive Property and Combining Like Terms
- Solving Multi-Step Equations with Variables on One or Both Sides of the Equal Sign
- Solving One and Two Step Inequalities
- Solving and Graphing Compound Inequalities
- Solving and Graphing Systems of Inequalities
- Identifying Solutions to Inequalities
- Finding Intercepts when Equations are in Standard Form
- Converting Equations from Standard Form to Slope Intercept Form
- Finding Measures of Central Tendency
- Classifying Rational and Irrational Numbers

Big Ideas

Big Idea #1: Mathematical relationships among numbers can be represented, compared, and communicated.
Big Idea #2: Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.
Big Idea #3: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.
Big Idea #4: Patterns exhibit relationships that can be extended, described, and generalized.
Big Idea #5: Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.
Big Idea #6: Data can be modeled and used to make inferences.
Big Idea # 7: Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.

Primary Textbooks and Supplemental Resources:

Primary Textbook:

- Glencoe Math Course 3 (2016)
  Textbook ISBN #: 978-0-02-145425-9
  Textbook Publisher & Year of Publication: McGraw-Hill 2016

Additional Resources:

- Textbook:
  - Glencoe Algebra 1
    Textbook ISBN #: 978-0-07-898515-7
    Textbook Publisher & Year of Publication: 2018 McGraw-Hill Education
- Teacher created worksheets with Kuta Software
- IXL
- Desmos
- PDE PSSA item samplers for grade 8

Delaware Valley School District
Curriculum Plan

Unit 1: Expressions and Number Sense **Time Range in Days: 25 days**

Standard(s):
CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.
CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.
CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

Anchors:
M08.A-N.1 Demonstrate an understanding of rational and irrational numbers.
M08.B-E.1 Demonstrate an understanding of expressions and equations with radicals and integer exponents.

Eligible Content:
M08.A-N.1.1.1 Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).
M08.A-N.1.1.2 Convert a terminating or repeating decimal to a rational number (limit repeating decimals to thousandths).
M08.A-N.1.1.3 Estimate the value of irrational numbers without a calculator (limit whole number radicand to less than 144). Example: $\sqrt{5}$ is between 2 and 3 but closer to 2.
M08.A-N.1.1.4 Use rational approximations of irrational numbers to compare and order irrational numbers.
M08.A-N.1.1.5 Locate/identify rational and irrational numbers at their approximate locations on a number line.
M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator. Example: If $x^2 = 25$ then $x = \pm\sqrt{25}$.
A1.1.1.1.2 Simplify square roots (e.g., $\sqrt{24} = 2\sqrt{6}$).
A1.1.1.1.1 Compare and/or order any real numbers (rational and irrational may be mixed).
A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots and/or absolute value to solve problems (exponents should be integers from -10 to 10).

Objectives:
Students will be able to:
1. Calculate the sum, difference, product, and quotient of real numbers. (DOK 1)
2. Evaluate expressions by applying the order of operations which includes grouping symbols and exponents. (DOK 1)
3. Classify, graph and compare real numbers which include rational and irrational numbers. (DOK 2)
4. Represent and use numbers in equivalent forms. (DOK 2)

5. Evaluate rational squares and roots. (DOK 2)
6. Apply number theory concepts to show relationships between real numbers in problem-solving settings. (DOK 2)
7. Identify equivalent expressions with variable terms. (DOK 2)
8. Create expressions based on real world situations. (DOK 4)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of the real number system, including operations with and properties of real numbers, as well as other pre-algebra skills (simplifying and/or evaluating algebraic expressions).
- Engage students through the use of personal whiteboards to simplify expressions.
- Use online manipulatives to provide students additional support with combining like terms found at https://mathsbot.com/manipulatives/tiles.
- Use IXL as a supplemental resource for differentiation or remediation with integer operations and finding equivalent expressions.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 1 lessons 1, 8, 9, 10 and teacher created lessons to reinforce with real-world applications.
- Review core lesson vocabulary in both written and verbal form (integer, term, distribute, simplify, expression, equivalent, rational number, repeating decimal, terminating decimal, square root, perfect square, radical sign, cube root, perfect cube, irrational number, real number) through classroom discussion and practice exercises.
- Engage in collaborative working groups to practice interpreting and communicating verbal expressions and algebraic expressions with peers.
- Explain and apply concepts of expressions and use of number sense, through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Perform math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 1

Summative

- Common Assessment Unit 1 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 2: Equations **Time Range in Days: 15 days**

Standard(s):
CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.

Anchors:
M08.B-E.3 Analyze and solve linear equations and pairs of simultaneous linear equations.
M08.B-E.1 Demonstrate an understanding of expressions and equations with radicals and integer exponents.

Eligible Content:
M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
M08.B-E.3.1.1 Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation solving process (linear equations only).

Objectives:
Students will be able to:
1. Identify appropriate solutions to equations. (DOK 1)
2. Use tables, equations, and graphs to describe relationships. (DOK 2)
3. Solve equations (one-step in one variable, two-step in one variable, multi-step in one variable which includes equations with variables on both sides, identities and equations with no solution, and literal equations). (DOK 2)
4. Reason and critique what a solution represents in context. (DOK 3)
5. Create equations based on real world situations. (DOK 4)
6. Justify equations using algebraic properties (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Expose students' prior knowledge of solving one-step and multi-step equations, properties of equality, and basic inequalities via a warm-up activity involving numerical and algebraic expressions.
- Engage students using personal whiteboards to practice solving simple equations, multi-step equations, and identifying inverse operations.
- Use IXL as a supplemental resource for differentiation and remediation on topics such as solving equations, properties of equality, and graphing inequalities.

- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 2 lessons 1-5 and teacher-created lessons to reinforce solving equations.
- Students will review core lesson vocabulary in both written and verbal form (inverse operation, coefficient, equivalent, two-step equation, variable, no solution, infinitely many, reciprocal, rational, distribute, like terms) through classroom discussion and practice exercises.
- Engage students in an error analysis activity, where they critique and correct incorrect solutions to linear equations, identifying algebraic properties used in the solving process.
- Explain and apply concepts of solving equations and identifying their solution types through writing, given a real-world problem, using PSSA Constructed Response Questions.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 2

Summative

- Common Assessment Unit 2 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 3: Linear Relationships **Time Range in Days: 12 days**

Standard(s):
CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.

Anchors:
M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope.

Eligible Content:
M08.B-E.2.1.1 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.
M08.B-E.2.1.3 Derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.
A1.2.1.2.1 Create, interpret and/or use the equation, graph or table of a linear function.
A1.2.1.2.2 Translate from one representation of a linear function to another (graph, table and equation).
A1.1.2.1.1 Write, solve and/or apply a linear equation (including problem situations).
A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.
A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, 2 points on the line, or the slope and point on a line, (Linear equation may be in point-slope, standard and/or slope-intercept form).
A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation (linear equations only).
A1.2.2.1.1 Identify, describe and/or use constant rates of change.
A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems.
A1.2.2.1.4 Determine the slope and/or y-intercept represented by a linear equation or graph.
G.2.1.2.2 Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations).

Objectives:
Students will be able to:
1. Identify the equation, graph, or table of a linear function (DOK 1)
2. Identify the slope and y-intercept of a line given a graph, linear equation, or two points (DOK 2)

3. Identify the slope given a table of values (DOK 2)
4. Interpret and analyze the unit rate given a graph or table of values (DOK 4)
5. Construct and justify a linear equation (slope intercept, point slope, and standard form) given a graph or table of values (DOK 3)
6. Create and determine if linear equations are perpendicular or parallel (DOK 4)
7. Graph linear equations (slope intercept, point slope, and standard form) (DOK 2)
8. Create and analyze a real-world situation modeled by a linear function, including different representations (DOK 4)
9. Write linear equations (slope intercept, point slope, and standard form) given a table of values, graph, or two points (DOK 2)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of proportional relationships, unit rates, and graphing points on the coordinate plane through a warm-up activity reviewing real-world proportional scenarios.
- Engage students using personal whiteboards to practice calculating unit rates and identifying slope from tables, graphs, and equations.
- Use online graphing tools (i.e. Desmos or Geogebra) to explore proportional relationships and visualize the connection between unit rate and slope.
- Use IXL as a supplemental resource for differentiation or remediation on identifying slope, graphing lines, and converting between different representations of linear functions.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 3 lessons 2, 4, 6, and teacher-created lessons to reinforce analyzing linear relationships in multiple forms.
- Students will review core lesson vocabulary in both written and verbal form (slope, rate of change, unit rate, proportional, linear equation, y-intercept, x-intercept, parallel, perpendicular, point-slope form, slope-intercept form, standard form) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to compare different representations of proportional relationships (graphs, tables, equations) and determine which scenario represents a greater rate of change.
- Use similar right triangles to explain why the slope between any two points on a non-vertical line is constant, reinforcing the geometric connection to algebraic slope calculations via student handout and collaborative working groups.
- Engage students in an interactive matching activity, where they pair graphs, tables, and equations representing the same linear function.
- Use PSSA Constructed Response Questions found in the math department public folder to have students apply their understanding of linear relationships in real-world problem-solving situations.
- Have students analyze sets of data to identify patterns, represent them

algebraically, and interpret the significance of slope and y-intercept in context using textbook resources and Kuta Worksheets.

- Provide students additional instructional videos, examples, and online check that will provide immediate feedback when determining if the slope of two lines are parallel or perpendicular by accessing https://www.studypug.com/algebra-help/parallel-and-perpendicular-lines-in-linear-functions
- Provide students with additional examples and practice that will provide immediate feedback when identifying the slope and y-intercept of linear equations by accessing https://thirdspacelearning.com/us/math-resources/topic-guides/algebra/slope-intercept-form/#practice-questions

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 3

Summative

- Common Assessment Unit 3 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 4: Systems of Equations **Time Range in Days: 9 days**

Standard(s):
CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.

Anchors:
M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope.

Eligible Content:
M08.B-E.3.1.3 Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs because points of intersection satisfy both equations simultaneously.
M08.B-E.3.1.4 Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection. Example: $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
M08.B-E.3.1.5 Solve real-world and mathematical problems leading to two linear equations in two variables. Example: Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.
A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation (systems of 2 linear equations only).
A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution and/or elimination (limit systems to 2 linear equations).

Objectives:
Students will be able to:

1. Graph systems of equations on a coordinate plane (DOK 2)
2. Determine the solution of a system of equations by identifying the intersection on the coordinate plane (DOK 2)
3. Differentiate between one solution, no solution, and infinitely many solutions when graphing systems of equations and justify answer (DOK 3)
4. Use substitution method to solve system of equations (DOK 2)
5. Use elimination method to solve system of equations (DOK 2)
6. Apply knowledge of solving systems of equations to real world applications (DOK 4)
7. Verify a solution by substituting values back into the original equations (DOK 2)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of graphing linear equations, identifying slope and y-intercept, and solving for a variable through a warm-up activity involving graphing two linear equations and estimating their point of intersection.

- Engage students using personal whiteboards to practice solving simple systems by inspection and identifying cases with no solution, one solution, or infinitely many solutions.
- Allow students to graph systems of equations dynamically and visually analyze points of intersection (i.e. Desmos or IXL).
- Use IXL as a supplemental resource for differentiation or remediation on solving systems by graphing, substitution, and elimination.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 3 lessons 7, 8, and teacher-created lessons to reinforce solving systems of equations with real-world applications.
- Students will review core lesson vocabulary in both written and verbal form (system of equations, solution, no solution, infinitely many solutions, substitution, elimination, point of intersection, parallel, coincident, inconsistent, dependent, independent) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to explore real-world problems leading to systems of equations, such as comparing phone plans or determining where two paths intersect.
- Engage students in an error analysis activity, where they critique and correct incorrect solutions to systems of equations, identifying whether the mistake was in graphing, substitution, or elimination.
- Have students use guided notes and structured problem-solving steps for solving systems of equations using the graphing, substitution, and elimination methods, ensuring they understand when each method is most efficient.
- Use PSSA and Keystone Constructed Response Questions to allow students to explain and justify their reasoning when solving systems of equations.
- Engage students in a class discussion, paired with a teacher created worksheet, to analyze systems that have one, none, or infinitely many solutions.
- Students will practice graphing two equations on the coordinate plane to determine where they intersect to find a solution at https://www.geogebra.org/m/yxhbwagx

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 3 and teacher created

Summative

- Common Assessment Unit 3 Test/CRQ and teacher created

Delaware Valley School District
Curriculum Plan

Unit 5: Functions **Time Range in Days: 29 days**

Standard(s):
CC.2.2.8.C.1 Define, evaluate, and compare functions.
CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.

Anchors:
M08.B-F.2 Use functions to model relationships between quantities.
M08.B-F.1 Analyze and interpret functions.

Eligible Content:
M08.B-F.2.1.2 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.
M08.B-F.1.1.1 Determine whether a relation is a function.
M08.B-F.1.1.3 Interpret the equation y = mx + b as defining a linear function whose graph is a straight line; give examples of functions that are not linear.
M08.B-F.2.1.1 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.
M08.B-F.1.1.2 Compare properties of two functions, each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions).
Example: Given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table).
A1.2.1.1.2 Determine if a relation is a function given a set of points or a graph.

Objectives:
Students will be able to:
1. Identify the domain and range of a relation given ordered pairs, a table, or a graph (DOK 1)
2. Determine if a relation is a function given a set of points or a graph (DOK 1)
3. Compare properties of two functions when represented in different forms (DOK 2)
4. Analyze a graph to describe qualitatively whether a function is increasing or decreasing, linear or nonlinear (DOK 2)
5. Determine the rate of change (slope) and initial value (y-intercept) of a function from a table, graph, or two points (DOK 2)

6. Interpret the meaning of slope and y-intercept in the context of real-world problems (DOK 3)
7. Justify whether a given relation is a function using multiple representations (graph, table, equation, verbal description) (DOK 3)
8. Construct a linear function to model a real-world situation given a description or data points (DOK 3)
9. Compare two functions represented in different ways and determine which has the greater rate of change (DOK 3)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of relations, input-output tables, and graphing points through a warm-up activity identifying ordered pairs and determining whether they form a function.
- Engage students using personal whiteboards to evaluate functions and articulate characteristics of functions (linear vs non-linear, domains, range, etc.).
- Use IXL as a supplemental resource for differentiation or remediation on identifying functions, identifying points on a coordinate plane, analyzing graphs, and determining domain and range.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 4 lessons 9, 1, 2, 3, 4, 5, and 7 and teacher-created worksheets to reinforce function concepts and their real-world applications.
- Students will review core lesson vocabulary in both written and verbal form (function, relation, input, output, domain, range, vertical line test, linear, nonlinear, rate of change, initial value) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to compare different representations of functions, such as tables, graphs, and equations, and determine which has the greater rate of change.
- Students will participate in class discussions in which they will articulate their observations of functions given in various forms and use content specific vocabulary to justify their position.
- Have students take guided notes and participate in structured problem-solving steps to organize functions vocabulary and create reference materials for using to analyze functions.
- Use PSSA and Keystone Constructed Response Questions to allow students to explain, justify their reasoning when identifying and comparing functions, and practice meeting the CRQ grading rubric.
- Have students compare different function representations (graph vs. table vs. equation).

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 4

Summative

- Common Assessment Unit 4 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 6: Exponents **Time Range in Days: 13 days**

Standard(s):
CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

Anchors:
M08.B-E.1 Demonstrate an understanding of expressions and equations with radicals and integer exponents.

Eligible Content:
M08.B-E.1.1.1 Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). Properties will be provided. Example: 3^12 x 3^-15 = 3^-3 = 1/(3^3)
M08.B-E.1.1.3 Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10 and express how many times larger or smaller one number is than another. Example: Estimate the population of the United States as 3 × 10^8 and the population of the world as 7 × 10^9 and determine that the world population is more than 20 times larger than the United States' population.
M08.B-E.1.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7 × 10^9).
A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots and/or absolute value to solve problems (exponents should be integers from -10 to 10).

Objectives:
Students will be able to:

1. Define, identify, simplify, and write integer exponents, square roots, cube roots, absolute value, and scientific notation (DOK 1)
2. Recall and apply the properties of exponents to simplify numerical expressions (DOK 1)
3. Convert between standard notation and scientific notation (DOK 1)
4. Estimate very large or very small quantities using scientific notation (DOK 2)
5. Compare two numbers in scientific notation and determine how many times larger or smaller one is than the other (DOK 2)
6. Perform operations with numbers in scientific notation, expressing answers in scientific notation (DOK 2)
7. Justify whether two exponential expressions are equivalent using exponent properties (DOK 3)

8. Analyze and justify the reasonableness of an estimation using scientific notation (DOK 4)
9. Create and solve real-world problems involving scientific notation to compare quantities (DOK 4)
10. Rewrite exponents as positive and/or negative (DOK 1)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of multiplication, division, and exponent notation through a warm-up activity simplifying basic exponent expressions without negative exponents.
- Engage students using personal whiteboards to apply various exponent properties.
- Use IXL as a supplemental resource for differentiation or remediation on exponent rules, simplifying expressions, and working with scientific notation.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 7 lessons 1, 2, 3, 4, 5, 6) and teacher-created lessons to reinforce exponent properties, square roots, cube roots, and scientific notation.
- Students will review core lesson vocabulary in both written and verbal form (exponent, base, power, product of powers, quotient of powers, zero exponent, negative exponent, scientific notation, standard notation, square root, cube root) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to explore exponent properties by creating and solving their own exponent rule problems and trading them with classmates for practice.
- Engage students in a Number Talk activity where they can share strategies for simplifying numerical and algebraic expressions involving exponents.
- Use real-world scenarios where students estimate and compare very large and small numbers using scientific notation, such as population sizes, distances in space, and microscopic measurements.
- Allow students to use a calculator to practice converting numbers from scientific notation to standard form. Follow up with a class discussion about how the use of exponents and a factor of 10 impacts the value of a number.
- Have students take guided notes on integer exponents rules and converting between standard form and scientific notation.
- Use PSSA and Keystone Constructed Response Questions to allow students to explain and justify their reasoning when applying exponent rules.
- Require students to write expressions with exponents in expanded form via whiteboards or teacher created worksheets.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 7

Summative

- Common Assessment Unit 7 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 7: Pythagorean Theorem **Time Range in Days: 9 days**

Standard(s):
CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.

Anchors:
M08.C-G.2 Understand and apply the Pythagorean theorem.

Eligible Content:
M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle.
M08.C-G.2.1.2 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.)
M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.
M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator. Example: If x^2 = 25 then x = ±√25.
G.2.1.2.3 Use slope, distance and/or midpoint between 2 points on a coordinate plane to establish properties of a 2-dimensional shape.
G.2.1.2.1 Calculate the distance and/or midpoint between 2 points on a number line or on a coordinate plane.
G.1.2.1.1 Identify and/or use properties of triangles
G.1.2.1.3 Identify and/or use properties of isosceles and equilateral triangles.
G.2.2.1.1 Use properties of angles formed by intersecting lines to find the measures of missing angles.
G.2.2.1.2 Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.

Objectives:
Students will be able to:

1. Define and identify key terms related to triangles, including right triangles, isosceles triangles, and equilateral triangles (DOK 1)
2. Recognize and apply the converse of the Pythagorean Theorem to determine whether a triangle is a right triangle (DOK 2)
3. Recall and apply the Pythagorean Theorem to determine missing side lengths in right triangles in real world and mathematical problems (DOK 2)
4. Calculate the distance between two points on a coordinate plane using the Pythagorean Theorem (DOK 2)
5. Identify and use properties of angles formed by intersecting lines (DOK 1)

6. Identify and use properties of angles formed when two parallel lines are cut by a transversal (DOK 1)
7. Identify and use the midpoint and distance formulas to determine the midpoint and distance between two points on a number line or coordinate plane (DOK 2)
8. Use properties of isosceles and equilateral triangles to determine missing angles or side lengths (DOK 2)
9. Use properties of angles formed by intersecting and/or parallel lines cut by a transversal to determine missing angle measures (DOK 3)
10. Solve multi-step real-world problems involving right triangles in two and three dimensions using the Pythagorean Theorem (DOK 3)
11. Use the distance formula and properties of triangles to classify a given shape in the coordinate plane (DOK 3)
12. Analyze how changing one angle or side length in a triangle affects the overall shape and classification of the triangle (DOK 3)
13. Model a real-world problem using the distance and midpoint formulas to analyze locations on a coordinate plane (DOK 4)
14. Use square root and cube root symbols to solve equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number (DOK 2)
15. Interpret the meaning of square and cube roots in a real-world context (DOK 3)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of square roots, right triangles, and coordinate plane distances through a warm-up activity where they identify triangle and angle vocabulary terms taught in previous grades.
- Engage students using personal whiteboards to test their understanding of the Pythagorean Theorem by solving for unknown side lengths in right triangles, determining if measures make a right triangle, and identifying the parts of a right triangle (i.e. legs vs hypotenuse).
- Provide a dynamic, visual demonstration of the Pythagorean Theorem and its converse, allowing students to manipulate triangle side lengths and observe the relationship (i.e. Desmos, Geogebra, or Geometer's Sketchpad).
- Use IXL as a supplemental resource for differentiation or remediation on applying the Pythagorean Theorem, solving equations with squares and roots, and squaring rational numbers.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 1 lesson 8, chapter 5 lessons 1, 5, 6, 7, and teacher-created lessons to allow students to practice finding the distance between two points on a coordinate plane and apply the Pythagorean Theorem to abstract problems.
- Students will review core lesson vocabulary in both written and verbal form (Pythagorean Theorem, hypotenuse, legs, distance formula, midpoint, right triangle, converse, perpendicular, parallel, transversal, corresponding angles, alternate interior/exterior angles) through classroom discussion and interactive exercises.

- Engage students in collaborative working groups to explore real-world applications of the Pythagorean Theorem, such as determining the diagonal length of a TV screen or the shortest walking distance between two locations on a map.
- Use real-world scenarios where students must apply the Pythagorean Theorem and distance formula to solve practical problems, such as determining the length of a ladder needed to reach a given height or calculating distances between locations on a coordinate grid.
- Engage students in an error analysis activity, where they critique and correct incorrect applications of the Pythagorean Theorem and identify whether mistakes occurred in squaring, adding, or solving for missing sides.
- Have students use guided notes and structured problem-solving steps to apply the theorem and its converse, ensuring they understand when a given set of side lengths forms a right triangle.
- Use PSSA Constructed Response Questions on geometric relationships to allow students to justify their thinking and practice meeting the CRQ grading rubric.
- Engage students in a class activity where they analyze the relationships between angles created by two parallel lines cut by a transversal.
- Students will work in class groups to help identify congruent and supplementary angles created by two parallel lines cut by a transversal.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 5

Summative

- Common Assessment Unit 5 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 8: Transformations **Time Range in Days: 16 days**

Standard(s):
CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.

Anchors:
M08.C-G.1 Demonstrate an understanding of geometric transformations.

Eligible Content:
M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations.
Example: Angle measures are preserved in rotations, reflections, and translations.
M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.
M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.

Objectives:
Students will be able to:

1. Define and identify properties of geometric transformations, including rotations, reflections, translations, and dilations (DOK 1)
2. Recall and explain how angle measures are preserved in rotations, reflections, and translations (DOK 1)
3. Identify congruent and similar figures based on their properties (DOK 1)
4. Recognize the effects of dilations, translations, rotations, and reflections on two-dimensional figures (DOK 1)
5. Apply the properties of rotations, reflections, and translations to determine the image of a given figure (DOK 2)
6. Apply transformations to figures on a coordinate plane to show the congruence or similarity between two figures (DOK 2)
7. Identify the scale factor and describe the sequence of transformations that show the similarity between two figures (DOK 2)
8. Analyze a given transformation sequence and explain how each transformation contributes to the congruence or similarity of the figures (DOK 3)
9. Use coordinates to describe a sequence of transformations that exhibits the congruence or similarity between two figures (DOK 3)
10. Solve real-world problems involving transformations using a sequence of rotations, reflections, and translations to model the transformations of figures (DOK 3)
11. Compare and contrast how different types of transformations affect a figures shape, size and orientation (DOK 3)

12. Justify the sequence of transformations that involve using transformations to show congruence or similarity between two figures in a real-world problem (DOK 4)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of transformations by having them complete a warm-up where they match similar and congruent figures that have undergone a rotation, reflection or dilation (not on a coordinate plane).
- Engage students using personal whiteboards to test their understanding of transformations by performing simple translations, reflections, and rotations on given coordinate points and explaining how coordinates change.
- Provide a dynamic, visual demonstration of transformations, allowing students to manipulate figures and observe how their properties are preserved (i.e. Desmos, Geogebra, or Geometer's Sketchpad).
- Use IXL as a supplemental resource for differentiation or remediation on identifying transformation types, performing transformations on the coordinate plane, and describing transformation sequences, or identifying the scale factor under dilations.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 6 lessons 1-4 and chapter 7 lessons 1-3 along with teacher-created lessons, to allow students to practice performing and describing transformations using coordinate rules.
- Students will review core lesson vocabulary in both written and verbal form (translation, reflection, rotation, dilation, congruence, similarity, image, pre-image, transformation sequence, rigid motion, center of dilation, scale factor) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to describe transformation sequences that map one congruent or similar figure onto another, using teacher created worksheets.
- Have students complete a transformation scavenger hunt around the classroom, identifying different types of transformations in images and writing coordinate rules for each.
- Assign an activity where students design a transformation-based artwork (i.e. a pattern using multiple transformations) and explain the sequence of transformations used.
- Assign students a PSSA Constructed Response Question in which they have to explain and apply concepts of transformations, congruency, and similarities, through writing, given a real world problem.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 6 and 7

Summative

- Common Assessment Unit 6-7 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 9: Volume **Time Range in Days: 5 days**

Standard(s):
CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.

Anchors:
M08.C-G.3 Solve real-world and mathematical problems involving volume.

Eligible Content:
M08.C-G.3.1.1 Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.
G.2.3.1.2 Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.
G.2.3.1.3 Find the measurement of a missing length given the surface area or volume.
G.2.3.1.1 Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet.
G.1.2.1.2 Identify and/or use properties of quadrilaterals.
G.1.2.1.4 Identify and/or use properties of regular polygons.
G.1.2.1.5 Identify and/or use properties of pyramids and prisms.

Objectives:
Students will be able to:

1. Identify and define key three-dimensional shapes: prisms, cylinders, cones, pyramids, and spheres (DOK 1)
2. Apply formulas for calculating volume and surface area of three-dimensional figures (DOK 2)
3. Calculate surface area of prisms, cylinders, cones, pyramids, and spheres using appropriate formulas (DOK 2)
4. Determine the missing dimension of a three-dimensional figure when given its surface area or volume (DOK 2)
5. Compare and contrast the properties of different quadrilaterals and regular polygons (DOK 2)
6. Analyze the relationship between surface area and volume in different three-dimensional figures (DOK 2)
7. Solve multi-step real-world problems involving volume and surface area of three-dimensional shapes (DOK 3)
8. Justify whether a given measurement or solution is reasonable when calculating volume or surface area (DOK 3)
9. Determine how changing one dimension of a figure affects its volume or surface area (DOK 3)
10. Investigate, solve, and justify real-world problems that involve finding the volume and/or surface area of multiple three-dimensional objects combined (DOK 4)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of three-dimensional shapes by having them identify a set of images into categories (prisms, pyramids, cylinders, cones, and spheres) and discuss their properties in small groups.
- Activate prior knowledge via a classroom discussion where students differentiate radii from diameters, height measures base measures and express an understanding of how to interpret the measurements of 3D figures.
- Engage students using personal whiteboards to formatively assess their ability to apply the various volume formulas to a series of questions with geometric figures.
- Provide a dynamic, visual demonstration of how changing the radius or height of a cylinder, cone, or sphere affects its volume (i.e. Desmos, Geogebra, Geometer's Sketchpad, and Youtube videos).
- Use IXL as a supplemental resource for differentiation or remediation on calculating volume, finding missing dimensions given volume, and applying volume formulas to solve real-world problems.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 8 lessons 1-5, along with teacher-created lessons, to allow students to practice calculating volume and surface area in both mathematical and real-world contexts.
- Students will review core lesson vocabulary in both written and verbal form (volume, surface area, radius, diameter, height, base, prism, pyramid, cylinder, cone, sphere, cross-section, composite solid) through classroom discussion and interactive exercises.
- Engage students in collaborative working groups to solve real-world volume problems, such as determining the amount of water needed to fill a cylindrical tank or compound shapes like finding the volume of an ice cream cone with a spherical scoop.
- Explain and apply concepts of volume and surface area, through writing, given a real world problem, using PSSA Constructed Response Questions.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 8

Summative

- Common Assessment Unit 8 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 10: Scatterplots and Two Way Tables **Time Range in Days: 21 days**

Standard(s):
CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.
CC.2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.

Anchors:
M08.D-S.1 Investigate patterns of association in bivariate data.

Eligible Content:
M08.D-S.1.1.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association.
M08.D-S.1.1.2 For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line.
M08.D-S.1.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. Example: In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
M08.D-S.1.2.1 Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible associations between the two variables. Example: Given data on whether students have a curfew on school nights and whether they have assigned chores at home, is there evidence that those who have a curfew also tend to have chores?
A1.2.2.2.1 Draw, find and/or write an equation for a line of best fit for a scatter plot.

Objectives:
Students will be able to:
1. Define and identify key terms related to scatter plots (DOK 1)
2. Recall that a line of best fit represents the general trend of the data in a scatter plot (DOK 1)
3. Identify the slope and y-intercept from a given linear equation (DOK 1)
4. Recognize and identify categorical variables and relative frequencies in a two-way table (DOK 1)
5. Construct scatter plots from bivariate data (DOK 2)
6. Determine whether a scatter plot suggests a linear association (DOK 2)
7. Construct a two-way table and calculate relative frequencies (DOK 2)
8. Describe possible associations between variables using a two-way table (DOK 2)

9. Analyze a scatter plot to determine the strength and direction of an association (DOK 3)
10. Write an equation for a line of best fit based on a scatter plot (DOK 3)
11. Interpret the slope and y-intercept of a line of best fit in the context of real-world data (DOK 3)
12. Compare different scatter plots to determine which has the strongest correlation (DOK 3)
13. Use a two-way table to make predictions about data (DOK 3)
14. Develop and justify how a line of best fit represents trends in data (DOK 4)
15. Compare and contrast multiple linear models to determine which best represents a given data set (DOK 4)
16. Investigate real-world applications of scatterplots and correction (DOK 4)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of data representation via a warm-up handout by having them analyze different types of graphs (bar graphs, line graphs, and dot plots) and engage in a classroom discussion in which students can hear and share their knowledge of relative vocabulary.
- Engage students using personal whiteboards to identify types of association (positive, negative, or no correlation) by looking at scatter plots and predicting trends based on the data.
- Engage students using personal whiteboards to write equations for lines of best fit in point slope form or slope intercept form and using those equations to make predictions about the data.
- Use IXL as a supplemental resource for differentiation or remediation on identifying correlation types, constructing scatter plots, and interpreting trends in bivariate data.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable chapter 9 lessons 1-3, along with teacher-created worksheets, to allow students to practice drawing lines of best fit and interpreting slope and intercept in real-world contexts.
- Students will review core lesson vocabulary in both written and verbal form (scatter plot, correlation, outlier, line of best fit, linear association, nonlinear association, two-way table, relative frequency) through classroom discussion and interactive exercises.
- Have students participate in an "around the world" activity in which they walk around the classroom analyzing and answering questions about data that's been organized in two way tables.
- Assign a culminating project where students collect data, (such as each students' height and wingspan), make a scatterplot of the data that they can use to execute the standards of this unit.
- Explain and apply concepts of scatter plots and two-way tables, through writing, given a real world problem, using PSSA Constructed Response Questions.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Quizzes/graded assignment from unit 9

Summative

- Common Assessment Unit 9 Test/CRQ

Delaware Valley School District
Curriculum Plan

Unit 11: Introduction to Algebra **Time Range in Days: 26 days**

Standard(s):
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.
CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.
CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.
CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real-world or mathematical problems.

Anchors:
A1.1.1.1 Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, and exponents).
A1.1.3.2 Write, solve, and/or graph systems of linear inequalities using various methods
A1.2.3.1 Use measures of dispersion to describe a set of data.

Eligible Content:
A1.1.1.5.3 Simplify/reduce a rational algebraic expression.
A1.1.3.1.1 Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities).
A1.1.3.2.1 Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities.
A1.2.2.1.3 Write or identify a linear equation when given • the graph of the line, • two points on the line, or • the slope and a point on the line. Note: Linear equations may be in point-slope, standard, and/or slope-intercept form.
A1.2.3.1.1 Calculate and/or interpret the range, quartiles, and interquartile range of data.
A1.2.3.2.2 Analyze data, make predictions, and/or answer questions based on displayed data (box and whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations).
A1.1.3.1.2 Identify or graph the solution set to a linear inequality on a number line.
A1.1.1.1.1 Compare and/or order any real numbers. Note: Rational and irrational may be mixed.
A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from –10 to 10.

Objectives:
Students will be able to:

1. Identify like terms in an algebraic expression (DOK 1)
2. Recognize and apply the distributive property to simplify expressions (DOK 1)
3. Solve one-step and two-step equations and inequalities (DOK 1)
4. Identify, classify, compare, and explain the difference between numbers that are rational and/or irrational (DOK 2)
5. Find the x-intercept and y-intercept of an equation in standard form (DOK 1)
6. Define measures of central tendency (DOK 1)
7. Simplify expressions using the distributive property and combining like terms (DOK 2)
8. Solve multi-step equations with variables on one or both sides of the equal sign (DOK 2)
9. Solve and graph one-step and two-step inequalities on a number line (DOK 2)
10. Solve and graph compound inequalities (DOK 2)
11. Determine if a given value is a solution to an inequality (DOK 2)
12. Convert an equation from standard form to slope-intercept form (DOK 2)
13. Recognize and recall the standard form of a linear function (DOK 1
14. Calculate measures of central tendency for a given data set (DOK 2)
15. Solve and graph systems of inequalities in two variables (DOK 3)
16. Determine and justify whether a given point is a solution an inequality or system of inequalities (DOK 3)
17. Analyze the effects of operations on rational and irrational numbers (DOK 3)
18. Explain how different transformations affect an equation when converting between standard form and slope-intercept form (DOK 3)
19. Analyze data to determine the most appropriate measure of central tendency (DOK 3)
20. Develop and solve real-world problems involving multi-step equations and inequalities (DOK 4)
21. Investigate patterns in data and justify conclusions using measures of central tendency (DOK 4)

Core Activities and Corresponding Instructional Methods:

- Expose students' prior knowledge of number systems by having them categorize numbers (integers, fractions, terminating and repeating decimals, irrational numbers) into a sorting activity and discuss their properties with partners.
- Engage students using personal whiteboards to compare and order real numbers, simplify expressions with exponents and roots, and identify rational vs. irrational numbers.
- Engage students using personal whiteboards and teacher created worksheets to practice plotting rational and irrational numbers on a number line and graphing equations/inequalities.
- Use IXL as a supplemental resource for differentiation or remediation on solving and graphing linear equations, simplifying algebraic expressions, and comparing rational and irrational numbers.
- Corresponding textbook/workbook: i.e. Glencoe Math Course Three student consumable

chapter 3 lesson 5 and chapter 9 lesson 4 and Glencoe Algebra 1 chapter 1 lesson 4, chapter 2 lessons 3-4, chapter 5 lessons 1-4, chapter 6 lesson 6, chapter 4 lesson 2, and teacher created lessons to allow students to practice writing, solving, and graphing linear equations, inequalities, and systems of inequalities.

- Students will review core lesson vocabulary in both written and verbal form (rational, irrational, exponent, root, absolute value, equation, inequality, compound inequality, system of inequalities, linear function, slope, intercept, quartile, interquartile range) through classroom discussion and interactive exercises.
- Have students construct and interpret box-and-whisker plots, calculating the range, quartiles, and interquartile range for a given set of data and analyzing measures of dispersion.

Assessments:

Diagnostic

- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/Firefly Diagnostic Assessment

Formative

- Teacher observations
- Group activities
- Homework assignments from corresponding textbook or teacher created worksheets
- Teacher created quizzes/graded assignments

Summative

- Teacher created common assessment/CRQ