DELAWARE VALLEY SCHOOL DISTRICT

<u>PLANNED INSTRUCTION</u>

A PLANNED COURSE FOR:

Algebra 2

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Curriculum writing committee: Sara Walsh, Lori Simonelli-Yost

Grade Level: 10, 11, 12

Date of Board Approval: _____ 2023 _____

Course Weighting: Algebra Two

Grading Policy Algebra 2

Marking Periods	Quiz	Test	Graded Assignments	Homework/Participation	Total Points
MP1 points	100	200	80	20	400
MP2 points	100	200	80	20	400
MP3 points	100	200	80	20	400
MP4 points	100	200	80	20	400
Total points	400	800	320	80	1600
Total percentages	25%	50%	20%	5%	100%

Curriculum Map

Overview:
This course follows Concepts of Algebra 1. The course is designed for students who are proficient in arithmetic skills but are not ready for Algebra Two & Trigonometry. Topics will include linear functions, systems of equations, quadratic functions, polynomial functions, exponential functions, rational expressions, and probability and statistics.
Full Academic Year; 1 Credit; 1 period per day

Goals:
Marking Period 1: Overview based on 45 days.
       Unit One Generalizing Patterns - 15 days
       Understanding of:
- Linear, quadratic, and cubic equations that describe patterns
- Describing arithmetic and geometric patterns
- Connecting patterns over multiple representations (i.e., graphs, tables, equations, charts, etc.

       Unit Two Linear Functions - 30 days
       Understanding of:
- Proportional Relationships
- Proportional Relationships in the Coordinate Plane
- Slope of the line
- Linear equations
- Graphing linear functions
- Linear reasoning
- Horizontal and vertical lines
- Standard form of a linear equation

Marking Period 2: Overview based on 45 days.

        Unit Three Solving Equations and Inequalities - 16 days
        Understanding of:

- Exploring Equivalence
- Representing and solving linear equations
- Solving linear/absolute value equations by balancing
- Reasoning with linear/absolute value equations
- Solving linear/absolute value equations using order of operations
- Representing linear scenarios with inequalities
- Solving linear inequalities
- Reasoning with linear inequalities
- Writing and solving linear inequalities

        Unit Four System of Linear Equations and Inequalities - 16 days
        Understanding of:

- Interpreting linear systems in context.
- Interpreting solutions to a linear system graphically
- Solving linear systems algebraically
- Determine the number of solutions of a system of equations algebraically.
- Graphing linear systems in two variables
- Writing and solving systems of linear inequalities

        Unit Five Quadratic Functions - 13 days
        Understanding of:

- Quadratic growth
- Properties of the parent functions.
- Transforming quadratic functions
- Features of a quadratic function
- Forms of a quadratic function
- Factoring quadratic functions

Marking Period 3: Overview based on 45 days.

        Unit Five Quadratic Functions - 15 days
        Understanding of:

- Solving quadratic equations by factoring
- Quadratic Models

        Unit Six Exponents and Radical - 30 days
        Understanding of:

- Properties of exponents.
- Exponential functions and equations.
- Roots and radical expressions
- Operations with roots and radical expressions
- Solving roots and radicals equation

Marking Period 4: Overview based on 45 days.

        Unit Seven Polynomials and Rational Expressions- 20 days

Understanding of:
- Graphs of polynomial functions and polynomial applications
- Operations with polynomial functions
- Simplifying rational expressions
- Operations with rational expressions

Unit Eight Data Analysis and Statistics- 25 days
Understanding of:
- Probability, simulations, theoretical, experimental
- Analyzing graphical representations of data
- Creating descriptive statistics and appropriate analysis

Big Ideas:

Big Idea #1: Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.

Essential Questions:
- How are relationships represented mathematically?
- How can patterns be used to describe relationships in mathematical situations?
- How can you extend algebraic properties and processes to exponential expressions and equations and then apply them to solve real world problems?

Concepts:
- Functions, Exponential functions and Equations

Competencies:
- Use the concept and notation of function to interpret and apply them in terms of their context.
- Interpret functions in terms of the situations they model.
- Create and/or analyze functions using multiple representations (graph, table, and equation).
- Create new functions from existing functions (transformations and/or inverses of functions).
- Extend algebraic properties and processes to exponential expressions and equations and apply them to solve real world problems.
- Represent an exponential function in multiple ways, including tables, graphs, equations, and contextual situations, and make connections among representations; relate the solution of the associated exponential or equation to each representation.

Big Idea #2: Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.

Essential Questions:
- How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?
- How are relationships represented mathematically?

Concepts:

- Equations, Inequalities, Polynomials and Rational Expressions

Competencies:
- Create and/or solve equations (including literal, polynomial, rational, radical, exponential, and logarithmic) both algebraically and graphically.
- Use and/or explain reasoning while solving equations and justify the solution method.
- Perform arithmetic operations on polynomials.
- Understand the relationship between zeros and factors of polynomials.
- Simplify/factor expressions involving polynomials.
- Rewrite rational expressions.

Big Idea # 3: Families of functions exhibit properties and behaviors that can be recognized across representations. Functions can be transformed, combined, and composed to create new functions in mathematical and real-world situations.

Essential Question:
- How do you explain the benefits of multiple methods of representing quadratic functions (tables, graphs, equations, and contextual situations)?

Concept:
- Algebraic properties, processes, and representations

Competencies:
- Represent linear functions in multiple ways, including tables, graphs, equations, and contextual situations, and make connections among representations; relate the solution of the associated polynomial equation to each representation.

Big Idea # 4: Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.

Essential Question:
- How can you extend algebraic properties and processes to quadratic, exponential and polynomial expressions and equations and then apply them to solve real world problems?

Concept:
- Algebraic properties, processes, and representations

Competencies:
- Extend algebraic properties and processes to quadratic, exponential and polynomial expressions and equations and to matrices, and apply them to solve real world problems.

Big Idea # 5: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.

Essential Questions:
- In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?
- How does the type of data influence the choice of display?
- How can data be organized and represented to provide insight into the relationship between quantities?

Concepts:

- Data

Competencies:
- Summarize, represent, and interpret single-variable data (including standard deviation) and two-variable data.
- Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

Primary Textbook(s) Used for this Course of Instruction

Name of Textbook: Glencoe Algebra 2

Textbook ISBN #: 978-0-07-903990-3

Textbook Publisher & Year of Publication: McGraw-Hill Education, 2018

Curriculum Textbook is utilized in (title of course): Algebra 2

DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Plan

<u>**Unit 1**</u>: **Generalizing Patterns, Tools of Algebra, Linear Equations**
<u>**Days: 15**</u>

Standards Addressed:
PACCS Math: CC.2.4.HS.B.1, CC.2.4.HS.B.2, CC.2.4.HS.B.3, CC.2.4.HS.B.4, CC.2.4.HS.B.5, CC2.1.HS.F.2, CC2.1.HS.F.3, CC2.1.HS.F.4, CC2.2.HS.C.1, CC2.2.HS.C.2, CC2.2.HS.C.3, CC2.2.HS.C.4, CC2.2.HS.C.5, CC2.2.HS.C.6, CC2.2.HS.D.1, CC2.2.HS.D.2
http://static.pdesas.org/

Anchors: A2.1.1.2, A2.1.2.2, A2.1.3.2.1 A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.2.1.1, A2.2.3.1.1, A2.2.3.1.2
https://www.education.pa.gov/

Eligible Content:
- Apply the order of operations in computation and in problem-solving situations.
- Use exponents, roots, and/or absolute values to represent equivalent forms or to solve problems.
- Use algebraic processes to solve a formula for a given variable.
- Analyze and/or use patterns or relations.
- Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically.

Objectives:
1. Students will be able to describe the relationship between two or more variables presented verbally, numerically, or algebraically. (DOK – Level Two)
2. Students will be able to write equations that describe the relationship between two quantities in context. (DOK – Level Three)
3. Students will be to evaluate algebraic expressions. (DOK – Level one)
4. Students will be able to use the concept and notation of functions to interpret and apply them in terms of their context. (DOK - Level One)
5. Students will be able to graph and analyze functions and use their properties to make the connection between the different representations. (DOK -Level Two)
6. Students will be able to write functions or sequences that model relationships between two quantities. (DOK - Two)

Core Activities and Corresponding Instructional Methods:
1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning
   b. Direct instruction as needed using Smart Technology and online textbook and resources
   c. Keystone based constructed response questions and SAT based questions
   d. Cooperative learning groups
2. Expose students' prior knowledge of the real number system, including operations with

real numbers and properties of real numbers, as well as other Algebra 1 skills (simplifying and/or evaluating algebraic expressions, solving equations and inequalities).
   a. Diagnostic assessment, questioning
   b. Direct instruction as needed using Smart Technology and online textbook and resources, Venn Diagrams
   c. Guided practice
   d. Cooperative learning groups

3. Expose students' prior knowledge of graphing linear functions and writing equations of lines in slope-intercept form, point-slope form, and standard form, including the line of best fit.
   a. Diagnostic assessment, questioning
   b. Cooperative learning groups
   c. Direct instruction as needed using Smart Technology and online textbook and resources
   d. Guided practice

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 1

Unit 2: **Tools of Algebra, Linear Functions**   **Days: 30**

Standards Addressed:
PACCS Math: CC.2.4.HS.B.3, CC2.1.HS.F.4, CC2.2.HS.C.1, CC2.2.HS.C.4, CC2.2.HS.C.5,
CC2.2.HS.C.6, CC2.2.HS.D.2, CC2.2.HS.D.7, CC2.2.HS.D.8, CC2.2.HS.D.9, CC2.2.HS.D.10
http://static.pdesas.org/

Anchors: A2.1.3.1.4. A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.2.1.1,
A2.2.3.1.1, A2.2.3.1.2,
https://www.education.pa.gov/

Eligible Content:
- Determine the domain, range, or inverse of a relation.
- Draw, identify, find, interpret, and/or write an equation for a regression model (lines and curves of best fit) for a scatter plot.
- Make predictions using the equations or graphs of regression models (lines and curves of best fit) of scatter plots.
- Write, solve, and/or apply a linear equation (including problem situations).
- Use and/or identify an algebraic property to justify any step in equation-solving process.
- Interpret solutions to problems in the context of the problem situation.

Objectives:
1. Students will be able to determine whether a relation is a function, find the domain, range, and use function notation. (DOK – Level One)
2. Students will be able to analyze the graph of a linear or absolute value function: identify domain, range, degree. (DOK – Level Three and Four)
3. Students will be able to apply their understanding of linear functions to solve real world applications. (DOK – Level Two)
4. Students will be able to classify, graph and order real numbers. (DOK – Level One)
5. Students will be able to identify and apply properties of real numbers (DOK – Level Two)
6. Students will be able to evaluate and/or simplify algebraic expressions by applying the order of operations. (DOK – Level Two)
7. Students will be able to solve equations and inequalities with one variable and graph solutions on a number line. (DOK – Level Two)
8. Students will be able to write and solve compound inequalities, absolute value equations and inequalities as well as graph solutions on a number line (DOK – Level Two)
9. Students will be able to write and graph linear functions in slope-intercept form, point slope form, and standard form. (DOK – Level Two)
10. Students will be able to write and interpret equations involving direct variation. (DOK Level Two)
11. Students will be able to write and solve linear equations that model real-world data. (DOK – Level Three)
12. Students will be able to write an equation of a trend line and line of best fit as well as use the trend line or line of best fit to make predictions. (DOK – Level Three and Four)

Core Activities and Corresponding Instructional Methods:
1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
    a. Diagnostic assessment, questioning
    b. Direct instruction as needed using Smart Technology and online textbook and resources
    c. Keystone based constructed response questions and SAT based questions
    d. Cooperative learning groups
2. Expose students' prior knowledge of the real number system, including operations with real numbers and properties of real numbers, as well as other Algebra 1 skills (simplifying and/or evaluating algebraic expressions, solving equations and inequalities).
    a. Diagnostic assessment, questioning
    b. Direct instruction as needed using Smart Technology and online textbook and resources, Venn Diagrams
    c. Guided practice
    d. Cooperative learning groups
3. Develop students' skills in solving absolute value equations and inequalities, compound inequalities and solving problems by applying algebraic processes.
    a. Direct instruction using Smart Technology and online textbook and resources.
    b. Guided practice
    c. Cooperative learning groups
4. Expose students' prior knowledge of graphing linear functions and writing equations of lines in slope-intercept form, point-slope form, and standard form, including the line of best fit.
    a. Diagnostic assessment, questioning
    b. Cooperative learning groups
    c. Direct instruction as needed using Smart Technology and online textbook and resources
    d. Guided practice

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 2
Unit 3: Solving Equations and Inequalities

Days: 16

Standards Addressed:
PACCS Math: CC.2.4.HS.B.3, CC2.2.HS.C.1, CC2.2.HS.C.4, CC2.2.HS.C.5, CC2.2.HS.C.6, CC2.2.HS.D.2, CC2.2.HS.D.7, CC2.2.HS.D.8, CC2.2.HS.D.9, CC2.2.HS.D.10
http://static.pdesas.org/

Anchors: A2.1.1.2, A2.1.2.2, A2.1.3.2.1 A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.2.1.1, A2.2.3.1.1, A2.2.3.1.2
https://www.education.pa.gov/

Eligible Content:
- Use and/or identify an algebraic property to justify any step in equation-solving process.
- Use algebraic processes to solve a formula for a given variable.
- Interpret solutions to problems in the context of the problem situation.
- Write, solve, and/or apply a linear equation (including problem situations).

Objectives:
1. Students will be able to evaluate and/or simplify algebraic expressions by applying the order of operations. (DOK – Level Two)
2. Students will be able to solve equations and inequalities with one variable and graph solutions on a number line. (DOK – Level Two)
3. Students will be able to write and solve compound inequalities, absolute value equations and inequalities as well as graph solutions on a number line (DOK – Level Two)
4. Students will be able to write and graph linear functions in slope-intercept form, point slope form, and standard form. (DOK – Level Two)
5. Students will be able to write and interpret equations involving direct variation. (DOK Level Two)
6. Students will be able to write and solve linear equations that model real-world data. (DOK – Level Three)

Core Activities and Corresponding Instructional Methods:
1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
    a. Diagnostic assessment, questioning
    b. Direct instruction as needed using Smart Technology and online textbook and resources
    c. Keystone based constructed response questions and SAT based questions
    d. Cooperative learning groups
2. Develop students' skills in solving linear/absolute value equations by applying algebraic processes.
    a. Diagnostic assessment, questioning
    b. Direct instruction using Smart Technology and online textbook and resources.
    c. Guided practice
    d. Cooperative learning groups
3. Expose students' prior knowledge of graphing linear functions and writing equations of lines in slope-intercept form, point-slope form, and standard form
    a. Diagnostic assessment, questioning

   b. Cooperative learning groups
   c. Direct instruction as needed using Smart Technology and online textbook and resources
   d. Guided practice

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 3

DELAWARE VALLEY SCHOOL DISTRICT

Unit 4:Linear Systems of Equations/Inequalities   **Days: 16**

Standards Addressed:
PACCS Math: CC2.1.HS.F.3, CC2.1.HS.F.4, CC2.2.HS.C.2, CC2.2.HS.C.3, CC2.2.HS.C.5,
CC2.2.HS.C.6, CC2.2.HS.D.1, CC2.2.HS.D.2, CC2.2.HS.D.7
http://static.pdesas.org/

Anchor(s): A2.1.1.2, A2.1.2.2, A2.1.3.2.1 A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.2.1.1,
A2.2.3.1.1, A2.2.3.1.2
https://www.education.pa.gov/

Eligible Content
- Use and/or identify an algebraic property to justify any step in equation-solving process.
- Interpret solutions to problems in the context of the problem situation.
- Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination.
- Use algebraic processes to solve a formula for a given variable.

Objectives:
1. Students will be able to solve a system of linear equations algebraically, using substitution, or using the elimination method. (DOK – Level Two)
2. Students will be able to solve for the break-even or equilibrium point of two linear expressions. (DOK - Level Two)
3. Students will be able to interpret scenarios with linear systems that have 0, 1, or infinitely many solutions. (DOK- Level Two)
4. Students will be able to identify the algebraic structures that make a system of linear equations that have 0, 1, or infinitely many solutions. (DOK - Level Two)
5. Students will be able to apply their understanding of systems of equations to solve real world problems. (DOK – Level Four)
6. Students will be able to understand the solutions to a system of inequalities is the set of all ordered pairs that make both inequalities true and are represented by the overlap of shaded regions. (DOK - Level Two-Four)
7. Students will be able to use the constraints of a problem to write and graph the inequalities and interpret solutions (DOK - Level Four)

Core Activities and Corresponding Instructional Methods:
1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Keystone based constructed response questions and SAT based questions.
   d. Cooperative learning groups
2. Develop students' ability to solve real world problems by applying their understanding of linear functions.
   a. Guided practice

       b. Cooperative learning groups
3. Expose students' prior knowledge of functions and graphing in the coordinate plane, guiding students to graph system of equations and inequalities.
       a. Diagnostic assessment, questioning.
       b. Direct instruction as needed using Smart Technology and online textbook and resources, Venn Diagrams
       c. Guided practice
       d. Cooperative learning groups

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Homework
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 4

DELAWARE VALLEY SCHOOL DISTRICT

<u>**Unit 5**</u>**: Quadratic Functions**   <u>**Days: 28**</u>

Standards Addressed:
PACCS Math: CC2.1.HS.F.3, CC2.1.HS.F.4, CC2.1.HS.F.6, CC.2.2.HS.C.1, CC2.2.HS.C.2, CC2.2.HS.C.3, CC2.2.HS.C.4, CC2.2.HS.C.5, CC2.2.HS.C.6, CC2.2.HS.D.1, CC2.2.HS.D.2, CC2.2.HS.D.7
http://static.pdesas.org/

Anchor(s): A2.1.2.2.1, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.2.1, A.2.2.1.1.1, A.2.2.1.1.2, A.2.2.1.3, A2.2.1.1.4, A2.2.2.1.3, A2.2.2.1.4
https://www.education.pa.gov/

Eligible Content
- Interpret solutions to problems in the context of the problem situation.
- Factor algebraic expressions, including difference of squares and trinomials.
- Write and/or solve quadratic equations (including factoring and using the Quadratic Formula)
- Use algebraic processes to solve a formula for a given variable.
- Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function.
- Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics).
- Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic functions.
- Translate a polynomial, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation)
- Identify or describe the effect of changing parameters within a family of functions.

Objectives:
1. Students will be able to identify quadratic functions and graphs, including the properties of a parabola such as the maximum or minimum values. (DOK – Level Two)
2. Students will be able to distinguish between quadratic growth and linear growth. (DOK - Level Two)
3. Students will be able to graph quadratic functions from standard form or vertex form. (DOK – Level Two)
4. Students will be able to solve a quadratic equation by graphing, factoring, completing the square, or using the quadratic formula. (DOK – Level One and Two)
5. Students will be able to apply their understanding of quadratic functions to solve real world applications. (DOK – Level Four)

Core Activities and Corresponding Instructional Methods:
1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Keystone based constructed response questions and SAT based questions.

       d.   Cooperative learning groups

2. Develop students' ability to solve real world problems by applying their understanding of quadratic functions.
       a.   Guided practice
       b.   Cooperative learning groups

3. Expose students' prior knowledge of functions and graphing in the coordinate plane, guiding students to graph quadratic functions. Investigate the properties of quadratic functions.
       a.   Diagnostic assessment, questioning.
       b.   Direct instruction as needed using Smart Technology and online textbook and resources
       c.   Guided practice
       d.   Cooperative learning groups

4. Build math language/vocabulary including *relation, function, domain, range, vertex, local minimum, local maximum, zeros, x-intercepts*.
       a.   Teachers will use appropriate language to identify algebraic terms and processes.
       b.   During class discussions and investigations, teachers will encourage and guide students to use appropriate math terminology.
       c.   Writing activities incorporating appropriate math language

5. Develop students' skills in solving quadratic functions by graphing, factoring, and using the quadratic formula.
       a.   Direct instruction using Smart Technology and online textbooks and resources.
       b.   Graphing activity using TI-Smartview, guiding students to find the appropriate window to view the graph and identifying properties of the graph.
       c.   Guided practice
       d.   Cooperative learning groups

6. Develop students' ability to solve real world problems involving quadratic functions.
       a.   Direct instruction using Smart Technology and online textbooks and resources.
       b.   Guided practice
       c.   Cooperative learning groups

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Homework
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 5

Unit 6: Exponents and Radical Expressions   <u>Days: 30</u>

Standards Addressed:
PACCS Math: CC2.2.HS.C.1, CC2.2.HS.C.2, CC2.2.HS.C.3, CC2.1.HS.F.1, CC2.1.HS.F.2, CC.2.2.HS.D.1, CC.2.2.HS.D.2, CC.2.2.HS.D.3, CC2.2.HS.D.4, CC2.2.HS.D.9, CC2.1.HS.F.4
http://static.pdesas.org/

Anchor(s): A2.1.2.1, A2.1.3.1.2, A2.2.2.1.1, A2.2.2.1.2
https://www.education.pa.gov/

Eligible Content:
- Simplify expressions involving exponents.
- Identify and/or determine the characteristics of an exponential function.
- Create, interpret, and/or use the equation, graph, or table of an exponential function.
- Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic functions.
- Translate an exponential, or logarithmic function from one representation of a function to another (graph, table, and equation)
- Simplify expressions involving radicals.
- Solve equations involving radical expressions.

Objectives:
1. Students will be able to add, subtract, multiply, and divide expressions with exponents. (DOK – Level Two)
2. Students will be able to solve real world problems using expressions with exponents (DOK - Level Two - Four)
4. Students will be able to simplify radical expressions including rationalizing the denominators. (DOK – Level Two)
5. Students will be able to add, subtract, multiply, and divide radicals. (DOK – Level Two)
6. Students will be able to solve a radical equation using algebraic properties or by graphing calculator. (DOK – Level Two)

Core Activities and Corresponding Instructional Methods:

1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Keystone based constructed response questions and SAT based questions.
   d. Cooperative learning groups
2. Develop students' skills in adding, subtracting, multiplying, and dividing expressions with exponents.
   a. Direct instruction using Smart Technology and online textbooks and resources.
   b. Guided practice
   c. Cooperative learning groups

4. Expose students' prior knowledge of radicals and properties of exponents, guiding students to make a connection between them.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Guided practice
   d. Cooperative learning groups
5. Build math language/vocabulary for expressions with radicals and exponents.
   a. Teachers will use appropriate language to identify parts of a radical and exponents.
   b. During class discussions and investigations, teachers will encourage and guide students to use appropriate math terminology.
   c. Writing activities incorporating appropriate math language

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Homework
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 6

Unit 7: Polynomials and Rational Expressions   Days: 20

Standards Addressed:
PACCS Math: CC.2.2.HS.C.1, CC.2.2.HS.C.2, CC.2.2.HS.C.3, CC.2.2.HS.D.1, CC.2.2.HS.D.2, C.C2.2.HS.D.3, CC.2.2.HS.D.4, CC.2.2.HS.D.5, CC2.2.HS.D.9, CC.2.1.HS.F.4
http://static.pdesas.org/

Anchor(s): A2.1.1.1.2, A2.1.2.1.3, A2.1.2.2, A2.1.3.1.2, A2.2.1.1.4, A2.2.2.1.1
https://www.education.pa.gov/

Eligible Content:
- Simplify expressions involving polynomials.
- Solve equations involving rational and/or radical expressions.
- Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function.
- Create, interpret, and/or use the equation, graph, or table of a polynomial function.
- Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic functions.
- Translate a polynomial, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation)
- Simplify rational algebraic expressions.

Objectives:
1. Students will be able to classify polynomials and determine their degree. (DOK – Level One)
2. Students will be able to add, subtract, multiply and divide (long division and synthetic division) polynomials. (DOK – Level Two)
3. Students will be able to solve real world problems using polynomial expressions (DOK - Level Two - Four)
4. Students will be able to simplify radical expressions including rationalizing the denominators. (DOK – Level Two)
5. Students will be able to simplify rational expressions. (DOK – Level One)
6. Students will be able to perform operations with rational expressions. (DOK – Level Two)
7. Students will be able to solve real world problems using rational expressions. (DOK - Level Four)

Core Activities and Corresponding Instructional Methods:

1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Keystone based constructed response questions and SAT based questions.
   d. Cooperative learning groups

2. Develop students' skills in adding, subtracting, multiplying, and dividing polynomials as well as solving polynomials by graphing or factoring.
   a. Direct instruction using Smart Technology and online textbooks and resources.
   b. Guided practice
   c. Cooperative learning groups
3. Develop students' ability to solve real world problems by applying their understanding of polynomials and their zeros.
   a. Guided practice
   b. Cooperative learning groups
4. Build math language/vocabulary.
   a. Teachers will use appropriate language to identify algebraic terms and processes.
   b. During class discussions and investigations, teachers will encourage and guide students to use appropriate math terminology.
   c. Writing activities incorporating appropriate math language

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam

Formative:
Teacher observations, questions, discussions
Homework
Teacher prepared assessments (quizzes and chapter tests)

Summative:
Common Assessment for Unit 7

UNIT 8 Data Analysis and Statistics   **Days: 25**

Standard(s):
PACCS Math: CC.2.4.HS.B.1, CC.2.4.HS.B.2, CC.2.4.HS.B.3, CC.2.4.HS.B.4, CC2.4.HS.B.5, CC.2.4.HS.B.6, CC.2.4.HS.B.7
http://static.pdesas.org/

Anchor(s): A2.2.2.2.1, A2.2.3.1.1, A2.2.3.1.2, A2.2.3.2

https://www.education.pa.gov/

Eligible Content
- Use combinations, permutations, and the fundamental counting principle to solving problems involving probability.
- Use odds to find probability and/or use probability to find odds.
- Use probability for independent, dependent, or compound events to predict outcomes.

Objectives:
1. Students will be able to organize data in frequency and relative frequency tables. (DOK – Level Three)
2. Students will be able to interpret bar charts and pic charts. (DOK – Level Two)
3. Students will be able to create, analyze, and frame descriptive statistics in the context of real-world situations (DOK - Four)
4. Students will be able to draw and interpret a box-and-whisker plot and/or a stem-and leaf plot. (DOK – Level Two)
5. Students will be able to use probability for independent, dependent, or compound events to predict outcomes. (DOK – Level Two)
6. Students will be able to find conditional probabilities. (DOK – Level Two).
7. Students will be able to use odds to find probability and/or use probability to find odds. (DOK – Level One)

Core Activities and Corresponding Instructional Methods:

1. Build students' problem-solving skills regarding constructed response questions and develop math literacy from algebraic word problems.
   a. Diagnostic assessment, questioning.
   b. Direct instruction as needed using Smart Technology and online textbook and resources.
   c. Keystone based constructed response questions and SAT based data-analysis questions.
   d. Cooperative learning groups
2. Build math language/vocabulary.
   a. Teachers will use appropriate language to identify algebraic terms and processes.
   b. During class discussions and investigations, teachers will encourage and guide students to use appropriate math terminology.

3. Develop students' ability to predict based on measures of central tendency and dispersion. Analyze visual displays of data sets such as box-and-whisker plots and stem and-leaf plots.
    a. Guided practice
    b. Cooperative learning groups
    c. Writing activities incorporating appropriate math language
5. Expose students' prior knowledge of probability (calculating the probability of simple and compound events) and statistics (mean, median, mode). Contrast probability and odds.
    a. Diagnostic assessment, questioning.
    b. Direct instruction as needed using Smart Technology and online textbook and resources.
    c. Guided practice
    d. Cooperative learning groups
6. Develop students' skills in using combinations, permutations, and the fundamental counting principle to solve problems.
    a. Direct instruction using Smart Technology and online textbooks and resources.
    b. Guided practice
    c. Cooperative learning groups

Assessments:
Diagnostic:
Glencoe Algebra 2 Support File
Teacher prepared pre-test/diagnostic test
Teacher questioning and observation
Keystone Algebra I exam
Formative:
Teacher observations, questions, discussions
Homework
Teacher prepared assessments (quizzes and chapter tests)
Summative:
Common Assessment for Unit 8
Extensions:
Worksheets prepared from Kuta Software and online resources
Glencoe enrichment worksheets
SAT question bank from College board and Khan Academy

Correctives:
Glencoe Resources: Study Guide, Intervention and Study Notebook
Remediation practice worksheets prepared from Kuta software and online resources
More extensive direct instruction

Additional Materials and Resources:
Glencoe Algebra 2
Glencoe teacher/student resources
Prentice Hall Algebra 2
Kuta Software and Teacher Generated Worksheets
Graphing Calculator
TI Smart View Software
Teacher developed SAT question bank
Websites such as those from Collegeboard and Khan Academy
Geometer's Sketchpad
Smart Notebook Gallery Essentials

Checklist to Complete and Submit:
(Scan and email)

_____ **Copy of the curriculum using the template entitled "Planned Instruction," available on the district website.**

_____ **The primary textbook form(s).**

_____ **The appropriate payment form, in compliance with the maximum curriculum writing hours noted on the first page of this document.**

Each principal and/or department chair has a schedule of First and Second Readers/Reviewers. Each Reader/Reviewer must sign & date below.

First Reader/Reviewer Printed Name_____

First Reader/Reviewer Signature_____ Date_____

Second Reader/Reviewer Printed Name_____

Second Reader/Reviewer Signature _____ Date_____