DELAWARE VALLEY SCHOOL DISTRICT

PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Pre-Algebra

Grade Level: 7

Date of Board Approval: 2017

DELAWARE VALLEY SCHOOL DISTRICT

Planned Instruction

Title of Planned Instruction: Pre-Algebra

Subject Area: Math Grade(s): 7

Course Description:
This course is available to students in grade 7 who have successfully completed Math 6. The curriculum for Pre-Algebra is intended to prepare students for Algebra. In this course, students learn to understand and apply properties of real numbers. Students will explore one variable equations, linear relationships, geometry concepts, and data analysis. Students will develop effective mathematical communication skills including statistical representations.

Time/Credit for the Course: 2 SEMESTERS, 1 CREDIT, 180 days, meeting 1 period per day

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DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Map

1. **Marking Period One -**
   Integers and Rational Numbers
   Marking Period One -Goals:
   Understanding of:
   - Simplifying Algebraic Expressions
   - Properties of Numbers
   - Absolute Value
   - Adding and Subtracting Integers & Fractions
   - Multiplying and Dividing Integers & Fractions
   - Rational Numbers
   - Terminating and Repeating Decimals
   - Comparing and Ordering Numbers

2. **Marking Period Two -**
   Ratios & Proportions, Percent's and Expressions
   Marking Period Two -Goals:
   Understanding of:
   - Unit Rates
   - Complex Fractions
   - Proportional Relationships
   - Scale Drawings and Similar Figures
   - Percent's and Percent Applications
   - Linear Expressions

3. **Marking Period Three -**
   Equations, Inequalities, Probability & Statistics
   Marking Period Three -Goals
   Understanding of:
   - Solving one-Step Equations
   - Solving two-Step Equations
   - Solving Inequalities
   - Computing measures of Center and Variability
   - Simple & Compound Probability
   - Counting Principle
   - Predictions
   - Sampling
   - Angles
   - Triangles
   - Cross-Sections

- Circumference and Area of Circles
- Surface Area and Volume of Prisms

4. Marking Period Four –Geometric Figures and Measuring Figures

Marking Period Four -Goals:
Understanding of:

- Multiplying and Dividing Monomials
- Scientific Notation
- Real Number System
- Rate of Change and Slope
- Direct Variation
- Polygons
- Translations and Reflections in the Coordinate Plane
- Rotations and Dilations in the Coordinate Plane

DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Plan

UNIT 1:

Big Idea # 1:

- Integers can be used in everyday contexts that involve values above and below zero. These values can be used to represent and solve real-life problems.

Big Idea #2:

- Every quotient of integers is a rational number. Real-life problems can be solved by performing operations with rational numbers.

Standard(s): The Number System and Expressions and Equations

Standards Addressed:
PACS Math: CC.2.1.7.E.1, CC.2.2.7.B.3

Link to Standards in SAS:
https://www.pdesas.org/Standard/View#

Overview: Integers and Rational Numbers

Goals: Solve problems involving all forms of rational numbers. Apply these skills to real world problems.

Objectives:

1. Students will be able to use four-step plan to solve problems and connect to real world situations. (DOK Level 3)
2. Students will be able to translate verbal phrases into numerical expressions and use the order of operations to evaluate expressions. (DOK Level 2)
3. Students will be able to translate verbal phrases into algebraic expressions and evaluate expressions containing variables. (DOK Level 2)
4. Students will be able to identify and use properties of addition and multiplication. (DOK Level 2)
5. Students will be able to select appropriate problem-solving strategies to solve problems and connect to real world situations. (DOK Level 3)
6. Students will be able to use ordered pairs to locate points and use graphs to represent relations. (DOK Level 2)
7. Students will be able to translate among different verbal, tabular, graphical, and algebraic representations of relations. (DOK Level 2)
8. Student will be able compare and order integers and find the absolute value of an expression. (DOK Level 2)

9. Students will be able to add integers. (DOK Level 1)
10. Students will be able to subtract integers and find distances on the number line. (DOK Level 2)
11. Students will be able to multiply integers, simplify algebraic expressions. (DOK Level 2)
12. Students will be able to divide integers and find the mean of a set of data. (DOK Level 1)
13. Students will be able to graph points on a coordinate plane and graph algebraic relationships. (DOK Level 2)
14. Students will be able to write fractions as terminating or repeating decimals and compare fractions and decimals. (DOK Level 3)
15. Students will be able to write rational numbers as fractions, identify and classify rational numbers. (DOK Level 3)
16. Students will be able to multiply positive and negative fractions and evaluate algebraic expressions with fractions. (DOK Level 2)
17. Students will be able to divide positive and negative fractions and divide algebraic fractions. (DOK Level 2)
18. Students will be able to add and subtract rational numbers with common denominators. (DOK Level 1)
19. Students will be able to add and subtract unlike fractions. (DOK Level 2)

DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Plan

UNIT 2:

Big Idea # 1:

- Relationships can be determined to be proportional and proportions can be used to solve real-world problems. Proportional relationships can also be used to solve percent problems.

Big Idea #2:

- The properties of operations can be used to simplify and evaluate algebraic expressions.

Standard(s): Ratios & Proportional Relationships and Expressions and Equations

Standards Addressed:
PACS Math: CC.2.1.7.D.1, C.C.2.2.7.B.1, CC.2.2.7.B.3

Link to Standards in SAS:
https://www.pdesas.org/Standard/View#

Overview: Ratios & Proportions, Percent and Expressions

Goals: Identify proportional relationships and use proportions to solve problems of financial literacy and percent. Perform operations with linear expressions.

Objectives:

1. Students will be able to write and evaluate expressions containing exponents. (DOK Level 2)
2. Students will be able to write ratios as fractions in simplest form and simplify ratios involving measurements. (DOK Level 1)
3. Students will be able to find, compare, and use unit rates. (DOK Level ~~2~~ 3)
4. Students will be able to simplify complex fractions and find unit rates. (DOK Level 1)
5. Students will be able to convert rates using dimensional analysis and convert within systems of measurement. (DOK Level 4)
6. Students will be able to identify proportional and non-proportional relationships in tables and describe a proportional relationship using an equation. (DOK Level 3)
7. Students will be able to identify and analyze proportional relationships. (DOK Level 4)
8. Students will be able to use cross products and the constant of proportionality to solve problems. (DOK Level 4)
9. Students will be able to use and construct scale drawings. (DOK Level 3)
10. Students will be able to find missing measures of similar figures and use scale factors to solve problems involving similar figures. (DOK Level 4)

11. Students will be able to solve problems involving indirect measurement using shadow reckoning and solve problems using surveying methods. (DOK Level 4)
12. Students will be able to use and apply the percent proportion to solve problems. (DOK Level 2)
13. Students will be able to compute mentally and estimate with percent. (DOK Level 4)
14. Students will be able to solve percent problems and problems involving taxes using percent equations. (DOK Level 2)
15. Students will be able to find percent of increase and decrease and find percent error and connect to real world situations. (DOK Level 3)
16. Students will be able to solve real-world problems involving discount and markup. (DOL Level 4)
17. Students will be able to solve simple interest problems and apply the simple interest equation to real-world problems. (DOK Level 4)
18. Students will be able to use the Distributive Property to write equivalent numerical and algebraic expressions. (DOK Level 3)
19. Students will be able to identify parts of an algebraic expression and use the Distributive Property to simplify algebraic expressions. (DOK Level 2)
20. Students will be able to add linear expressions and find perimeter by adding linear expressions. (DOK Level 3)
21. Students will be able to subtract linear expressions, solve real-world problems by subtracting linear expressions. (DOK Level 4)
22. Students will be able to find the greatest common factor of two monomials, use properties to factor linear expressions. (DOK Level 2)

DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Plan

UNIT 3:

Big Idea # 1:

- The properties of operations can be used to simplify and evaluate algebraic equations.

Big Idea # 2:

- Problems involving area, surface area and volume can be solved by using formulas. Scale models can be used to represent real-life spaces and to calculate real-life measurements.

Big Idea #3:

- Students will be able to describe a data set using statistical measures and/or displays. Students will use an understanding of probability of independent events and use proportional reasoning to make predictions.

Big Idea #4:

- Statistics can be used to draw conclusions about a population. Random samples can be used to make predictions and compare populations.

Standard(s): Expressions and Equations and Geometry and Statistics and Probability

Standards Addressed:
PACS Math: CC.2.3.7.A.1, CC.2.3.7.A.2, CC.2.2.7.B.3, CC.2.4.7.B.1, CC.2.4.7.B.2, CC.2.4.7.B.3

Link to Standards in SAS:
https://www.pdesas.org/Standard/View#

Overview: Equations, Inequalities, Geometric Figures and Measuring Figures

Goals: Solve equations and inequalities that can be used to represent real-world situations. Find probability of simple and compound events and use that to predict. Use statistics including measures of center and variability and mean absolute deviation to compare populations. Find probability of simple and compound events and use that to predict. Use statistics including measures of center and variability and mean absolute deviation to compare populations.

Objectives:

1. Students will be able to solve equations by using the Division Property of Equality and solve equations by using the Multiplication Property of Equality. (DOK Level 2)
2. Students will be able to solve two-step equations and solve real-world problems involving two-step equations. (DOK Level 4)

3. Students will be able to write two-step equations and solve verbal problems by writing and solving two-step equations. (DOK Level 3)
4. Students will be able to solve equations of the form $p(x + q) = r$. (DOK Level 1)
5. Students will be able to solve equations with variables on each side. (DOK Level 1)
6. Students will be able to write inequalities and graph inequalities on a number line and connect to real world situations. (DOK Level 3)
7. Students will be able to solve inequalities by using the Addition and Subtraction Properties of Inequality and solve inequalities by multiplying or dividing by a positive or negative number. (DOK Level 1)
8. Students will be able to solve multi-step equations and solve multi-step inequalities. (DOK Level 2)
9. Students will be able to use measures of center and choose appropriate measures of center. (DOK Level 3)
10. Students will be able to find and use measures of variability to interpret and analyze data. (DOK Level 4)
11. Students will be able to find the mean absolute deviation of a set of data and compare the mean absolute deviations of two data sets. (DOK Level 4)
12. Students will be able to compare two populations using the measures of center and variability. (DOK Level 4)
13. Students will be able to identify various sampling techniques and determine the validity of a sample and predict the actions of a larger group. (DOK Level 4)
14. Students will be able to find the probability of simple events and find the probability of the complement of an event. (DOK Level 2)
15. Students will be able to find and compare experimental and theoretical probabilities. (DOK Level 2)
16. Students will be able to find the number of outcomes for an event and find the probability of a compound event. (DOK Level 3)
17. Students will be able to examine relationships between pairs of angles and examine relationships of angles formed by parallel lines and a transversal. (DOK Level 2)
18. Students will be able to find the missing angle measure of a triangle and classify a triangle by its angles and by its sides. (DOK Level 2)
19. Students will be able to find the circumference of circles and solve problems involving circumference. (DOK Level 2)
20. Students will be able to find areas of circles and use areas of circles to solve problems. (DOK Level 2)
21. Students will be able to solve problems involving the area of composite figures. (DOK Level 4)

22. Students will be able to identify three-dimensional figures and describe and draw vertical, horizontal and angled cross sections of three-dimensional figures. (DOK Level 3)
23. Students will be able to find volume of prisms and find volume of composite figures. (DOK Level 4)
24. Students will be able to find lateral area and surface area of prisms and find surface area of real-world objects shaped like prisms. (DOK Level 4)

DELAWARE VALLEY SCHOOL DISTRICT

Curriculum Plan

UNIT 4:

Big Idea #1:

- Students will use an understanding of the real number system and recognize functions.

Big Idea #2:

- Students will understand rate of change and identify and use slope in equations and graphs.

Big Idea #3:

- Students will translate, reflect, rotate and dilate on a coordinate plane.

Standard(s): Expressions and Equations and Geometry
Standards Addressed:
PACS Math: CC.2.2.7.B.1, CC.2.2.8.B.3, CC.2.3.8.A.2

Link to Standards in SAS:
https://www.pdesas.org/Standard/View#

Overview: Exponents, Scientific Notation, Systems of Equations and Transformations

Goals: Develop a deeper understanding of exponents including negative exponents. Solve systems of equations. Complete transformations on a coordinate plane.

Objectives:

1. Students will be able to write and evaluate expressions using negative exponents. (DOK Level 2)
2. Students will be able to multiply and divide monomials. (DOK Level 1)
3. Students will be able to write, compare, and order numbers in scientific notation. (DOK Level 2)
4. Students will be able to add, subtract, multiply, and divide numbers written in scientific notation. (DOK Level 2)
5. Students will be able to find and estimate square roots and cube roots. (DOK Level 1)
6. Students will be able to identify and compare numbers in the real number system and solve equations by finding square roots or cube roots. (DOK Level 2)
7. Students will be able to determine whether a relation is a function and write a function using function notation. (DOK Level 3)
8. Students will be able to solve linear equations with two variables and graph linear equations using ordered pairs. (DOK Level 2)

9. Students will be able to find the constant rate of change for a linear relationship and find the slope of a line. (DOK Level 2)
10. Students will be able to identify and use direct variation. (DOK Level 2)
11. Students will be able to determine slopes and *y*-intercepts of lines and use them to graph linear equations. (DOK Level 2)
12. Students will be able to solve a system of linear equations by graphing and determine the number of solutions of a system of linear equations and connect to real world situations. (DOK Level 3)
13. Students will be able to solve a system of linear equations algebraically and interpret the meaning of the solutions. (DOK Level 4)
14. Students will be able to classify polygons and determine the sum of the measures of the interior angles of a polygon. (DOK Level 2)
15. Students will be able to define and identify transformations, draw translations and reflections on a coordinate plane. (DOK Level 3)
16. Students will be able to define, identify, and draw rotations and determine if a figure has rotational symmetry. (DOK Level 3)
17. Students will be able to use a series of transformations to identify congruent figures and identify transformations. (DOK Level 3)
18. Students will be able to graph dilations on a coordinate plane and find the scale factor of a dilation. (DOK Level 3)
19. Students will be able to use a series of transformations to identify similar figures and use a scale factor to create similar figures. (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Expose students' prior knowledge of the real number system, including operations with and properties of real numbers, in addition to other pre-algebra skills (simplifying and/or evaluating algebraic expressions).
    a. Diagnostic assessment, questioning
    b. Cooperative learning groups
    c. Direct instruction as needed using Smart Technology and online textbook and resources, manipulative (such as Algebra Tiles), Venn Diagrams
    d. Guided Practice

2. Build math language and vocabulary
    a. Teacher will use appropriate language to identify algebraic terms and processes.
    b. Writing activities incorporating appropriate math language and vocabulary.

3. Develop students' skills in solving two-step and multi-step equations
    a. Direct instruction using Smart Technology and online Textbook and resources
    b. Guided Practice
    c. Cooperative learning groups

4. Develop students' ability to solve problems by applying algebraic processes
    a. Guided Practice
    b. Cooperative learning groups

5. Develop students' skills in identifying and graphing relations and functions
    a. Direct instruction using Smart Technology and online Textbook and resources
    b. Guided Practice
    c. Cooperative learning groups

6. Develop students' skills in properties of exponents
    a. Direct instruction using Smart Technology and online Textbook and resources
    b. Guided Practice
    c. Cooperative learning groups

7. Develop students' ability to identify, evaluate, add, subtract, and multiply polynomials
    a. Guided Practice
    b. Cooperative learning groups

Assessments:

Diagnostic:

Teacher prepared pre-test/diagnostic test
Teach questioning and observation
Benchmark Assessment

Formative:

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

Summative:

Teacher prepared chapter tests and Unit Common Assessments

DELAWARE VALLEY SCHOOL DISTRICT

Extensions:

Study Island – preparation for PACS Mathematics PSSA

Correctives:
Re-teaching and practice worksheet available with textbook
Practice worksheets generated through Kuta Software

Materials and Resources:
Glencoe Math Accelerated (2014)
Textbook Online Resources
Teacher Generated Worksheets (Kuta Software)

DELAWARE VALLEY SCHOOL DISTRICT

Primary Textbook(s) Used for this Course of Instruction

Name of Textbook: Glencoe Math Accelerated

Textbook ISBN #: 978-0-07-664461-2

Textbook Publisher & Year of Publication: McGraw Hill 2014

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