

# Southern York County School District Instructional Plan

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| <b>Name:</b>   | <b>Dates: August</b>  |
| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b>  | <b>Chapter 1 – Probability and Portions</b>   |
| <b>Stage 1 – Desired Results</b>   |   |
| <b>PA Core Standards Addressed: 2.1.7.E.1, 2.2.8.B.2, 2.4.8.B.1</b>  |   |
| <p><b>Understanding(s):</b><br/><i>Students will understand . . .</i></p> <ol style="list-style-type: none"> <li>1. Working in a team enables more accomplishment.</li> <li>2. When facing a challenging problem, look to break the problem down into subparts.</li> <li>3. Theoretical probability is the mathematical calculation and experimental probability is computed by performing the events.</li> <li>4. Probabilities of compound events involve the probability of each event.</li> <li>5. Every common fraction has a decimal fraction equivalent and every decimal fraction has common fraction equivalent.</li> </ol> | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ How does working as a team help overcome obstacles?</li> <li>▪ What is an effective approach (start) to a problem that is not familiar?</li> <li>▪ How can I represent this?</li> <li>▪ How can I organize my work?</li> <li>▪ How can the number be rewritten?</li> <li>▪ Are the numbers equal?</li> </ul>  |
| <p><b>Learning Objectives:</b><br/><i>Students will know . . .</i></p> <ul style="list-style-type: none"> <li>▪ How to use different representations to develop mathematical arguments.</li> <li>▪ How to make generalizations across a set.</li> <li>▪ The difference between experimental and theoretical probability</li> <li>▪ Ways to organize data to answer different questions.</li> <li>▪ The meaning of terminating and repeating decimals.</li> <li>▪ How to convert fractions, decimals, and percents.</li> </ul>  | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Find out how likely it is that a specific event will occur.</li> <li>▪ Calculate the probabilities of two separate events to decide which is more likely to happen.</li> <li>▪ Rewrite numbers in different forms in order to compare them.</li> <li>▪ Determine whether a fraction can be rewritten as a repeating or terminating decimal.</li> </ul> |
| <b>Name:</b>   | <b>Dates: September</b>   |
| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b>  | <b>Chapter 2 – Transformations and Area</b>   |
| <b>Stage 1 – Desired Results</b>   |   |
| <b>PA Core Standards Addressed: 2.1.7.E.1, 2.3.7.A.1, 2.3.8.A.2</b>  |   |
| <b>Understanding(s):</b>   | <b>Essential Question(s):</b>   |

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| <p><b>Students will understand . . .</b></p> <ol style="list-style-type: none"> <li>1. The connections between adding a negative with subtracting a positive number and will generalize how to tell if the sum will be positive, negative or zero.</li> <li>2. Subdivide complicated figures into pieces and convert that into a rectangles or parallelograms to calculate the area.</li> <li>3. The order of operations is: parentheses, exponents, multiplication or division, addition or subtraction.</li> </ol>                                       | <ul style="list-style-type: none"> <li>▪ How can I visualize it?</li> <li>▪ How can I describe the motion?</li> <li>▪ How can I transform it?</li> <li>▪ How can I break it into smaller pieces?</li> <li>▪ How can I rearrange the shape?</li> </ul>   |
| <p><b>Learning Objectives:</b><br/><b>Students will know . . .</b></p> <ul style="list-style-type: none"> <li>▪ How to move a shape on a coordinate grid using rigid transformations (translations, rotations, and reflections).</li> <li>▪ The rules for multiplying positive and negative integers through the concept of dilation.</li> <li>▪ Addition and subtraction of Integers.</li> <li>▪ Addition, subtraction and multiplication of fractions.</li> <li>▪ Formulas for area of rectangles, parallelograms, triangles, and trapezoids.</li> </ul> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Connect addition and subtraction of integers to movement along a number line.</li> <li>▪ Transform shapes by flipping, turning, and sliding them on a coordinate grid.</li> <li>▪ Describe movement on a graph using coordinates and expressions.</li> </ul> |
| <p><b>Name:</b></p>  | <p><b>Dates: October</b></p>  |
| <p><b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b></p>   | <p><b>Chapter 3 – Building Expressions</b></p>  |
| <p><b>Stage 1 – Desired Results</b></p>  |   |
| <p><b>PA Core Standards Addressed: 2.2.7.B.1&amp;3, 2.2.8.B.1, 2.3.7.A.1</b></p>   |   |
| <p><b>Understanding(s):</b><br/><b>Students will understand . . .</b></p> <ol style="list-style-type: none"> <li>1. Combining like terms is a form of sorting in the context of calculating area and perimeter of algebra tiles.</li> <li>2. A variable can represent any number.</li> <li>3. How perimeter and area of a shape change.</li> <li>4. Relationships can be represented by pictures and diagrams.</li> </ol>  | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ How can I write it?</li> <li>▪ How can I represent the relationship?</li> <li>▪ How can I organize my thinking?</li> <li>▪ Are these representations equivalent?</li> </ul>   |
| <p><b>Learning Objectives:</b></p>   |   |

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| <p><b>Students will know . . .</b></p> <ul style="list-style-type: none"> <li>▪ Variables can be used to represent unknown lengths.</li> <li>▪ Constants and variables in expressions</li> <li>▪ A five-step problem solving strategy called the “5-D Process” and apply it to solve word problems.</li> <li>▪ To use variables to define the quantities.</li> </ul>  | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Combine like terms and simplify variable expressions.</li> <li>▪ Use a variable to represent any number.</li> <li>▪ Substitute a given value for a variable and evaluate an expression.</li> <li>▪ Solve situational problems using the 5-D Process.</li> </ul>                              |
| <p><b>Name:</b></p>   | <p><b>Dates: November</b></p>   |
| <p><b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b></p>  | <p><b>Chapter 4 – Proportional Relationships and Statistics</b></p>   |
| <p><b>Stage 1 – Desired Results</b></p>   |   |
| <p><b>PA Core Standards Addressed: 2.1.7.D.1, 2.2.7.B.3, 2.2.8.B.2, 2.4.6.B.1</b></p>   |   |
| <p><b>Understanding(s):</b><br/><b>Students will understand . . .</b></p> <ol style="list-style-type: none"> <li>1. Strategies to find a percentage of a whole and to use a part and whole to identify the percentage.</li> <li>2. A linear model is used to examine part-whole relationships and their connection to percents.</li> <li>3. How to interpret situations related to percentage decrease to find percentages, portions and wholes.</li> <li>4. What kinds of information different representations (histograms, stem-and-leaf plots and box-and-whisker plots) communicate and decide which representation is most useful for answering a specific question.</li> </ol> | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ What’s the relationship?</li> <li>▪ How can I represent the data?</li> <li>▪ What is the part?</li> <li>▪ What is the whole?</li> </ul>   |
| <p><b>Learning Objectives:</b><br/><b>Students will know . . .</b></p> <ul style="list-style-type: none"> <li>▪ How to estimate percents of wholes.</li> <li>▪ How to compare data using mean, median, mode and range.</li> <li>▪ Outliers and their affects on a data set.</li> <li>▪ How to interpret histograms, stem-and-leaf plots and box-and-whisker plots.</li> <li>▪ What makes shapes similar and/ or congruent.</li> <li>▪ How to divide fractions.</li> <li>▪ How to find missing parts of similar figures.</li> </ul>  | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Find and use percentages to solve problems?</li> <li>▪ Use measures of central tendency, histograms, stem-and-leaf plots, and box-and-whisker plots to compare data.</li> <li>▪ Compare shapes and use similarity to find missing side lengths of polygons, especially triangles.</li> </ul> |
| <p><b>Name:</b></p>   | <p><b>Dates: December</b></p>   |
| <p><b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b></p>  | <p><b>Chapter 5 – Inequalities and Descriptive Geometry</b></p>   |

**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.1.7.E.1, 2.2.7.B.1, 2.3.7.A.1&2**

**Understanding(s):**

*Students will understand . . .*

1. Inverse operations to numbers and variable expressions in order to represent mathematical steps.
2. The distributive property can be represented by using pictures and expressions.
3.  $\pi$  is the circumference divided by the diameter.
4. Solutions can be represented by words, graphs, and symbols.

**Essential Question(s):**

- How can I build it?
- What's the relationship?
- Are they equivalent?
- Is there more than one way?
- How can I measure it?

**Learning Objectives:**

*Students will know . . .*

- How to simplify algebraic expressions by combining like terms.
- How to simplify expressions to determine which is greater, or if they are equal.
- How to find and represent solutions to one-variable inequalities on number line graphs.
- How to construct geometric shapes using tracing paper, protractor, compass and straightedge.
- Geometric vocabulary such as parallel, perpendicular, angle and angle measure.
- How to find the area of a circle.

**Students will be able to:**

- Rewrite expression by combining like terms and using the Distributive Property.
- Simplify and compare two algebraic expressions.
- Write and solve algebraic inequalities.
- Construct geometric shapes.
- Find the circumference and area of a circle.

**Name:**

**Dates: January**

**Course/Subject: Making Connections:  
Foundations for Algebra Year 2**

**Chapter 6 – Graphing and Solving Equations**

**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.1.7.E.1, 2.2.7.B.3, 2.2.8.B.3, 2.4.7.B.1&2**

**Understanding(s):**

*Students will understand . . .*

1. How to draw a trend line and use it to make predictions.
2. The relationship between tables, graphs and rules.
3. How to recognize and describe patterns in data tables.
4. How to use the 5-D process to write and solve equations from word problems.

**Essential Question(s):**

- What would a graph of this data look like?
- Can I make a prediction?
- Is there a relationship?
- How can I represent it?
- How can I solve it?

**Learning Objectives:**

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| <p><b>Students will know . . .</b></p> <ul style="list-style-type: none"> <li>▪ How to construct an interpret circle graphs using central angles and percents.</li> <li>▪ Correlations: positive, negative and no correlation.</li> <li>▪ How to graph linear functions.</li> <li>▪ How to solve equations and check their solution that has one solution, infinite solutions and no solutions.</li> <li>▪ How to define variables.</li> </ul> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Create scatterplots that show relationships among two-variable data.</li> <li>▪ Identify correlations between sets of data and represent the relationship with a trend line.</li> <li>▪ Solve for a variable when two expressions are equals.</li> <li>▪ Write and solve an equation to solve a word problem.</li> <li>▪ Recognize when an equation has no solution or infinite solutions.</li> </ul> |
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| <b>Name:</b> | <b>Dates: February</b> |
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| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b> | <b>Chapter 7 – Slopes and Rates of Change</b> |
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**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.2.7.B.1&2, 2.2.8.B.2&3**

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| <p><b>Understanding(s):</b><br/><i>Students will understand . . .</i></p> <ol style="list-style-type: none"> <li>1. Rates must be changed to unit rates in order to compare them.</li> <li>2. Rates can be compared using tables and graphs.</li> <li>3. Systems of equations through graphs, tables, situations and equations.</li> </ol> | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ What is being compared?</li> <li>▪ What does the comparison tell me?</li> <li>▪ How else can I represent it?</li> <li>▪ How can I find the solutions?</li> <li>▪ When are the solutions the same?</li> </ul> |
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| <p><b>Learning Objectives:</b><br/><i>Students will know . . .</i></p> <ul style="list-style-type: none"> <li>▪ The rate of change of a line (slope), as a ratio between the vertical change and horizontal change.</li> <li>▪ The affect of scaling on the steepness of a line.</li> </ul> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Calculate rates, including unit rates.</li> <li>▪ Compare ratios and rates with different units.</li> <li>▪ Measure the steepness of a line using slope.</li> <li>▪ Compare equations to determine when they have the same solution.</li> </ul> |
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| <b>Name:</b> | <b>Dates: March</b> |
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| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b> | <b>Chapter 8 – Percents and More Solving Equations</b> |
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**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.1.7.D.1, 2.1.7.E.1., 2.2.7.B.1&3**

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| <p><b>Understanding(s):</b><br/><i>Students will understand . . .</i></p> <ol style="list-style-type: none"> <li>1. Discount and Increase problems can be solved in one or two steps.</li> <li>2. A multiplier is used to represent the percent of increase and decrease.</li> </ol> | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ How is it changing?</li> <li>▪ What is the relationship</li> <li>▪ What is the connection?</li> <li>▪ How can I represent it?</li> <li>▪ What strategy should I use?</li> </ul> |
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| <b>Learning Objectives:</b><br><b>Students will know . . .</b> <ul style="list-style-type: none"> <li>▪ The relationship between distance, rate and time.</li> <li>▪ The importance of units when comparing rates and when using rates to compute.</li> <li>▪ How to solve equations with fractional coefficients and decimal coefficients.</li> <li>▪ How to apply the formula for simple interest.</li> </ul> | <b>Students will be able to:</b> <ul style="list-style-type: none"> <li>▪ Solve problems involving distance, rate and time.</li> <li>▪ Convert units so that they are the same, and then use them to compare rates.</li> <li>▪ Solve equations that have fractional or decimal coefficients.</li> <li>▪ Find the whole amount if you only know a percentage of it.</li> <li>▪ Calculate simple interest.</li> </ul> |
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| <b>Name:</b> | <b>Dates: April</b> |
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| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b> | <b>Chapter 9 – Proportions and Pythagorean Theorem</b> |
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**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.1.7.D.1, 2.1.7.E.1, 2.3.7.A.2, 2.3.8.A.2**

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| <b>Understanding(s):</b><br><b>Students will understand . . .</b> <ol style="list-style-type: none"> <li>1. Proportions are used in problem solving.</li> <li>2. The relationship between side lengths of a right triangle as the Pythagorean Theorem and apply that relationship to solve problems.</li> </ol> | <b>Essential Question(s):</b> <ul style="list-style-type: none"> <li>▪ What’s the relationship?</li> <li>▪ How else can I solve it?</li> <li>▪ What is being compared?</li> <li>▪ Which shapes are similar?</li> </ul> |
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| <b>Learning Objectives:</b><br><b>Students will know . . .</b> <ul style="list-style-type: none"> <li>▪ The difference between proportional relationships and other linear relationships.</li> <li>▪ Different strategies for solving proportions.</li> <li>▪ That if two shapes are similar, their perimeter is related by the scale factor and the area is related by the scale factor squared.</li> <li>▪ The definition of square root and irrational number</li> <li>▪ How to estimate the value of square roots.</li> </ul> | <b>Students will be able to:</b> <ul style="list-style-type: none"> <li>▪ Set up and solve proportional equations.</li> <li>▪ Identify and use the ratio between the areas of two similar shapes.</li> <li>▪ Find missing side lengths of right triangles using the Pythagorean Theorem.</li> <li>▪ Find the square root of a number and identify irrational numbers.</li> </ul> |
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| <b>Name:</b> | <b>Dates: May</b> |
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| <b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b> | <b>Chapter 10 – Exponents and Three Dimensions</b> |
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**Stage 1 – Desired Results**

**PA Core Standards Addressed: 2.2.8.B.1, 2.2.7.B.3, 2.3.7.A.1&2**

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| <b>Understanding(s):</b> | <b>Essential Question(s):</b> |
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| <p><b>Students will understand . . .</b></p> <ol style="list-style-type: none"> <li>1. That compound interest is an example of multiplicative growth that is represented by a curve on a graph and with an exponent in an equation.</li> <li>2. Simple interest using one time period and compound interest using multiple interest period.</li> <li>3. How to find the surface are and volume of prisms and the relationship between surface area and volume.</li> <li>4. That the volume of a cylinder is three times the volume of a cone with the same height and base.</li> </ol>                                   | <ul style="list-style-type: none"> <li>▪ How is it changing?</li> <li>▪ What patterns can I see?</li> <li>▪ How much will it hold?</li> <li>▪ Am I measuring in one, two or three dimensions?</li> <li>▪ How are they related?</li> </ul>  |
| <p><b>Learning Objectives:</b><br/><b>Students will know . . .</b></p> <ul style="list-style-type: none"> <li>▪ How to recognize linear and non-linear situations from tables and graphs.</li> <li>▪ How to calculate compound interest over periods of time.</li> <li>▪ How to write numbers in scientific notation.</li> <li>▪ The laws of exponents.</li> <li>▪ How to predict the appearance of three-dimensional shapes from nets.</li> </ul>   | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>▪ Calculate compound interest.</li> <li>▪ Determine whether a relationship grows linearly or exponentially.</li> <li>▪ Rewrite expressions using exponents and scientific notation.</li> <li>▪ Find the surface area and volume of rectangular prisms.</li> <li>▪ Find the surface area and volume of non-rectangular shapes including pyramids, cylinders and cones</li> </ul> |
| <p><b>Name:</b></p>  | <p><b>Dates: June</b></p>  |
| <p><b>Course/Subject: Making Connections: Foundations for Algebra Year 2</b></p>   | <p><b>Chapter 11 – Growth, Probability, and Volume</b></p>   |
| <p><b>Stage 1 – Desired Results</b></p>  |  |
| <p><b>PA Core Standards Addressed: 2.2.7.B.3, 2.3.7.A.1&amp;2, 2.4.7.B.3</b></p>   |  |
| <p><b>Understanding(s):</b><br/><b>Students will understand . . .</b></p> <ol style="list-style-type: none"> <li>1. The graphs of linear equations are lines and non-linear graphs are not lines.</li> <li>2. The growth pattern of a non-linear graph is not a constant value.</li> <li>3. Probabilities of multiple events are represented using a tree diagram, a list, and an outcome chart.</li> <li>4. Conditional probability is based upon a previous event and compound probability is based upon separate events.</li> <li>5. The volumes of similar solids are computed by using the scale factor.</li> </ol> | <p><b>Essential Question(s):</b></p> <ul style="list-style-type: none"> <li>▪ How does it grow?</li> <li>▪ How can growth be described?</li> <li>▪ What kind of equation makes a graph that is not a line?</li> <li>▪ How likely is it?</li> <li>▪ How does the volume change?</li> </ul>  |
| <p><b>Learning Objectives:</b></p>   |  |

***Students will know . . .***

- How to graph non-linear equations and to recognize linear and non-linear situations from tables and graphs.
- How to calculate compound probabilities using a deck of cards and a random number generator.
- How to build three dimensional shapes with cubes.
- How to use the scale factor to calculate the surface area and volume of similar shapes.

***Students will be able to:***

- Identify patterns of growth for non-linear equations in graphs and tables.
- Determine which of two events will be more likely.
- Calculate probability of compound (multiple) events.
- Use the scale factor to find the volume of a similar solid.