Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **1 - Numbers, Operations and Expressions** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.6.E.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions. CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers. CC.2.1.6.E.3 Develop and/or apply number theory concepts to find common factors and multiples. CC.2.1.6.E.2 Identify and choose appropriate processes to compute fluently with multi-digit numbers. CC.2.1.6.E.4 Apply and extend previous understandings of numbers to the system of rational numbers.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.* *b. Mathematical relationships among numbers can be represented, compared, and communicated.* *c. Values can be expressed as positive as well as negative and operations with those numbers can be calculated.* *d. Real Number Properties apply to numbers and variables in all situations.* *e. Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.* *f. Numerical quantities and calculations can be estimated or analyzed by using appropriate strategies and tools* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* ** Students will apply integer concepts to real life situations.*

CC.2.2.6.B.1 Apply and extend previous understandings of arithmetic to algebraic expressions.
CC.2.2.7.B.1
Apply properties of operations to generate equivalent expressions.
CC.2.2.6.B.2 Understand the process of solving a one-variable equation or inequality and apply it to real-world and mathematical problems.

- PA Content Standards

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How can you model integer and/or fraction operations?
   b. How can you use a model to support your answer?
   c. How do you use the properties of real numbers to simplify expressions?
   d. How can expressions, equations, and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?
   e. What makes a tool and/or strategy appropriate for a given task?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   practice of integer operations

7. What vocabulary should students know and be able to recall?
   Associative Property, Commutative Property, Distributive Property, like terms, integer, rational number, substitution, evaluate, expression

8. What basic concepts should students know and be able to recall and apply?
   Recognize like terms
   Solve one-step equations
   Evaluate and write variable expressions
   Compare and order integers
   Integer operations
   Apply real number properties to expressions

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?
   M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real-world contexts.
   M07.A-N.1.1.2 Represent addition and subtraction on a horizontal or vertical number line.
   M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats
   M06.A-N.1.1.1 Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.
   M06.A-N.2.1.1 Solve problems involving operations (+, –, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.
   M06.A-N.2.2.1 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
   M06.A-N.2.2.2 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of

		two whole numbers with no common factor. *M06.A-N.3.1.1 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge).* *M06.A-N.3.1.2 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., –(–3) = 3; 0 is its own opposite).* *M06.A-N.3.1.3 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.* *M06.A-N.3.2.1 Write, interpret, and explain statements of order for rational numbers in real-world contexts. Example: Write – 3°C > – 7°C to express the fact that – 3°C is warmer than – 7°C.* *M06.A-N.3.2.2 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. Example: For an account balance of – 30 dollars, write |– 30| = 30 to describe the size of the debt in dollars, and recognize that an account balance less than – 30 dollars represents a debt greater than 30 dollars.* *M06.A-N.3.2.3 Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.* *M06.B-E.1.1.1 Write and evaluate numerical expressions involving whole-number exponents* *M06.B-E.1.1.3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity).* *M06.B-E.1.1.4 Evaluate expressions at specific values of their variables, including expressions that*

		arise from formulas used in real-world problems. Example: Evaluate the expression b2 – 5 when b = 4. M06.B-E.1.1.5 Apply the properties of operations to generate equivalent expressions. Example 1: Apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x. Example 2: Apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y). Example 3: Apply properties of operations to y + y + y to produce the equivalent expression 3y. M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50 an hour (or 1.1 × $25 = $27.50). M06.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Use models to demonstrate algorithm for integers and fractions (3a,3b,3c,3f,4b,4e,5a,5b,5e).* *Generate equations and representations that can be used to solve word problems and check for reasonability of solutions.(3e,3f,5d)* *Participate in discussion board responding to teacher created prompts.(3d,4a, 4b,4d,5c)*

	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3e, 4a, 4d, 5c)*

Stage 3 – Learning Plan			
NETS for Students	**Learning Activities**		**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?		• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** Remembering rules for adding and multiplying negatives Distributing -- remember to distribute to EVERYTHING in the parentheses Know different between associative and commutative property Difference between GCF and LCM x and x^2 are NOT like terms Dividing fraction -- you multiply by the reciprocal of the SECOND fraction Difference between expression and equation • **How will students get the feedback they need?** Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*:	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment,*	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb*

	Modeling integer operations and fraction operations-using multiple representations, Hot Air Balloon activity-real world application, Counting and Building Rectangles--multiple representations and communicating, Discovering Algorithms for Dividing Fractions, Show Me the Sign, Class notes, Video lessons with textbook	*maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, colored math counters	interactive textbook quizzes, Study Island, mini whiteboards

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **2: Proportional Thinking** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.6.E.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions. CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers. CC.2.1.6.E.3 Develop and/or apply number theory concepts to find common factors and multiples. CC.2.1.6.E.2 Identify and choose appropriate processes to compute fluently with multi-digit numbers. CC.2.1.6.E.4 Apply and extend previous understandings of numbers to the system of rational numbers.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. A proportion is a relationship of equality between two ratios.* *b. All fractions are ratios (part-to-whole), but not all ratios are fractions (part-to part).* *c. Proportionality involves a relationship in which the ratio of two quantities remains constant as the corresponding values of quantities change.* *d. Ratios use division to represent relations between two quantities* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies.* ** Students will recognize and apply proportional reasoning to real-world situations.*

CC.2.2.6.B.1 Apply and extend previous understandings of arithmetic to algebraic expressions.
CC.2.2.7.B.1
Apply properties of operations to generate equivalent expressions.
CC.2.2.6.B.2 Understand the process of solving a one-variable equation or inequality and apply it to real-world and mathematical problems.

- PA Content Standards

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. What kinds of problems can I solve by using ratios?
   b. How are unit rates helpful in solving real-world problems?
   c. How are ratios and rates similar and different?
   d. What are ways we use percentages in everyday life?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   simplify fractions, converting fractions, decimals and percents, divisibility rules, multiples and factors, relationships and rules for multiplication and division of whole numbers as they apply to decimal fractions,

7. What vocabulary should students know and be able to recall?
   ratio, proportion, rate, unit rate, percent, compare, analyze, simplify, rational number, relationship

8. What basic concepts should students know and be able to recall and apply?
   identify proportional relationships, solving proportions and percent problems, Using unit rates appropriately,

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?
   M06.A-R.1.1.1: Use ratio language and notation (such as 3 to 4, 3:4, 3/4) to describe a ratio relationship between two quantities.
   M06.A-R.1.1.2: Find the unit rate a/b associated with a ratio a:b (with b $\neq$ 0) and use rate language in the context of a ratio relationship.
   M06.A-R.1.1.3: Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.
   M06.A-R.1.1.4: Solve unit rate problems including those involving unit pricing and constant speed.
   M06.A-R.1.1.5: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percentage.
   M07.A-R.1.1.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.
   M07.A-R.1.1.2: Determine whether two quantities are proportionally related (e.g., by testing for equivalent ratios in a table, graphing on a coordinate plane and observing whether the graph

		is a straight line through the origin). *M07.A-R.1.1.3: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships* *M07.A-R.1.1.4: Represent proportional relationships by equations.* *M07.A-R.1.1.5: Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r), where r is the unit rate.* *M07.A-R.1.1.6: Use proportional relationships to solve multi-step ratio and percent problems.* *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.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *1. Make sense of ratio and unit rates in real-world contexts (3a,3b,3d,5c,5d)* *2. Use arguments to justify their reasoning when creating and solving proportions used in real-world contexts. (3a, 4a, 4b, 5a, 5c)* *3. Create models using tape diagrams, double number lines, manipulatives, tables and graphs to represent real-world and mathematical situations involving ratios and proportions.(3a,4a,4b)* *4. Look for patterns that exist in ratio tables in order to make conjectures about solving the problem presented in this task. (3a,3c,5a,5d)* *5. Formally begin to make connections between covariance, rates, and representations showing the relationships between quantities. (3d,4a,4b,5c)* *6.Participate in discussion board responding to teacher created prompts.(3d,4a,4b,5c)*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests.

	List the assessments: *Quizzes and tests (3a,3b,3c,3d,4a)*

<table>
<tr><th colspan="4">Stage 3 – Learning Plan</th></tr>
<tr><th>NETS for Students</th><th colspan="2">Learning Activities</th><th>Progress Monitoring/Formative Assessment</th></tr>
<tr><td rowspan="2">NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.

Critical Thinking
Technology Operations</td><td colspan="2">Questions to consider while planning:
• Are transfer and acquisition addressed in the learning plan?
• Does the learning plan reflect principles of learning and best practices?
• Is there tight alignment with Stages 1 and 2?
• Is the plan likely to be engaging and effective for all students?</td><td>• How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?
Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions
• What are potential rough spots and student misunderstandings?
Proportional relationships are additive rather than multiplicative.
Regarding percents, often there is a misunderstanding that a percent is always a natural number less than or equal to 100.

• How will students get the feedback they need?
Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Class notes
Fruit Punch lesson
Rope Jumper activity
Reaching the Goal assignment
Free Throws activity
Thumbs on Fire lesson</td><td>List resources required
(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)
Textbook, laptops, whiteboards, document cameras, calculators, colored math counters,</td><td>FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.

Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb

interactive textbook quizzes, Study Island, mini whiteboards</td></tr>
</table>

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **3 - Solving Equations/Inequalities** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Transfer of Learning
   Career Planning and Life-Long Learning
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards

   - Math PA Core State Standards
     CC.2.2.6.B.2 Understand the process of solving a one-variable equation or inequality and apply it to real-world and mathematical problems.
     CC.2.2.7.B.3 Model and solve realworld and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.
     CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   a. Obtaining a solution to an equation, no matter how complex, always involves the process of undoing operations.
   b. Real world situations can be modeled and solved by using equations and inequalities.
   c. Equations may have one solution, no solution, or infinitely many solutions.
   d. Inequalities have a set of solutions, which are sometimes graphed on a number line. Inequalities can also have no solution.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will make sense of and persevere in solving complex and novel mathematical problems.*
   ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.*
   ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.*
   ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.*
   ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies*
   ** Students will recognize and solve real life problems with a given unit rate and fixed cost.*
   ** Students will recognize what an equation/inequality with no solution means in real life; they also will recognize what an equation/inequality with an infinite number of solutions means.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

equations.
CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.
CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.
CC.2.2.HS.D.5 Use polynomial identities to solve problems.
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.
CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically

- PA Content Standards

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How can writing an equation for a real-world situation make you a better problem solver?
   b. How can expressions, equations, and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?

Acquisition

Students will know...	**Students will be skilled at... (be able to do)**
6. What facts should students know and be able to use to gain further knowledge? *When you divide or multiply by a negative number, the inequality sign changes direction.* 7. What vocabulary should students know and be able to recall? *Distributive Property, Like terms, integer, substitution, like term, inequality, equation, reasonable, no solution, infinitely many solutions* 8. What basic concepts should students know and be able to recall and apply? *Recognize like terms* *Distribute first* *If there are variables on both sides, you must move one of the variables to the other side.* *When graphing inequalities with less than or equal to OR greater than or equal to you must fill in the circle; otherwise the circle is left open.*	9. What discrete skill and processes should students be able to demonstrate? *M06.B-E.2.1.1 Use substitution to determine whether a given number in a specified set makes an equation or inequality true.* *M06.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.* *M06.B-E.2.1.3 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all non-negative rational numbers.* *M06.B-E.2.1.4 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.* *M07.B-E.1.1.1 Apply properties of operations to add, subtract,* *factor, and expand linear expressions with rational coefficients.* *M07.B-E.2.2.1 Solve word problems leading to equations of the* *form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers.* *Example: The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* *M07.B-E.2.2.2 Solve word problems leading to inequalities of the* *form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers, and graph the solution set of the inequality.*

		M07.B-E.2.3.1 Determine the reasonableness of answer(s) or *interpret the solution(s) in the context of the problem.* *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).* *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.* *CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.* *CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.* *A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations).* *A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Mathemathetical Design Collaborative activity -- Students are paired with a peer and given a set of equations. The students then sort the equations into 3 categores -- one solution, no solution, or infinitely many solutions showing work and explaining. Then the students go around and critique each other's work, explaining (3a, 3c, 4c)*

	Students will write and solve equations from word problems and then test for reasonableness of answer, including rounding up or down, as appropriate (3b, 4a, 4b, 5a, 5b).
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3a, 3b, 3c, 3d, 4a, 4b)*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** When dividing or multiplying by a negative number, the inequality sign changes direction. Calculation errors at the beginning of a problem will give an incorrect answer. Students don't choose the easiest way to solve the problem which creates more difficult arithmetic. Students forget that they must move variables to the same side of the equation Students forget that they must do the same thing to both sides of the equation. • **How will students get the feedback they need?** Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Analyzing Tables Real Life Equations When is it not Equal worksheets, homework from textbook, Study Island, interactive textbook quizzes	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, Hands on Equations	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* interactive textbook quizzes, Study Island, mini whiteboards

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **4 - Lines and Functions** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.2.6.B.3 Represent and analyze quantitative relationships between dependent and independent variables. CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations. 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. CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. Ratios can be used to show a relationship between changing quantities, such as vertical and horizontal change.* *b. A line on a graph can be represented by a linear equation.* *c. The relationship between two lines can be determined by comparing their slopes and y-intercepts.* *d. The equation of a line can be written in multiple forms.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* ** Students will make sense of functional relationships and persevere in solving complex and novel mathematical problems that are functional relationships.* ** Students will make use of structure and repeated reasoning to gain a deeper understanding of functional relationships and how they can be used to formulate generalized problem solving strategies.*

CC.2.1.HS.F.2 A pply properties of rational and irrational numbers to solve real - world or mathematical problems.
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.
CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.
CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.
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.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.
CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.
CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.
CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.
CC.2.2.HS.C.6 Interpret functions in terms of the situations they model.
CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.

- PA Content Standards

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How are relationships between dependent and independent variables represented mathematically?
   b. How does the shape of a graph and the manipulation of a parameter represent the real world situation?
   c. What can you interpret from a shape of a graph?
   d. How is a function different from a relation?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   Lines can have a positive slope /
   Lines can have a negative slope
   Lines can have a slope of zero (horizontal line)
   Lines can have no slope (vertical line)
   The best way to graph a line is using slope-intercept form
   f(x) is the same as y

7. What vocabulary should students know and be able to recall?
   relation, function, slope, domain, range, parallel, perpendicular, linear, non-linear, standard form, slope-intercept form, line of best fit

8. What basic concepts should students know and be able to recall and apply?
   Students will graph a line in standard and slope-intercept form.
   Students will calculate the equation of a line given appropriate information.
   Students will check to see if a solution is valid.
   Students will calculate intercepts.
   Students will recognize the difference between linear and non-linear equations.
   Students will create a line of best fit.

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?

M06.B-E.3.1.1 Write an equation to express the relationship between the dependent and independent variables
M06.B-E.3.1.2 Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation.
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.
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.
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).
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-F.1.1.1 Determine whether a relation is a

		function. *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).* *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.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.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.* *A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations).* *A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation.* *Note: Linear equations only.* *A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.* *A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph.*

		A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). *A1.2.1.2.1 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 (i.e., graph, table, and equation).* *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.* *A1.2.2.1.3 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 equation may be in point ‐ slope, standard, and/or slope ‐ intercept form.* *A1.2.2.1.4 Determine the slope and/or y ‐ intercept represented by a linear equation or graph.* *A1.2.2.2.1 Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot.* *A1.2.3.2.3 Make predictions using the equations or graphs of best ‐ fit lines of scatter plots.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *1. Students explain how to verify that a relationship is a function. (5d)* *2. Students construct arguments using verbal or written explanations accompanied by expressions, equations,*

Technology Operations	*inequalities, models, and graphs, tables, and other data displays. They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students through participation in classroom discussion boards. (3a,3b,3c,4a,4c,4d,5b,5c)* *3. Students form expressions, equations (in different forms), or inequalities from real world contexts and connect symbolic (3a,3b,3c,4b,4d,5b,5c) and graphical representations as they apply algebraic concepts to the context.* *4. Students translate functions numerically, graphically, verbally, and algebraically (3b,3c,4b,4d,5b,5c)* *5. Students gather their own data or graphs in contexts they understand and interpret the data and graphs in terms of equations, using correct terminology.(5a)*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3b,3c,3d,,5a)*

Stage 3 – Learning Plan			
NETS for Students	**Learning Activities**		**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?		• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** Algebraic errors when manipulating the equation Errors when graphing linear equations • **How will students get the feedback they need?** Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*:	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-*	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs,*

	Graphing Stories Order Matters Foxes and Rabbits Vending Machine Tile around the Fountain Class notes, worksheets, homework from textbook, Study Island, interactive textbook quizzes	*fiction text, lab equipment, maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, graphing calculators, graph paper, graphing software	*DIBELS, Aimsweb* interactive textbook quizzes, Study Island, mini graph side whiteboards

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **5 - Exponents and Number Sets** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Transfer of Learning
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards

   - Math PA Core State Standards
     CC.2.1.6.E.4 Apply and extend previous understandings of numbers to the system of rational numbers.
     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.
     CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.
     CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   a. Squaring a number and finding the square root are inverse operations.
   b. The square root of a non-perfect square is an irrational number.
   c. In scientific notation, if the exponent increases by one, the value increases by ten.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will make sense of and persevere in solving complex and novel mathematical problems.*
   ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.*
   ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.*
   ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.*
   ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How do you compare numbers in scientific notation -- with and without calculators?
   b. How does the use of exponents make representing quantities more efficient?

Acquisition

Students will know...	Students will be skilled at... (be able to do)

real - world or mathematical problems. • PA Content Standards	6. What facts should students know and be able to use to gain further knowledge? *Numbers between 0-1 have a negative exponent.* *Numbers greater than one have a positive exponent.* *To multiply numbers with the same base, add the exponents.* *To divide numbers with the same base, subtract the exponents.* 7. What vocabulary should students know and be able to recall? *scientific notation, exponent, square root, cube root, rational, irrational* 8. What basic concepts should students know and be able to recall and apply? *Change numbers from scientific notation to regular form and vice versa.* *Convert a repeating number into a fraction.* *Multiply and divide expressions in exponent form.* *Simplify square roots.* *Estimate square roots and cube roots and comparing them.*	9. What discrete skill and processes should students be able to demonstrate? *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).* *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.1.1.1 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.* *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 122) and cube roots of perfect cubes (up to and including 53) without a calculator.* *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.* *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. Interpret scientific notation that has been generated by technology. *A1.1.1.1.1 Compare and/or order any real numbers* *A1.1.1.1.2 Simplify square roots* *A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): ** Students will represent positive and negative exponents in table to find patterns and relationships.(4a, 3c)* ** Students will apply exponential skills to solve problems such as bacteria growth, radioactive decay, population growth, and compound interest.(4a)* *Participate in discussion board responding to teacher created prompts.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3a, 3b, 3c, 5a, 5b)*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher

<table>
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<td rowspan="2">live productively in an increasingly global and digital world.

Critical Thinking
Technology Operations</td>
<td colspan="2">• Is the plan likely to be engaging and effective for all students?</td>
<td>observation during peer share-out sessions
• What are potential rough spots and student misunderstandings?
Students mistakenly multiply the numerical bases when calculating the product of two or more exponential expressions with numerical bases

Failure to perform the correct operation of coefficients and/or exponents.
Students incorrectly convert between standard and scientific notation by mistakenly counting zeros rather than place value.

Not converting an answer to proper scientific notation.

• How will students get the feedback they need?
Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz</td>
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<td>List planned activities (examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Ancestor Study
Rational or Irrational Reasoning
Got Cubes

Worksheets, homework from textbook, Study Island, interactive textbook quizzes, completion of class notes,
Additional activities can be found: https://www.georgiastandards.org/Georgia-Standards/Frameworks/8th-Math-Unit-2.pdf</td>
<td>List resources required (examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)

Textbook, laptops, whiteboards, document cameras, calculators</td>
<td>FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.

Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb

Interactive textbook quizzes, Study Island, mini whiteboards</td>
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Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **6 - Geometry** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.3.6.A.1 Apply appropriate tools to solve real-world and mathematical problems involving area, surface area, and volume. CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them. CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. Geometric figures can be represented in the coordinate plane.* *b. The structure of the coordinate system can be used to calculate measures contained in geometric figures.* *c. The Distance Formula is an application of the Pythagorean Theorem.* *d. The measures of geometric figures can be calculated and analyzed using a variety of strategies, tools, and technologies.* *e. A change in one dimension of an object results in predictable changes in area and or volume.* *f. A constant ratio exists between corresponding lengths of sides of similar figures* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* ** Students will communicate precisely when describing geometric relationships.* ** Students will apply the geometric concepts they know to solve problems arising in everyday life, society and the workplace.*

real - world and mathematical problems.
CC.2.3.8.A.2
Understand and apply congruence, similarity, and geometric transformations using various tools.
CC.2.3.8.A.3
Understand and apply the Pythagorean Theorem to solve problems.
CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real - world or mathematical problems.

PA Content Standards

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?
   b. How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?
   c. How can geometric properties and theorems be used to describe, model, and analyze situations?
   d. How do you use the Pythagorean Theorem in real life?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?

   Pythagorean Theorem is a^2 + b^2 = c^2
   Nets can be used to help find surface area.
   Similar figures have the same shape, but a different size.

7. What vocabulary should students know and be able to recall?
   Translation, reflection, symmetry, rotation, similar figure, congruent, Pythagorean Theorem, prism, cylinder, sphere, cone, pyramid

8. What basic concepts should students know and be able to recall and apply?
   Formulas can be applied to find area, surface area, and volume of geometric figures.
   Use the Pythagorean Theorem to decide if a triangle is a right triangle.
   Area and volume can be applied to real-life examples.
   Find the distance between 2 points.
   Transform figures.
   Calculate volumes of prism, cylinder, sphere, cone and pyramid.

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?

   M06.C-G.1.1.1 Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided.
   M06.C-G.1.1.2 Determine the area of irregular or compound
   polygons. Example: Find the area of a room in the shape of an irregular polygon by composing and/or decomposing.
   M06.C-G.1.1.3 Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided.
   M06.C-G.1.1.4 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided.
   M06.C-G.1.1.5 Represent three-dimensional figures using nets made of rectangles and triangles.
   M06.C-G.1.1.6 Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.

		M07.B-E.2.3.1 Determine the reasonableness of answer(s) or interpret the solution(s) in the context of the problem. *M07.C-G.1.1.1 Solve problems involving scale drawings of geometric figures, including finding length and area.* *M07.C-G.1.1.2 Identify or describe the properties of all types of triangles based on angle and side measures.* *M07.C-G.1.1.3 Use and apply the triangle inequality theorem.* *M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures.* *M07.C-G.2.1.1 Identify and use properties of supplementary, complementary, and adjacent angles in a multistep problem to write and solve simple equations for an unknown angle in a figure.* *M07.C-G.2.1.2 Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding).* *M07.C-G.2.2.1 Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Formulas will be provided.* *M07.C-G.2.2.2 Solve real-world and mathematical problems involving area, volume, and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Formulas will be provided.* *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.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.* *M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.*

		M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them. *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.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.* *A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): ** Students will use manipulatives to find patterns and relationships of two-dimensional figures (3d, 3e, 4a, 4b).* ** Students will find the surface area by converting three-dimensional shapes into two dimensional representations (3d, 4c, 5a, 5b)* ** Students can apply area and surface of 2-dimensional figures to solve interior design problems or surface area and volume of 3-dimensional figures to solve architectural problems (4c, 4d, 5a, 5c, 5d) .* *Participate in discussion board responding to teacher created prompts.*

	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3a, 3b, 3c, 3f, 4c, 4d, 5a, 5b, 5c, 5d)*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** Incorrectly graphing or representing geometric figures in a coordinate plane. Application of the distance formula to the Pythagorean Theorem. Using Pythagorean Theorem to check for a right triangle using the hypotenuse and one leg. Differentiating between rotations, dilations, translations, and reflections. Applying different formulas to find surface area and volume. Choosing the correct units for final answers. Decomposing a compound figure into correct geometric shapes to find surface area and volume. Understanding the different types of angles and how they relate to each other. Determining if figures are similar • **How will students get the feedback they need?** Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Food Pyramid Square Circle Secret Angles Circle Cover-up worksheets, homework from textbook, Study Island, interactive textbook quizzes	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, geometric solids, geometric net figures, geoboards, rulers,	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* interactive textbook quizzes, Study Island, mini whiteboards

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **7 - System of Equations** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.2.7.B.3 Model and solve realworld and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations. CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations. CC.2.2.HS.C.3 Write functions or sequences that model relationships	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. Systems of linear equations can be used to model problems.* *b. Systems of equations can be solved by graphing, substitution, or eliminating a variable.* *c. Solutions to systems of equations can vary from no solution to infinite solutions.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* .
	Essential Questions
	What thought-provoking questions will foster inquiry, meaning-making, and transfer? 5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit: *a. How do you decide which method would be easier to solve a particular system of equations?* *b. How do you use systems of equations to solve real life problems?* *c. How can data be organized and represented to provide insight into the relationship between quantities?*

	Acquisition	
between two quantities. CC.2.2.HS.C.6 Interpret functions in terms of the situations they model. CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems. CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials. CC.2.2.HS.D.5 Use polynomial identities to solve problems. CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically • PA Content Standards	**Students will know...** 6. What facts should students know and be able to use to gain further knowledge? *Graphing lines* *LCM in order to solve using elimination* 7. What vocabulary should students know and be able to recall? *substitution, elimination, graphing* 8. What basic concepts should students know and be able to recall and apply? *Solve a system of equations using both elimination and substitution* *Students will know how to choose elimination or substitution* *Graph system of equations*	**Students will be skilled at... (be able to do)** 9. What discrete skill and processes should students be able to demonstrate? *M06.B-E.2.1.1 Use substitution to determine whether a given number in a specified set makes an equation or inequality true.* *M06.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.* *M06.B-E.2.1.3 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q, and x are all non-negative rational numbers.* *M06.B-E.2.1.4 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.* *M07.B-E.1.1.1 Apply properties of operations to add, subtract,* *factor, and expand linear expressions with rational coefficients.* *M07.B-E.2.2.1 Solve word problems leading to equations of the* *form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers.* *Example: The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* *M07.B-E.2.2.2 Solve word problems leading to inequalities of the* *form px + q > r or px + q < r, where p, q, and r are specific rational numbers, and graph the solution set of the inequality.* *M07.B-E.2.3.1 Determine the reasonableness of answer(s) or* *interpret the solution(s) in the context of the problem.* *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). *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.* *A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations).* *A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation* *A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations.* *A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation.* *A1.1.3.2.1 Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities* *A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function.*

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Choosing theme park admission: should students buy an annual pass, pay daily, extend the problem to decide about purchasing a meal plan, soft drink plan, parking plan etc. Other examples that could be used intstead of theme park: coffee (per cup, buy mug with refills, set price for unlimited coffee), cell phone plans, (4a 5b 5c)*

	Participate in discussion board responding to teacher created prompts.
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3a, 3b, 3c, 5a, 5b)*

Stage 3 – Learning Plan			
NETS for Students	**Learning Activities**		**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?		• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments,teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** If students try to subtract the equations for elimination, they lose negative signs. Some students struggle to find the LCM for elimination. For substitution, students struggle to solve for x instead of y. If solving algebraically, systems with no solution or infinitely many solutions are difficult to interpret. • **How will students get the feedback they need?** Graded assessment, teacher observation immediate feedback, peer feedback, mid-chapter quiz
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*:	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment,*	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb*

	Playing Catch up Kara's Candles Planning a Party worksheets, homework from textbook, Study Island, interactive textbook quizzes	*maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, Hands on Equations	interactive textbook quizzes, Study Island, mini whiteboards

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra** Unit: **8 - Data Analysis and Probability** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **July, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Transfer of Learning* *Career Planning and Life-Long Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.4.6.B.1 Demonstrate an understanding of statistical variability by displaying, analyzing, and summarizing distributions. CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts. CC.2.4.7.B.2 Draw informal comparative inferences about two populations.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *a. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.* *b. Data can be modeled and used to make inferences.* *c. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.* *d. Patterns exhibit relationships that can be extended, described, and generalized.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* ** Students will make sense of the data distributions by interpreting the measures of center and variability in the context of the situations they represent.* ** Students will use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences about and make comparisons between data sets.* ** Students will understand how and why data can be manipulated.*

CC.2.4.7.B.3
Investigate chance processes and develop, use, and evaluate probability models.
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.

CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.
CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.
CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model

PA Content Standards

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   a. How does the type of data influence the choice of display?
   b. How can data be organized and represented to provide insight into the relationship between quantities?
   c. How can data be manipulated to convey an intentional message?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   How to create and interpret: interquartile, Stem-&-Leaf, Box-&-Whisker, Circle Plot
   How to calculate mean, median, and mode.
   Range
   What is simple and compound probability
   What are independent and dependent events?

7. What vocabulary should students know and be able to recall?
   interquartile, Stem-&-Leaf
   Box-&-Whisker
   Circle Plot
   Mean
   Median
   Mode
   Range
   Simple Probability
   Compound Probability
   Independent Events
   Dependent Events
   Bias
   Manipulation of data

8. What basic concepts should students know and be able to recall and apply?
   Calculate simple and compound probability.
   Know and control if an event is independent or

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?
   M06.D-S.1.1.1 Display numerical data in plots on a number line, including line plots, histograms, and box-and whisker plots.
   M06.D-S.1.1.2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).
   M06.D-S.1.1.3 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered.
   M06.D-S.1.1.4 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
   M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation.
   M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
   M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability.
   M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2

	dependent and why that is important. *How to create and interpret graphs -- stem & leaf, box & whisker plots, circle graph* *Importance of knowing when to use mean, median, and/or mode as a means of central tendency.*	*indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event).* *M07.D-S.3.2.1 Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability.* *M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring.* *M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.* *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.1.2.1 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.* *A1.2.3.1.1 Calculate and/or interpret the range, quartiles, and interquartile range of data.* *A1.2.3.2.1 Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation.* *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).* *A1.2.3.3.1 Find probabilities for compound events (e.g., find probability of red and blue, find*

		probability of red or blue) and represent as a fraction, decimal, or percent.

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Students will create a question to ask the class and then display the data in appropriate manners, explaining their choice of graphs. They will also make conclusions about their data. Excel or an on-line graph maker will be used (4a, 4b, 5b).* *Participate in discussion board responding to teacher created prompts.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quizzes and tests (3a, 3b, 3c, 3d, 5a)*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Technology Operations*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Daily assessments, teacher observation of student in-class performance, teacher observation during peer share-out sessions • **What are potential rough spots and student misunderstandings?** Knowledge of the difference between Independent vs. Dependent events. Using the Box-&-Whisker plots to correctly identify the 5 number summary. Conditional Probability and how it relates to real-world events.

			Which measure of center is appropriate for different scenarios. • **How will students get the feedback they need?** Graded assessment, teacher observation, immediate feedback, peer feedback, mid-chapter quiz
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: How Long is a Minute Order Up Fast Food Frenzy worksheets, homework from textbook, Study Island, interactive textbook quizzes,	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, Hands on Equations, computers -- Excel and/or graphing software	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* interactive textbook quizzes, Study Island, mini whiteboards