Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra A** Unit: **1: Number Operations** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **August, 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? Please access the appropriate standards and copy/paste in the gray region • 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.2.1.6.E.2 Identify and choose appropriate processes to compute fluently with multi-digit 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.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. The meanings of each operation on fractions are consistent with the meanings of the operations on whole numbers. For example: It is possible to divide fractions without multiplying by the inverse or reciprocal of the second fraction.* *b. Least common multiple and greatest common factor are helpful when solving real-world problems.* *c. When dividing by a fraction, there are two ways of thinking about the operation – partition and measurement which will lead to two different thought processes for division.* *d. When we divide one number by another, we may get a quotient that is bigger than the original number, smaller than the original number or equal to the original number.* 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 fraction and decimal concepts to real life situations.*

CC.2.2.6.B.1 Apply and extend previous understandings of arithmetic to algebraic expressions.
CC.2.1.7.E.1:Apply and extend previous understandings of operations with fractions to operations with rational numbers.
CC.2.2.7.B.1
Apply properties of operations to generate equivalent expressions.

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:
   * *Why is it be useful to know the greatest common factor or least common multiple of a set of numbers?*
   * *How can the distributive property help me with computation?*
   * *Why does the process of invert and multiply work when dividing fractions?*
   * *When I divide one number by another number, do I always get a quotient smaller than my original number?*
   * *When I divide a fraction by a fraction what do the dividend, quotient and divisor represent?*
   * *What kind of models can I use to show solutions to word problems involving fractions?*
   * *Which strategies are helpful when dividing multi-digit numbers?*
   * *Which strategies are helpful when performing operations on multi-digit decimals?*

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   Basic algorithmic procedures for fractions and decimals
   Simplifying fractions.
   Find GCF and LCM.
   When dividing one number by another, I can get a quotient larger or smaller or equal to the original

7. What vocabulary should students know and be able to recall?
   Numerator, denominator, difference, dividend, divisor, factor, GCF, LCM, measurement model of division, multiple, quotient, partitive model of division, reciprocal, sum, product, prime factorization, prime, represent, representation, model, justify, mathematical evidence, reasoning, interpret
8. What basic concepts should students know and be able to recall and apply?
   How to find GCF and LCM efficiently and why that is important
   Divide fractions and decimals efficiently

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

9. What discrete skill and processes should students be able to demonstrate?
   M05.A-F.1.1.1: Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and representations.)
   M05.A-F.2.1.1: Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers)
   M05.A-F.2.1.2: Multiply a fraction (including mixed numbers) by a fraction
   M05.A-F.2.1.3: Demonstrate an understanding of multiplication as scaling (resizing).
   M05.A-F.2.1.4: Divide unit fractions by whole numbers and whole numbers by unit fractions.
   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.
   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.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.*

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 decimals and fractions (3a,3b,3c,3d,4a,4c,4e).* *Generate representations that can be used to solve word problems and check for reasonability of solutions.(3b, 3c, 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 (3a, 3d, 4e)*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational	Questions to consider while planning:	• **How will you monitor students' progress toward**

<table>
<tr>
<td rowspan="2">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">• 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>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?
Difference between GCF and LCM
x and x^2 are NOT like terms
Dividing fractions -- you multiply by the reciprocal of the SECOND fraction
Knowing when to find common denominator and when not to
Not confusing the algorithms for each operation
• 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):

Modeling fraction operations using multiple representations,
Counting and Building Rectangles--multiple representations and communicating,
Discovering Algorithms for Dividing Fractions,
Class notes,
Video lessons with textbook</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, use of Google Classroom</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 A** Unit: **2: Expressions** Grades: **6**

Teacher Team: **Deutsch, Bleiler, Cooperman** Date: **August, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? 2. What content standards will this unit address? Please access the appropriate standards and copy/paste in the gray region • 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	**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.* **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: ** What kinds of problems can I solve by using ratios?* ** How can I tell if a relationship is multiplicative?*

understandings of numbers to the system of rational numbers.
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.

- PA Content Standards

** How are unit rates helpful in solving real-world problems?*
** How are ratios and rates similar and different?*
** What are percentages and how do you use them?*
** What information do I get when I compare two numbers using a ratio and how can I use that information?*

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? *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 decimals and fractions* *solve a proporton using cross multiplying and equivalent fractions* *equivalent ratios* *rates* 7. What vocabulary should students know and be able to recall? *ratio, proportion, rate, unit rate, percent, compare, analyze, simplify, rational number* 8. What basic concepts should students know and be able to recall and apply? *identify and understand proportional relationships* *solving proportions and percent problems* *Using unit rates appropriately* *understanding the difference between a multiplicative and additive relationship* *Understanding of cross multiplying*	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.* *M06.B-E.1.1.2 Write algebraic expressions from verbal descriptions. Example: Express the description "five less than twice a number" as 2y – 5.* *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. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease.*

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.	*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)* *2. Use arguments to justify their reasoning when creating and solving proportions used in real-world contexts. (3a, 4a, 4b)* *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)* *5. Formally begin to make connections between covariance, rates, and representations showing the relationships between quantities. (3d,4a,4b)* *6.Participate in discussion board responding to teacher created prompts.(3d,4a,4b)*
	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="3">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.</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.
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, Google Classroom</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.

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

UbD Curriculum Template

Course: **PreAlgebra A** Unit: **3: Equations** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **August, 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.2.2.5.A.1: Interpret and evaluate numerical expressions using order of operations.
   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.

   PA Content Standards

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. Variables can be used as unique unknown values or as quantities that vary.
   b. Exponential notation is a way to express repeated products of the same number.
   c. Algebraic expressions may be used to represent and generalize mathematical problems and real life situations.
   d. Properties of numbers can be used to simplify and evaluate expressions.
   e. Algebraic properties can be used to create equivalent expressions.
   f. Two equivalent expressions form an equation.
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*
   ** Given a word problem, students will solve the word problem using an appropriate strategy or strategies and will share and compare the use of multiple strategies leading to the same answer.*

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:

	How do you use the properties of real numbers to simplify expressions and why is this important? *How can expressions be used to 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? *Vocabulary for solving operations: sum, difference, product, quotient* *Using exponents to solve expressions* *Substituting known numbers for variables to solve expressions* 7. What vocabulary should students know and be able to recall? *numerical expression* *algebraic expression* *associative property of addition* *associative property of multiplication* *commutative property of addition* *commutative property of multiplication* *distributive property* *identity property of addition* *identity property of multiplication* *coefficient* *constant* *term* *like terms* *exponent* *variable* *order of operations* 8. What basic concepts should students know and be able to recall and apply? *Understanding the relationship between standard form and exponential form* *The purpose of an exponent* *Recalling the properties (identity, associative, commutative) and how they are used to evaluate, simplify and expand expressions* *Understanding how to tell if two expressions are equivalent*	9. What discrete skill and processes should students be able to demonstrate? *M06.B-E.1.1.1 Write and evaluate numerical expressions involving whole-number exponents.* *M06.B-E.1.1.2 Write algebraic expressions from verbal descriptions. Example: Express the description "five less than twice a number" as 2y – 5.* *M06.B-E.1.1.3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity). Example: Describe the expression 2(8 + 7) as a product of two factors.* *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.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.*

	How to write an expression from a verbal description	

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): *Translate between verbal and symbolic algebraic expressions through real-world examples. (3a, 3c, 3e, 3f, 4a, 4b, 4c, 4d, 4e, 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, 3e, 3f, 4a, 4b, 4c, 4f, 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?** Using proper terminology to write expressions when given verbal descriptions Using proper substitution to solve expressions • **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)*: Expression Bingo Algebra Magic Tricks Jake's Diner 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, Google Classroom	**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, Kahoot, Socrative

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra A** Unit: **4: Ratio and Proportions** Grades: **6**

Teacher Team: **Deutsch, Bleiler, Cooperman** Date: **August, 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.6.D.1 Understand ratio concepts and use ratio reasoning to solve problems. 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 equations.	**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.* *e. Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules.* *f. Relate and compare different forms of representation for a relationship.* *g. Use values from specified sets to make an equation or inequality true.* *h. Understand conceptually the different uses of variables.* *i. Graphs can be used to represent all of the possible solutions to a given situation.* *j. Many problems encountered in everyday life can be solved using proportions, equations or inequalities.* 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 that can be solved and understood by writing an equation or inequality*

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
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

- PA Content Standards

** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.*

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 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...

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

7. What vocabulary should students know and be able to recall?
   Distributive Property, term, like terms, integer, substitution, inequality, equation, reasonable, inverse operations, variable, solution, addition property of equality, multiplicative property of equality, constant of proportionality, dependent variable, independent variable, direct variation, equation, proportion

8. What basic concepts should students know and be able to recall and apply?
   Understand how to solve one-step equations
   Understand why it's important to recognize like terms and distribute first
   Understand that If there are variables on both sides, you must move one of the variables to the other side and why/how that works
   Understanding why they must "do same thing" to both sides of an equation

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.
   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.

   M07.B-E.1.1.1 Apply properties of operations to

	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.	*add, subtract,* *factor, and expand linear expressions with rational coefficients.* *M07.B-E.2.1.1: Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.* *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 rare 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.3.1.2 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).* *A1.1.2.1.2: Use and/or identify an algebraic property to justify any step in an equation solving process (linear equations only).* *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*	*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 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. *Creative and Innovation* *Communication and Collaboration* *Critical Thinking*	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)*: Hands On Equations Foldable Activity Create Your Own Equation Inequality Exchange 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, Google Classroom	**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 A** Unit: **5: Geometry** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **August, 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.2.3.5.A.1: Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems. CC.2.3.6.A.1: Apply appropriate tools to solve real-world and mathematical problems involving area, surface area and volume. • PA Content Standards	**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. The area of regular and irregular polygons can be found by decomposing the polygon into rectangles and triangles.* *b. Manipulatives and the construction of nets may be used in computing the surface area of rectangular and triangular prisms, and volume of right rectangular prism.* *c. Formulas may be used to compute the areas of polygons and volumes of right rectangular prisms.* *d. Appropriate units of measure should be used when computing the area (square units) of polygons, and surface area (square units) and volume of prisms (cubic units).* *e. Views of rectangular and triangular prisms may be interpreted and sketched to provide a 2-dimensional representation (nets) of a three dimensional figure.* *f. Dimensions of solid figures may have fractional lengths.* *g. The volume of a solid figure is the number of same sized cubes filling the space so that there are no gaps and overlaps.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? *a. Students will make sense of and persevere in solving complex and novel mathematical problems.* *b. Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* *c. Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* *d. 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.* *e. Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies* *f. Given a word problem, students will solve the word problem using an appropriate strategy or strategies and will share and compare the use of multiple strategies leading to the same answer.*

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: *How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?* *How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?* *How can geometric properties and theorems be used to describe, model, and analyze situations?*	
Acquisition	
Students will know... 6. What facts should students know and be able to use to gain further knowledge? *Surface area describes the sum of all the sides of a 3-dimensional figure* *Volume describes the capacity of a 3-dimensional figure holds* *Nets can be used to help find surface area the sum of all the sides* *Finding the area of an irregular figure can be as simple as finding the area of two regular figures and finding the sum* *Triangles can be classified by their sides* 7. What vocabulary should students know and be able to recall? *3-dimensional* *area* *base of a prism* *composing a figure* *decomposing a figure* *cubic units* *dimension* *edge* *equilateral triangle* *isosceles triangle* *scalene triangle* *faces* *net* *parallelogram*	**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.*

polygon *polyhedron* *prism* *quadrilateral* *rectangle* *rectangular prism* *rhombus* *right triangle* *scalene triangle* *square* *surface area* *trapezoid* *triangular prism* *triangle* *vertices* *volume* 8. What basic concepts should students know and be able to recall and apply? *Finding the area of geometric figures* *How to rearrange irregular polygons in order to find their area* *Using one figure to determine the area of another* *Using manipulatives and nets to help compute the surface areas of rectangular and triangular prisms* *Using modeling to find surface area and volume of rectangular and triangular prisms*	

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): *Use square dot or graph paper to draw polygons of various perimeters and areas. (3a, 3b, 3c, 3d, 3e, 3f, 4a, 4b, 4d, 5a)* *Predict the area of irregular polygons and then calculate the area by composing and decomposing rectangles. (3a, 3c, 3d,*

Technology Operations	*3e, 3f, 4a, 4b, 4c, 4d, 5a, 5b)* *Solve a problem by finding the area of squares, rectangles, parallelograms, and triangles using formulas. (3a, 3c, 3d, 3f, 4a, 4b, 4e, 5a, 5b, 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, 3c, 3d, 3g, 4c, 4d, 4e, 4f, 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?** Incorrectly graphing or representing geometric figures in a coordinate plane Applying different formulas to find area, surface area and volume Choosing the correct units for final answers • **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*

	Create a Handbook Playground Design Surface Area/Volume Project worksheets, homework from textbook, Study Island, interactive textbook quizzes,	*maps, translator, calculators)* Textbook, laptops, whiteboards, document cameras, calculators, hands on equations, computers -- Excel and/or graphing software, Google Classroom	interactive textbook quizzes, Study Island, mini whiteboards, Kahoot, Socrative

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra A** Unit: **6: Statistics** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **August, 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.2.4.6.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.

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. 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 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.*

Essential Questions

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

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.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

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

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? *How to create and interpret graphs -- stem & leaf, box & whisker plots, circle graph.* *How to find measures of center and measures of variation* 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* 8. What basic concepts should students know and be able to recall and apply? *How to create and interpret graphs -- stem & leaf, box & whisker plots, circle graph.* *How to manipulate a graph*	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.*

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).*
	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. What 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)*: Mean, Median, Mode Cards Survey Project Sports Numbers 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

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgA** Unit: **7: Introduction to Integers** Grades: **6**

Teacher Team: **Deutsch, Bleiler, Cooperman** Date: **August, 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
   Adaptation and flexibility

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.2.2.6.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
   - PA Content Standards

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. Negative numbers are used to represent quantities that are less than zero such as temperatures, elevation, scores in games or sports, and loss of income in business.
   b. Absolute value is useful in ordering and graphing positive and negative numbers.
   c. Positive and negative numbers are often used to solve problems in everyday life.
   d. Rational numbers are points on a number line.
   e. Numbers in ordered pairs indicate locations in quadrants of the coordinate plane.
4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   a. Students will make sense of and persevere in solving complex and novel mathematical problems.
   b. Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.
   c. Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.
   d. 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.
   e. Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies
   f. Given a word problem, students will solve the word problem using an appropriate strategy or strategies and will share and compare the use of multiple strategies leading to the same answer.

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 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?*	
	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? *math facts (+, -, x, and /)* *how to compare numbers* *When are negative numbers used and why are they important?* *Why is it useful for me to know the absolute value of a number?* *When is graphing on the coordinate plane helpful?* *Where do I place positive and negative rational numbers on the number line?* *What are opposites, and how are opposites shown on a number line?* *How can I use absolute value to find the lengths of the sides of polygons on the coordinate plane?* 7. What vocabulary should students know and be able to recall? *compare, absolute value, distance, inequality, integer, magnitude, negative number, opposites, positive number, sign* 8. What basic concepts should students know and be able to recall and apply? ** How do I use positive and negative numbers in everyday life?* ** How do I use positive and negative numbers to represent quantities in real-world contexts?* ** How do statements of inequality help me place numbers on a number line?* ** How can I use coordinates to find the distances between points and why is that important?* ** How can I use number lines to find the distances between points and why is that important?*	9. What discrete skill and processes should students be able to demonstrate? *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.* *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.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..*

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): *Real life practice activities -- Coordinate plane graphing, golf scores, temperature changes using thermometers, graphing on number lines, chart rushing yardage with running backs, track stocks' gains and losses-3a, 3c, 4a, 4f, 5a* *Discussion board 4b, 4c, 4d, 4e, 4f, 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: *Tests and Quizzes--3a, 3b, 3c, 3e, 4c, 4d, 4e, 4f, 5a, 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.	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 to subtract when adding a positive and negative, multiplying 2 negatives gives a positive but adding 2 negative gives a negative • **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)*: Hands On Equations Integers Game Interger Bingo Class notes, video lessons with textbooks, Modeling integer operations and fraction operations-using multiple representations, Hot Air Balloon activity-real world application	**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, Google Classroom	**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, Padlet, Socrative, Kahoot

Southern Lehigh School District

UbD Curriculum Template

Course: **PreAlgebra A** Unit: **8: Linear Functions** Grades: **6**

Teacher Team: **Deutsch, Strobl, Mays, Hines** Date: **August, 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.2.2.6.B.3 Represent and analyze quantitative relationships between depe ndent 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.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable

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. Students will be able to graph lines using a line in slope intercept form or a table and what kind of information that will yield
   b. Students will be able to calculate slope and understand slope as a rate of change
   c. Students will recognize independent and dependent variables and how they applies to real life

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*
   ** Given a word problem, students will solve the word problem using an appropriate strategy or strategies and will share and compare the use of multiple strategies leading to the same answer.*

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?

• PA Content Standards	**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? *Calculate slope from a graph* *Calculate slope using change in y over change in x* *How to create an x/y chart given an equation of a line in slope intercept form* *Create a scatter plot* 7. What vocabulary should students know and be able to recall? *graphing* *slope* *rate of change* *constant* *dependent events* *independent events* 8. What basic concepts should students know and be able to recall and apply? *graph proportional relationships* *interpret unit rate as the slope* *compare two different proportional relationships represented in different ways* *derive the equation y = mx for a line through the origin* *interpret equations in y = mx + b form as linear functions.* *determining unit rate* *applying and graphing proportional relationships* *recognizing a function in various forms* *plotting points on a coordinate plane* *understanding of writing rules for sequences and number patterns* *identify attributes of similar figures*	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.* *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.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.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.*

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): *Scatter plot of real-life data and their interpretation (3a, 4a, 4b, 4c, 4d, 4e, 4f, 5a, 5b, 5c)* *Create x/y chart and graph line (3a, 3b, 3c, 4a, 4b, 4c, 4d, 4e, 4f, 5a, 5b, 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, 4a, 4c, 4d, 4e, 4f, 5a, 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?** Students have difficulty with rise and run when one is negative Students have difficulty finding change of x or y when one value is negative Students have difficulty multiplying by a fractional slope

			• **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)*: Tile Around the Fountain T Shirt Sales Graphing Activities Plant Growth Activities 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, Google Classroom	**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, Kahoot, Socrative