Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **1- Place Value Transfer** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards
   - Math PA Core State Standards
     CC.2.1.5.B.1 Apply place-value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.
   - 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):
   Mathematical relationships among numbers can be represented, compared, and communicated in more than one way.
   A decimal, which represents a part of a whole, is the foundation for coins in our monetary system.
   One representation may sometimes be more helpful than another; and used together, multiple representations give a fuller understanding of a problem.

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:
   How is mathematics used to quantify, compare, represent, and model numbers?
   How can mathematics support effective communication?

	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? *The decimal part of a number represents an amount less than a whole.* *The base-ten place-value system extends infinitely in two directions.* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3: Base ten numerals, expanded form, standard form, word form, digit, value, tenth, hundredth, thousandths, equivalent decimals, rounding* 8. What basic concepts should students know and be able to recall and apply? *The base ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value.* *Understanding the base 10 system includes reading, writing, and understanding decimals to the thousandths place using base 10 numerals, word and expanded forms.* *Like whole numbers, the location of a digit in decimal numbers determines the value of the digit. Ex. a digit in one place represents one-tenth of what it represents in the place to the left.* *Place value can be used to compare and order whole numbers and decimals.* *Compare two decimals to thousandths based on meanings of the digits in each place, using symbols <, >, and =.* *Round decimals to ones, tenths, hundredths, and thousandths.* *Rounding decimals must be "sensible" for the context of the problem.* *Some problems can be solved by identifying*	9. What discrete skill and processes should students be able to demonstrate? **M05.A-T.1.1.1, Demonstrate an understanding that in a multi-digit number a digit in one place represents 1/10 of what it represents to its left* *Example: Recognize that in the number 770, the 7 in the tens place is 1/10 the 7 in the hundreds place.* ** M05.A-T.1.1.2, Look for and Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.* *Example 1: 4 × 10^2 = 400 Example 2: 0.05 ÷ 10^3 = 0.00005* ** M05.A-T.1.1.3, Read and write decimals to thousandths using base 10 numerals, word form, and expanded form* *Example: 347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (0.1) + 9 × (0.01) + 2 × (0.001)* ** M05.A-T.1.1.4, Compare and order decimals to thousandths based on meanings of digits in each place, using symbols (>,=,<)* ** M05.A-T.1.1.5, Round decimals to ones, tenths, hundredths, or thousandths place* **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.*

	elements that repeat in a predictable way. Mathematical concepts can be communicated and evaluated through technology.	

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. *Communication and Collaboration* *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): *Daily warm-up activities - write the day in standard, word form, fraction, and decimal* *Discussion boards - share responses and discuss strategies using technology* *Base ten blocks - model, name, and compare decimals* *Decimal Squares - compare amounts* *Place value charts - scaffold naming base ten numerals and rounding* *Grid/graph paper - illustrate, round, and compare base ten numerals* *Pearson's Center Activities - complete differentiated activities according to their needs.* *Tuesday Dozens - review over the course of the year*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 1 Place Value*

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	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?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Classwork, homework, and quizzes • **What are potential rough spots and student**

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

Communication and Collaboration
Critical Thinking</td>
<td colspan="2">• Is there tight alignment with Stages 1 and 2?
• Is the plan likely to be engaging and effective for all students?</td>
<td>misunderstandings?
*Decimal place value thinking can mistakenly assume that digits to the right of the decimal point increase in value.
* Unlike whole numbers, decimals with a greater number of digits are not necessiarily larger

• How will students get the feedback they need?
Peer discussions, homework review, Pearson computer generated Lesson Quizzes; comments on quizzes, and comments on tests</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):

Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, class practice, on-line activities , Pearson center activities as extension materials to enrich students;</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)
Decimal squares, base ten blocks, place value charts, graph paper, laptops, websites, doc cam.</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

Aimsweb, websites, and pretests</td>
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Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **2- Add / Subtract Decimals** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards
   - Math PA Core State Standards
     CC.2.1.5.B.2 Extend an understanding of operations with whole numbers to perform operations including decimals
   - 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):
   Numerical quantities can be estimated and calculated using appropriate strategies and tools.
   There is more than one way to represent computation.
   Computational fluency includes understanding the meaning and appropriate use of numerical operations.
   Addition and subtraction with decimals are based on fundamental concepts of adding and subtracting the numbers in like place values.
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:
   What does it mean to estimate or analyze numerical quantities?
   When is it appropriate to estimate versus calculate?
   Why is place value important when adding and subtracting numbers?
   What makes a tool or strategy appropriate for a given task?
   How can mathematics support effective communication?

	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? *The decimal part of a number represents an amount less than a whole.* *Students will be able to compute addition and subtraction of multi-digit whole numbers with regrouping accurately.* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3: Commutative property, Associative property, compatible numbers, rounding, sum, difference, estimate* 8. What basic concepts should students know and be able to recall and apply? *Place value can be used to determine how to round a number.* *Rounding decimals to ones, tenths, hundredths, and thousandths.* *Understanding place value impacts estimation.* *There is more than one way to show addition and subtraction.* *Add and subtract decimals through the hundredths.* *Understanding why aligning decimal places (decimal points) is necessary when adding and subtracting using standard algorithms.* *Use of Commutative and Associative Properties facilitates the addition and subtraction of smaller decimals using mental math.* *Understand how to estimate the addition and subtraction of decimals.* *Some problems can be solved by identifying elements that repeat in predictable way.*	9. What discrete skill and processes should students be able to demonstrate? ** M05.A-T.1.1.5 Round decimals to ones, tenths, hundredths, or thousandths place* ** M.05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths* **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.*

	Mathematical concepts can be communicated and evaluated through technology.	

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. *Communication and Collaboration* *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): *Place value charts - to identify place values for rounding to aid in estimation and to facilitate lining up place values while adding and subtracting.* *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Base ten blocks - model the addition and subtraction of decimals* *Decimal Squares - illustrate the addition and subtraction of two amounts* *Grid-graph paper - to model adding and subtaction of decimals, also facilitate lining up place values* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Sum Dog and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 2 Adding and Subtracting Decimals*

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	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Classwork, homework, and quizzes

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

Communication and Collaboration
Critical Thinking</td>
<td colspan="2">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>• What are potential rough spots and student misunderstandings?
*Students may compute the sum or difference of decimals by lining up the right-hand digits as they would whole number.
* Students may confuse decimal place values which may affect the ability to estimate.
• How will students get the feedback they need?
Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests</td>
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<tr>
<td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, drawing models, class practice, on-line activities, Pearson center activities as extension materials to enrich students;</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)
Graph paper, decimal squares, base ten blocks, place value charts, laptops, websites, doc cam.</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

Aimsweb, websites, and pretests</td>
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Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **3- Multiply and Divide whole numbers, and Multiply Decimals** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July, 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards
   - Math PA Core State Standards
     CC.2.1.5.B.2 Extend an understanding of operations with whole numbers to perform operations including decimals
   - 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):
   Numerical quantities can be estimated and calculated using appropriate strategies and tools.
   There is more than one way to represent computation.
   Computational fluency includes understanding the meaning and appropriate use of numerical operations.
   The magnitude of numbers affects the outcome of operations on them.
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:
   What does it mean to estimate or analyze numerical quantities?
   When is it appropriate to estimate versus calculate?
   What makes a tool or strategy appropriate for a given task?
   How can patterns with multiples of ten be used to find products and quotients?

	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? *Know how to draw pictures that relate to given equations.* *Estimate and multiply whole numbers (four digits by one digit).* *Estimate and divide whole numbers.(four digits by one digit).* *There is more than one way to estimate or solve a product or quotient.* *Rules of multiplication known as properties (Commutative, Associative, Zero, Identity, and Distributive)* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3: Commutative property of multiplication, Associative property of multiplication, Identity property of multiplication, Distributive property of multiplication, Zero property of multiplication, factors, products, multiple, array, overestimate, underestimate, base, exponent, exponential notation, power, squared, cubed, dividend, divisor, quotient, estimate* 8. What basic concepts should students know and be able to recall and apply? *The properties of multiplication can be used to simplify computation.* *Multiplication and division have an inverse relationship.* *Basic facts and place-value patterns can be used to find products when a factor is a multiple of ten.* *Basic facts and place value patterns can be used to divide multiples of ten.*	9. What discrete skill and processes should students be able to demonstrate? **M05.A-T.1.1.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.* *Example 1: 4 × 10^2 = 400 Example 2: 0.05 ÷ 10^3 = 0.00005* **M05.A-T.1.1.5 Round decimals to ones, tenths, hundredths, or thousandths place* **M.05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed 3-digit by 3-digit)* ** M.05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors* **M.05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths* **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.*

	Division can be modeled and represented as sharing into equal groups with and without remainders. *Make sense of remainders in word problems and respond according to the context of the problem.* *Some numbers can be represented using a base number and an exponent.* *When decimals are multiplied, the size or the factors relate to the size of the product.* *Estimate the multiplication and division of whole numbers.* *While estimating and multiplying decimals, recognize that the product may be less than one or both of the factors.* *Apply properties of multiplication to simplify computation and verify mental math.* *Represent quantities using a base number and exponent.* *Conceptualize and explain why multiplying a decimal by a multiple of 10 causes the decimal point to move one or more places to the right.* *Conceptualize and explain why dividing a decimal by a multiple of 10 causes the decimal point to move one or more places to the left.* *Some problems can be solved by identifying elements that repeat in predictable way.* *Mathematical concepts can be communicated and evaluated through technology.*	

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	*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)*

and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Communication and Collaboration* *Critical Thinking*	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): *Place value chart - to illustrate the multiplication and division by a power of ten* *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Place value blocks or draw pictures to help solve multiplication problems* *Hundred charts to look for patterns to solve multiplication and division problems* *Play money - model division and multiplication* *Graph paper - model and solve multiplication and division* *Illustrate bar diagrams to meaningfully represent mathematical word problems* *Calculators to check products and quotients* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Sum Dog and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 3 Multiplying Whole Numbers, CA 4 Dividing by 1-Digit Divisors, CA 5 Dividing by 2-Digit Divisors, CA 6 Multiplying Decimals*

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. *Communication and Collaboration* *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?** Classwork, homework, and quizzes • **What are potential rough spots and student misunderstandings?** *Weak fact fluency skills and confusion with the meaning for each operation in the context of word problems will impede mastery of new concepts *Students may believe that multiplication always results in a larger number. Additionally, students may believe that division always results in a smaller number.

			*Exponents determine the number of times the base is multiplied, as opposed to multiplying the base and the value of the exponent. * Students may confuse right and left when moving the decimal point in multiplication and division. • **How will students get the feedback they need?** Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, class practice, on-line activities, Pearson center activities as extension materials to enrich students;	**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)* Graph paper, place value charts, hundred chards, play money, calculators, laptops, websites, doc cam.	**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* Aimsweb, websites, and pretests

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **4- Operations and Algebraic Thinking** Grades: **5**

Teacher Team: **Karen Ryan** 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? *Problem-solving* *Transfer of Learning* *Effective Communication Skills* 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.2.2.5.A.4 Analyze patterns and relationships using two rules. • 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): *Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.* *The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.* 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: *How are relationships represented mathematically?* *How can expressions, equations, and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?* *How can patterns be used as tools to describe and help explain real-life 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? *How to draw pictures that relate to given expressions or equations.* *Order of Operations* *Repeating patterns may be used in predictable ways to identify relationships.* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3: Variable, algebraic expression, order of operations, parentheses, brackets, braces, sequence, corresponding terms,* 8. What basic concepts should students know and be able to recall and apply? *A variable is a quantity that can change and is often represented with a letter.* *It is important to follow an order of operations when simplifying and evaluating expressions.* *Understand multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions containing these symbols.* *An expression can be written that demonstrates a situation or context.* *Write simple expressions that model calculations with numbers and variables.* *Interpret numerical expressions without evaluating them.* *Generate two numerical patterns using two given rules.* *An equation is comprised of two equal expressions.* *A pattern can sometimes be determined by studying a table.* *Rules and expressions can be written from tables*	9. What discrete skill and processes should students be able to demonstrate? **M05.B-O.1.1.1 Use multiple grouping symbols in numerical expressions and evaluate expressions containing these symbols.* **M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them.* *Example 1: Express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7).* *Example 2: Recognize that 3 × (18,932 + 921) is three times as large as 18,932 + 921 without having to calculate the indicated sum or product.* **M05.B-O.2.1.1 - Generate two numerical patterns using two given rules.* *Example: Given the rule "add 3" and the starting number 0 and given the rule "add 6" and the starting number 0, generate terms in the resulting sequences.* ** M05.B-O.2.1.2 Identify apparent relationships between corresponding terms of patterns with the same starting number that follow different rules.* *Example: Given two patterns in which the first pattern follows the rule "add 8" and the second pattern follows the rule "add 2," observe that the terms in the first pattern are 4 times the size of the terms in the second pattern.* **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.*

	that have mathematical relationships that repeat in predictable ways. *Some problems can be solved by identifying elements that repeat in predictable way.* *Mathematical concepts can be communicated and evaluated through technology.*	

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. *Communication and Collaboration* *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): *Tables - identify the relationship in patterns* *Base ten blocks and colored tiles - model and solve patterns* *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Graph paper - record computation in an organized manner* *Illustrate bar diagrams to meaningfully represent mathematical word problems* *Calculators to check mathematical calculations* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Sum Dog and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 8*

<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.

Communication and Collaboration
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?
Classwork, homework, and quizzes
What are potential rough spots and student misunderstandings?
*Weak fact fluency skills and confusion with the meaning for each operation in the context of word problems will impede mastery of new concepts.
* Students may evaluate expressions from left to right, ignoring the order of operation rules.
*Students may identify the pattern in one row of the table without recognizing the relationship between the two rows.
How will students get the feedback they need?
Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, class practice, on-line activities, Pearson center activities as extension materials to enrich students;</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)
Tables, place value blocks, calculators, laptops, websites, doc cam.</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

Aimsweb, websites, and pretests</td></tr>
</table>

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **5- Fraction Operations** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards

   - Math PA Core State Standards
     CC.2.1.5.C.1 Use the understanding of equivalency to add and subtract fractions.
     CC.2.1.5.C.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
     CC.2.4.5.A.4 Solve problems involving computation of fractions using information provided in a line plot.

   - 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):
   Numerical quantities can be estimated and calculated using appropriate strategies and tools.
   There is more than one way to represent computation.
   Computational fluency includes understanding the meaning and appropriate use of numerical operations.
   A fraction is another representation for division.
   Fractions are relations – the size or amount of the whole matters.
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:
   What does it mean to estimate or analyze numerical quantities?
   When is it appropriate to estimate versus calculate?
   How can a model help us make sense of a problem?
   What makes a tool or strategy appropriate for a given task?
   How can mathematics support effective communication?

	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? *The fractional part of a number represents an amount less than a whole.* *Fluency and accuracy with multiplication facts aids in multiplying and dividing fractions.* *Multiplication and division are inverse relationships.* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3:Equivalent fractions, simplest form, benchmark fraction, common multiple, least common multiple, common denominator, proper fractions, improper fraction, mixed numbers, area of a rectangle, scaling, resizing, factor, product, dividend, divisor, quotient, inverse operation, reciprocal* 8. What basic concepts should students know and be able to recall and apply? *Mixed numbers represent a whole number and a fractional part.* *Identify and write equivalent fractions that represent the same value.* *Finding equivalent fractions are helpful in solving addition and subtraction.* *Models can help to make sense of fraction operations.* *Conceptualize the pattern with unit fractions, the greater the denominator, the smaller the piece.* *There is more than one way to show addition and subtraction of fractions and mixed numbers.* *Identify fractions in simplest form and find the simplest form of a fraction.* *Estimate sum or difference of fractions.* *Students will conceptualize the reason for finding*	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.)* *Example: 2/3 + 5/4 = 8/12 + 15/12 = 23/12* ** M 05.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).* *Example 1: Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.* *Example 2: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in* ** M05.A-F.2.1.4 Divide unit fractions by whole numbers and whole numbers by unit fractions.* **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.*

	common multiples and LCM. *Determine common multiples and LCM to find common denominators of two or more fractions.* *Add and subtract fractions and mixed numbers with unlike denominators.* *Understand and recognize that fractions may represent division with a quotient of less than one.* *Use fractions to represent division and model on a number line.* *Estimate multiplication of a fraction.* *Multiply fractions and mixed numbers.* *Calculate area of a rectangle with lengths in fractional units.* *Divide whole numbers by fractions.* *Divide unit fractions by whole numbers.* *Comparing factor size to one helps to predict what will happen to the product.* *Multiplying two fractions will result in a product smaller than either factor.* *Compare the size of the product to the size of one factor without multiplying as they begin to consider multiplication as scaling.* *Dividing a whole number by a fraction will result in a quotient greater than the dividend.* *Dividing a fraction by a whole number will result in a quotient smaller than the dividend.* *Some problems can be solved by identifying elements that repeat in predictable way.* *Mathematical concepts can be communicated and evaluated through technology.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational	*Examples include but are not limited to:*

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. *Communication and Collaboration* *Critical Thinking*	*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): *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Decimal Squares - to name fractions and match equivalent fractions with denominators of 10, 100 or 1000* *Fraction strips - to find equivalent fractions and model addition/subtraction of fractions* *Plastic fraction bars - to manipulate equivalent fractions and facilitate the addition/subtraction of fractions* *Line plots - for the addition of fractions and mixed numbers* *Number lines - to facilitate estimation and model addition/subtraction of fractions as well as multiplication/division* *Objects like crayon boxes and pencil boxes to illustrate common multiples* *Grid-graph paper - to model all fraction operations* *Students write word problems - to illustrate an understanding of all the numbers and answer* *Play coins - to demonstrate a fraction divided by a whole number* *Circle graphs - to demonstrate dividing a whole number by a fraction* *Calculators - to check the reasonableness of an answer* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Fraction Nation, Sum Dog, and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 9 Adding and Subtracting Fractions, CA10 Adding and Subtracting Mixed Numbers, CA 11 Multiplying and Dividing Fractions and Mixed Numbers*

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?** Classwork, homework, and quizzes • **What are potential rough spots and student misunderstandings?** * Students may mix models (circles for one part and rectangles for another) or distort sizing.

<table>
<tr><td rowspan="2">Communication and Collaboration
Critical Thinking
Technology Operations</td><td colspan="2"></td><td>* Students may add or subtract denominators instead of finding common denominators.
*Students may believe that multiplication always results in a larger number.
*Students may believe that division always results in a smaller number.

• How will students get the feedback they need?
Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, drawing models, class practice, on-line activities, Pearson center activities as extension materials to enrich students;</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)
Graph paper, decimal squares, fraction strips, fraction bars, line plots, number lines, circle graphs, play coins, calculators, items in boxes, laptops, websites, doc cam.</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

Aimsweb, websites, and pretests</td></tr>
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Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **6- Geometry** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

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.2.3.5.A.2 Classify two-dimensional figures into categories based on an understanding of their properties.
     CC.2.4.5.A.5 Apply concepts of volume to solve problems and relate volume to multiplication and to addition.

   - 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):
   Numerical quantities can be estimated and calculated using appropriate strategies and tools.
   Two- and three-dimensional objects with or without curved surfaces can be described, classified, and analyzed by their attributes.
   An object's location in space can be described quantitatively.
   Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.
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:
   How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations?
   How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?

	How can geometric properties be used to describe, model, and analyze situations? *How can a model help us make sense of a problem?* *What makes a tool or strategy appropriate for a given task?* *How can mathematics support effective communication?*	
	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? *Area and perimeter formulas for rectangles.* *Draw: points, lines, line segments, rays and angles (acute, obtuse, and right).* *Classification of two-dimensional figures based on the presence or absence of parallels or perpendicular lines and classification of angles.* 7. What vocabulary should students know and be able to recall? *Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order* *Tier 3:Three-dimensional shapes, faces, edges, vertices, cube, prism, cylinder, cone, pyramid, views, volume, cubic unit, base area, polygon, regular polygon, equilateral triangle, isosceles triangle, scalene triangle, right triangle, acute triangle, obtuse triangle, parallelogram, trapezoid, rectangle, rhombus, square, generalization, coordinate grid, x-axis, y-axis, origin, ordered pair, x-coordinate, y-coordinate* 8. What basic concepts should students know and be able to recall and apply? *Three-dimensional (3-D) figures are described by their faces (surfaces), edges, and vertices (singular is "vertex").* *Identify 3-D shapes based on their properties.* *Volume can be expressed in both customary and metric units.* *Volume is represented in cubic units – cubic inches, cubic centimeters, cubic feet, etc.* *Volume refers to the space taken up by an object.*	9. What discrete skill and processes should students be able to demonstrate? ** M05.C-G.1.1.1 Identify parts of the coordinate plane (x-axis, y-axis,* *and the origin) and the ordered pair (x-coordinate and y-coordinate). Limit the coordinate plane to quadrant I.* ** M05.C-G.1.1.2 Represent real-world and mathematical problems* *by plotting points in quadrant I of the coordinate plane, and interpret coordinate values of points in the context of the situation.* ** M05.C-G.2.1.1 Classify two-dimensional figures in a hierarchy based on properties.* *Example 1: All polygons have at least 3 sides, and pentagons are polygons, so all pentagons have at least 3 sides.* *Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram, as a quadrilateral, and as a polygon.* **M05.D-M.3.1.1 Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. Formulas will be provided.* *M05.D-M.3.1.2 Find volumes of solid figures composed of two non-overlapping right rectangular prisms.*

	Model and apply formulas to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems. *Determine volume of solid figures comprised of two non-overlapping right rectangular prisms.* *Two-dimensional figures can be classified by the hierarchy of their properties, identified, and described precisely.* *Two-dimensional figures can fit into more than one category.* *On the coordinate plane, a point represents the two facets of information associated with an ordered pair.* *Graphical representations can be used to make predictions and interpretations about real world situations.* *Given two rules, students can generate two numerical patterns.* *Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules.* *Identify parts of the coordinate plane and ordered pairs, in quadrant 1.* *Represent real-world and mathematical problems by plotting points in quadrant 1 of a coordinate plane and interpret coordinate values of points in the context of a situation.* *Some problems can be solved by identifying elements that repeat in predictable ways.* *Mathematical concepts can be communicated and evaluated through technology.*	

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. *Communication and Collaboration* *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): *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Venn diagram - compare and contrast attributes of two-dimensional figures* *Two-dimensional shapes - to identify the properties and sort for classifications* *Cubes - to model three-dimensional figures and volume* *Three-dimensional objects - to identify the properties of solid figures* *Grid-graph paper - to model two-dimensional figures* *Calculators - to check the reasonableness of an answer* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Sum Dog, and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 12 Volume of Solids, CA 15 Classifying Plane Figures, CA 16 Coordinate Geometry*

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. *Communication and Collaboration* *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?** Classwork, homework, and quizzes • **What are potential rough spots and student misunderstandings?** *Students may think than when describing geometric shapes and placing them in subcategories, the last category is the only classification that can be used. * Students provide incomplete support when comparing and contrasting geometric figures.

			*Students reverse the points when plotting them on the coordinate grid, by counting up first on the Y first and then over on the X axis. * Students miss dimensions when calculating the volume of two non-overlapping rectangular prisms. • **How will students get the feedback they need?** Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, drawing models, class practice, on-line activities, Pearson center activities as extension materials to enrich students;	**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)* Formula page, graph paper, two-dimensional shapes, three-dimensional shapes, cubes, venn diagram, calculators, laptops, websites, doc cam.	**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* Aimsweb, websites, and pretests

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **7 - Measurement and Data** Grades: **5**

Teacher Team: **Karen Ryan** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards

   - Math PA Core State Standards
     CC.2.4.5.A.1 Solve problems using conversions within a given measurement system.
     CC.2.4.5.A.2 Represent and interpret data using appropriate scale.
     CC.2.4.5.A.4 Solve problems involving computation of fractions using information provided in a line plot.

   - 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):
   Numerical quantities can be estimated and calculated using appropriate strategies and tools.
   Everyday objects have a variety of attributes, each of which can be measured in many ways using unit amounts.
   What we measure affects how we measure it.
   Measurements can be used to compare, and make sense of situations.
   Data can be collected, modeled, and displayed in more than one way.
   Displays of data can be used to make inferences.
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:
   What does it mean to estimate or analyze numerical quantities?
   How accurate or precise does a measurement need to be?
   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?
How can data analysis be used to make predictions?
How can a model help us make sense of a problem?
What makes a tool or strategy appropriate for a given task?
How can mathematics support effective communication?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   Formula sheets are provided, and students will know that they should multiply to convert a large unit to a smaller unit.
   Formula sheets are provided, and students will know that they should divide to convert a small unit to a larger unit.
   Know the relative size of measurement units within a system.
   Information can be translated from one type of display to another (table, chart, bar graph, or pictograph).
7. What vocabulary should students know and be able to recall?
   Tier 2: Represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain, compare, order
   Tier 3: Customary units of length, mile, yard, feet, inches, customary capacity, gallon, quarts, pints, cups, fluid ounces, customary weight, ton, pounds, ounces, metric units, kilometer, meter, centimeter, millimeter, liter, milliliter, kilogram, milligram, line plot, survey, data, sample, frequency table, tallies, tables, charts, pictographs, bar graphs, and line graphs, title, appropriate scale, labels
8. What basic concepts should students know and be able to recall and apply?
   When changing from smaller units to larger related units within the same measurement system, there will be fewer larger units.

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

9. What discrete skill and processes should students be able to demonstrate?
   M05.D-M.1.1.1 Convert among different-sized measurement units within a given measurement system. A table of equivalencies will be provided. Example: Convert 5 cm to meters.
   M05.D-M.2.1.1 Solve problems involving computation of fractions by using information presented in line plots.
   M05.D-M.2.1.2 Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.

	A line plot can provide a sense of the shape of the data, including how spread out or how clustered the data points are. *Each data point is displayed on the line plot along a continuous numeric scale, similar to a number line.* *The powers of ten are the foundation for the metric system.* *The customary measurement system is comprised of many different units, each with a unique base.* *Convert one unit of customary length, capacity, or weight to another.* *Convert one unit of metric length, capacity, or weight to another.* *Add and subtract units within a system of measurement.* *Transfer understanding of base 10 to the metric system.* *Collect data, create line plots and interpret data points.* *Generate, analyze and interpret data from tallies, tables, charts, pictographs, bar graphs, and line graphs.* *Display data using a title, appropriate scale, and labels.* *Graph data using as small as 1/8 of a unit.* *Some problems can be solved by identifying elements that repeat in predictable way.* *Mathematical concepts can be communicated and evaluated through technology.*	

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. *Communication and Collaboration* *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): *Discussion boards - share responses and discuss strategies using technology* *Class discussions and written responses to construct viable arguments and critique the reasoning of others* *Measure and convert objects to different units in both the customary and metric system* *Demonstrate filling common units in both customary and metric capacity* *Mr. Gallon - optional activity to serve as an aide in converting customary capacity* *Survey students - to organize, record, graph, and analyze authentic data* *Fraction strips - to reinforce the correct intervals when making line plots and other graphs* *Line plots - for representing data and the addition of fractions and mixed numbers* *Tables - to record data from surveys and/or organize when decomposing a graph* *Grid-graph paper - to facilitate equal intervals when making graphs* *Prepared grids - for creating bar, line, and pictographs* *Calculators - to check the reasonableness of an answer* *Tuesday Dozens - review over the course of the year* *Pearson's Center Activities - complete differentiated activities according to their needs* *Web sites: Fraction Nation, Sum Dog, and other sites to practice addition and subtraction*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Tuesday Dozens, Quizzes, CA 13 Units of Measure, CA 14 Data*

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	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Classwork, homework, and quizzes • **What are potential rough spots and student misunderstandings?** * When solving problems that require regrouping

<table>
<tr><td rowspan="2">Communication and Collaboration
Critical Thinking
Technology Operations</td><td colspan="2">students?</td><td>customary units, students fail to use conversion charts and revert to base ten.
* Students may forget that the remainder when converting small units to larger units should be named in fractions.
* Line plots are number lines and need to be constructed with equal intervals, not just the values in the data set.
* All graphs must contain titles, labels, and a consistent scale.

• How will students get the feedback they need?
Peer discussions, Pearson computer generated Lesson Quizzes; homework review, comments on quizzes, and comments on tests</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Interactive learning discovery, lesson videos, note taking, recording vocabulary, discussion, drawing models, class practice, on-line activities, Pearson center activities as extension materials to enrich students;</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)
Graph paper, formula sheets, place value sheets, fraction strips, objects to measure, rulers, yard/meter sticks, capacity containers, line plots, number lines, tables, calculators, items in boxes, laptops, websites, doc cam.</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

Aimsweb, websites, and pretests</td></tr>
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