Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **1: Multiplication and Division Meaning** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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.2.2.4.A.1 Represent and solve problems involving the four operations CC.2.2.4.A.4 Generate and analyze patterns using one rule • 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): *Computational fluency includes understanding the meaning and the appropriate use of numerical operations. Numerical fluency includes both the understanding of and the ability to appropriately use numbers. Multiple and different problem-solving strategies can be used and communicated to accurately solve word problems.* 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 that relationships can be described and generalizations made for mathematical situations having numbers or objects that repeat in predictable ways.* ** Students will recognize that mastery of the basic facts is needed in order to complete multi-digit multiplication problems.* ** Students will recognize that multiplication facts are often used as a basis for division.*

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 can patterns and properties be used to discover multiplication facts?
   How can unknown multiplication facts be found by breaking them into known facts?
   How can unknown division facts be found by thinking about a related multiplication problem?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   ** Draw pictures that relate to given equations.*
   **Know basic multiplication and division facts up to 9x9=81 and 81/9=9.*
   **Rules of Multiplication known as properties; Commutative, Associative, Zero, Identity, and Distributive Properties of Multiplication.*

7. What vocabulary should students know and be able to recall?
   Tier 3 Vocab: array, product, factors, multiple, Commutative Property of Multiplication, Zero Property of Multiplication, Identity Property of Multiplication, Distributive Property of Multiplication, inverse operations, fact family

   Tier 2 Vocab: use appropriate tools, reason quantitatively, look for patterns, make generalizations, use structure, model with mathematics

8. What basic concepts should students know and be able to recall and apply?
   **Students will recognize multiplication as repeated addition of equal groups used in arrays and comparisons.*
   **Students will use arrays/patterns to find products with different factors.*

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

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

   **MO4.A-T.2.1 Use operations to solve problems.*
   **MO4.B-O.3.1.1 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.*
   Example 1: Given the rule "add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers.
   Example 2: Given the rule "increase the number of sides by 1" and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.

   **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.*

	**Students will use multiplication properties to simplify computations* **Students will recognize patterns and be able to continue the pattern.* **Students draw and use models to solve multiplication and division problems.* **Students will recognize that multiplication and division have an inverse relationship.*	

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* *Communication and Collaboration* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): **Students will use place value blocks or draw pictures to help solve multiplication equations.* **Students will use hundreds charts to look for patterns to solve multiplication problems.* **Students will use any problem solving strategy they choose to solve multiplication/division word problems.* **Students will use grid/graph paper to illustrate two different arrays for a given multiplication sentence and analyze how the arrays compare/differ.* **Students will use counters to understand there are multiple interpretations for division of whole numbers.* **Students will use structure to explain how multiplication or division can be used to solve problems.* **Students must master basic fact fluency in order to solve more complex multiplication problems using 4-digits by 1 digit in an upcoming unit.* **Students will illustrate bar diagrams to meangingfully represent mathematical word problems.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 1);*

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

Critical Thinking
Communication and Collaboration
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?
AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;
• What are potential rough spots and student misunderstandings?
*Weak fact fluency skills
*Difficulty understanding the meaning for each operation in the context of the information given
• How will students get the feedback they need?
Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Investigations with various manipulatives; White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;</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)
Counters; Grid/graph paper; Hundreds charts; Place value blocks; White boards and dry erase markers; Center Activities; Laptops</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 Montoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;</td></tr>
</table>

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **2: Operations and Algebraic Thinking: Patterns** Grades: **4**

Teacher Team: **Lisa DeSanctis+** Date: **July 2015**

Stage 1 – Desired Results

Established Goals

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

2. What content standards will this unit address?

   - ELA PA Core State Standards
   - Math PA Core State Standards

     CC.2.2.4.A.4
     Generate and analyze patterns using one rule

   - 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):

   Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.
   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 recognize, reproduce, extend, create, and describe patterns, sequences, and relationships verbally, numerically, and symbolically using a variety of materials.*
   Students will recognize that relationships can be described and generalizations made for mathematical situations having numbers or objects that repeat in predictable ways.

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 can patterns be used to describe how two quantities are related?

	How can a relationship between two quantities be shown using a table? *How can recognizing repetition or regularity assist in solving problems more efficiently?*	
	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? **Look for patterns in an arrangement of blocks, tiles, or numbers and be able to identify the block, tile, or number that would be found in a particular numbered place in the pattern.* **Analyze number sequence patterns to establish the rule for finding the next three numbers in a given sequence.* **Complete tables using number pairs that represent real-world situations.* **Write rules for tables in which the number pairs are linked by either addition, subtraction, multiplication, or division and then extend tables accordingly.* 7. What vocabulary should students know and be able to recall? *Tier 2: represent, look for patterns, compare, reason abstractly, communicate, model, interpret, use appropriate tools, reason quantitatively, make sense of problems, explain, justify* *Tier 3: Repeating pattern, sequence* 8. What basic concepts should students know and be able to recall and apply? **Students will identify and extend repeating geometric or repeating number patterns.* **Students will identify and extend whole number patterns involving addition and subtraction.* **Students will extend tables of ordered pairs for situations involving multiplication, addition, subtraction, or division.* **Students will evaluate pattern(s) to discover the*	9. What discrete skill and processes should students be able to demonstrate? **M04.B-O.3.1 Recognize, describe, extend, create, and replicate a variety of patterns;* **M04.B-O.3.1.1* *Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.* *Example 1: Given the rule "add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers.* *Example 2: Given the rule "increase the number of sides by 1" and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.* **M04.B-O.3.1.2* *Determine the missing elements in a function table (limit to +, –, or × and to whole numbers or money).* **M04.B-O.3.1.3* *Determine the rule for a function given a table (limit to +, –, or × and to whole numbers).* **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.*

	rule, and extend the table, given a table of number pairs. **Students will use objects to 'act problems out' and then 'use reasoning' to draw conclusions.*	

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* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): ** Students will use pattern blocks or draw shapes to begin a pattern and then continue the pattern in order to identify the block/shape in a particular numbered place in the pattern.* **Students will use 'recording sheets' to evaluate rules that can be used to find numbers in a repeating pattern/sequence.* **Students extend tables of ordered pairs for situations involving multiplication, addition, subtractions, and division.* **Students use"recording sheets" to write rules for number pairs in a given table, and then check that the rule applies to all pairs of numbers in the table.* **Students will use graph paper or cubes or tiles to construct and extend sequential patterns in predictable ways.* **Students will solve problems using tactile objects to 'act-it-out' and then use reasoning to draw a conclusion.* *Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 2);*

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

<table>
<tr>
<td rowspan="2">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">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>AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;
What are potential rough spots and student misunderstandings?
*When completing tables, students may be unsure of when to multiply or divide, add or subtract.
*When completing tables, students may forget to find the rule that relates to EACH pair of numbers in the table. Students should be cautioned to check that their rule works for all pairs in the table.
How will students get the feedback they need?
Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;</td>
</tr>
<tr>
<td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Investigations with pattern blocks, cubes, tiles; Illustrate patterns with graph paper; White boards and dry erase markers; Pearson recording sheets; Use various tactile objects to problem solve; Discussions; Class Practice; On-line activities;</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)
Pattern blocks; Tactile objects (cubes, tiles, buttons, etc); Graph Paper; Pearson Recording Sheets; White boards and dry erase markers; Center Activities; Laptops</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

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Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **3: Place Value** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *Transfer of Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers CC2.1.4.B.2 Use place-value understanding and properties of operations to perform multi-digit arithmetic • 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): *Place value is the foundation of our Hindu-Arabic numeration system, which is a decimal system based on the powers of 10.* *Mathematical relationships among numbers can be represented, compared and communicated.* *Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.* 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 know the base-ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value.* ** Students will demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right.*

	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 is a number system and which one should we use here?* *How are greater numbers read and written?* *How can place value be used to compare, order, and round numbers and why is this important?*	
	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? **Read and write whole numbers in expanded, standard, and word form through 1,000,000;* **Compare two-digit multi-digit numbers through 1,000,000 based on meanings of the digits in each place* **Round multi-digit whole numbers (through 1,000,000) to any place.* 7. What vocabulary should students know and be able to recall? *Tier 3: digits, place value, expanded form, standard form, word form, rounding, order, equivalencies,* *Tier 2: represent, model, compare, reason quantitatively, use structure, make generalizations, make sense of problems, use appropriate tools, justify, mathematical evidence, reasoning, interpret, explain,* 8. What basic concepts should students know and be able to recall and apply? **Students will read and write whole numbers up to 1,000,000 in standard, expanded, and word form.* ** Students will recognize how digits within a multi-digt whole number relate to each other by their place value.* **Students will apply their understanding of place*	9. What discrete skill and processes should students be able to demonstrate? **M04.A-T.1.1* *Apply place-value and numeration concepts to compare, find equivalencies, and round.* **M04.A-T.1.1.1* *Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right.* *Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.* **M04.A-T.1.1.2* *Read and write whole numbers in expanded, standard, and word form through 1,000,000.* **M04.A-T.1.1.3* *Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using >, =, and < symbols.* **M04.A-T.1.1.4* *Round multi-digit whole numbers (through 1,000,000) to any place.* **M04.B-O.1.1* *Use numbers and symbols to model the concepts of expressions and equations.* **M04.B-O.1.1.4* *Identify the missing symbol (+, –, ×, ÷, =, <, and >) that makes a number sentence true (single-digit*

	value in order to compare, order, and round whole numbers through 1,000,000 *Students will use the symbols >, <, or = to show the relationship between two numbers or two sides of a statement.* **Students will use 'make an organized list' in order to solve problems.*	*divisor only).* **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.*

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* *Technology Operations* *Select*	*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 learn how to draw place value charts to understand the periods and places in our Hindu-Arabic Base Ten Place Value System.* **Students will use place value blocks to write numbers in standard, expanded, and word form.* **Students will work together in pairs using place value blocks to compare how the digits of multi-digit numbers relate to each other.* **Students will use 'recording sheets' with horizontal/vertical number lines to compare, order, and round whole numbers.* **Students will illustrate bar diagrams to meangingfully represent mathematical word problems.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 3);*

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* *Communication and Collaboration* *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?** AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** *When writing numerals from verbal descriptions, many students will understand the 1000 and the 2 but then instead of placing the 2 in the ones place, students will write the numbers as they hear them, 10002 (ten thousand two). *Students often assume that the first digit of a multi-digit number indicates the "greatness" of a number. The assumption is made that 954 is greater than 1002 because students are focusing on the first digit instead of the number as a whole *Students may forget to carefully line up digits by place value first when comparing numbers; *Students may need to be reminded to name the place value from right to left to determine the value *While Students may recognize that the digit in one place is ten times as great as the same digit to its right, they may not recognize that IF they divide the value of the first digit on the left by the value of the second digit next to it on the right, their answer would be ten; *Students struggle with when to round up and when to round down. *When solving problems using the strategy 'Make An Organzed List, students forget to systematically record their thinking. • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily

			Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;
	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, maps, translator, calculators)*	**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*
	Investigations with place value blocks; Completing recording sheets with horizontal and vertical number lines; Creating and using Place Value charts; White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	Place Value charts; Place Value blocks; Recording sheets with number lines; White boards and dry erase markers; Center Activities; Laptops	AIMSWEB Montoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **4: Addition and Subtraction of Whole Numbers** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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* *Select* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.4.B.1 Apply place-value concepts to show an understandingof multi-digit whole numbers CC.2.1.4.B.2 Use place -value understanding and properties of operations to perform multi-digit arithmetic • 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 classroo to the real world.** 3. List the Enduring Understanding(s): *Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value.* *Numbers can be approximated using numbers that are close OR numerical calculations can be computed mentally by replacing certain numbers with other numbers that are close and easy.* *Context is critical when using estimations.* 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 add and subtract multi-digit whole numbers, including solving problems using mental math strategies.* ** Students will estimate to solve problems.*

	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 can sums and differences of whole numbers be estimated?* *How can students decide when to use an exact answer and when to use an estimate?*

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? **Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000)* **Estimate the answer to addition and subtraction using whole numbers through six digits* **Utilize various mental math strategies to add and subtract.* **Draw pictures that relate to given equations.* 7. What vocabulary should students know and be able to recall? *Tier 3: mental math, breaking apart, compensation, counting on, Commutative Property of Addition, Associative Property of Addition, Identify Property of Addition, inverse operations, estimation, rounding, addends, sum, minuend, subtrahend, difference, equation, number sentence.* *Tier 2: Represent, model, justify, mathematical evidence, reasoning, interpret, explain, make generalizations, check for reasonableness, model with mathematics, use appropriate tools, reason abstractly, communicate,* 8. What basic concepts should students know and be able to recall and apply? **Students will use mental mental math strategies to add and subtract whole numbers.*	9. What discrete skill and processes should students be able to demonstrate? **M04.A-T.1.1.4* *Round multi-digit whole numbers (through 1,000,000) to any place* **M04.A-T.2.1* *Use operations to solve problems.* **M04.A-T.2.1.1* *Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000).* **M04.A-T.2.1.4* *Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than 2 digits × 1 digit, excluding powers of 10)* **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.*

	**Students will add and subtract numbers with and without regrouping.* **Students will be able to explain why certain estimates are more reasonable than others.* **Students will draw a picture and write an equation to solve a problem.*	

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* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): ** Students will use place value blocks to learn various strategies to solve addition and subtraction problems mentally.* **Students will use use place value blocks to round and then estimate sums and differences to solve problems.* **Students will use place value blocks, along with place value charts, to add or subtract numbers with and without regrouping.* **Students will use place value blocks, along with place value charts, to subtract numbers with zeros.* **Students will draw a picture or use a bar diagram to meangingfully represent mathematical word problems and then translate their drawing into an equation* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 4);*

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.

Communication and Collaboration
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?
AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;
• What are potential rough spots and student misunderstandings?
*Students may confuse when to 'carry' and when to 'borrow'. They should be "regrouping" in both cases.
*Students often do not notice the need of borrowing and just take the smaller digit from the larger one
*Students having difficulty with lining up similar place values in numbers as they are adding and subtracting.
*Students have difficulty identifying when estimation is appropriate, reasonable, and accurate
• How will students get the feedback they need?
Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;</td>
</tr>
<tr>
<td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Investigations with various manipulatives; White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;</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)
Place Value blocks; Place Value charts; White boards and dry erase markers; Center Activities; Laptops</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 Montoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;</td>
</tr>
</table>

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **5: Multiplication by 1 and 2 Digit Numbers** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *Problem-solving* *Transfer of Learning* *Adaptation and flexibility* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers. CC.2.1.4.B.2 Use place value understanding and properties of operations to perform multi-digit arithmetic. CC.2.2.4.A.1 Represent and solve problems involving the four operations. • 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): ** Computational fluency includes understanding the meaning and the appropriate use of numerical operations, and accurately computing with appropriate speed.* ** Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.* ** Numbers can be approximated using numbers that are close.* ** Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.* ** Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.* ** Numeric fluency includes both the understanding of and the ability to appropriately use numbers.* 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 can mental math strategies be used to estimate and calculate greater products, and when is it appropriate to estimate versus calculate?* ** How do operations affect numbers?* ** How are the processes of addition, subtraction, multiplication, and division related and used to determine exact answers?* ** What makes a tool and/or strategy appropriate for a given task?* ** How can recognizing repetition or regularity assist in solving problems more efficiently?*	
	Acquisition	
	Students will know... 6. What facts should students know and be able to use to gain further knowledge? *Things that students will master:* **Use the expanded and standard algoritms to multiply a whole number of up to 4-digits by a 1-digit whole number, and multiply two, 2-digit numbers.* **Use mental math strategies to find products to multiplication problems* **Use estimation skills to determine a reasonable solution to a problem.* **Multiply multiples of 10, 100, and 1000* **Round multi-digit numbers.* **Estimate the answer to multiplication problems using no more than 2-digits × 1-digit, excluding powers of 10.* **Interpret a multiplication equation as a comparison and represent verbal statements of multiplicative comparisons as multiplication equations* **Multiply or divide to solve word problems involving multiplicative comparisons.* *Example: 5 x 8 = 40; Sally is five years old. Her mom is eight times older. How old is Sally's Mom?*	**Students will be skilled at... (be able to do)** 9. What discrete skill and processes should students be able to demonstrate? **M04.A-T.1.1* *Apply place-value and numeration concepts to compare, find equivalencies, and round.* **M04.A-T.1.1.4* *Round multi-digit whole numbers (through 1,000,000) to any place.* **M04.A-T.2.1.2* *Multiply a whole number of up to four digits by a one-digit whole number and multiply two, 2-digit numbers.* **M04.A-T.2.1.4* *Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than 2 digits × 1 digit, excluding powers of 10)* **M04.B-O.1.1.1* *Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.* *--Example 1: Interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.*

	7. What vocabulary should students know and be able to recall? *Tier 3: partial products, compensation, array, product, factors, multiple, compatible numbers, Commutative Property of Multiplication, Zero Property of Multiplication, Identity Property of Multiplication, Distributive Property of Multiplication, inverse operations, equivalence, operation, rounding, estimation, algorithm, expression, equation, number sentence* *Tier 2: Reason quantitatively, use appropriate tools, model with mathematics, use structure, reason quantitatively, communicate, make sense of problems, represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain* 8. What basic concepts should students know and be able to recall and apply? **What students should understand:* **Students will use basic multiplication facts, arrays, number patterns, and/or grids to multiply 2 digit numbers by multiples of 10, 100, and 1000.* **Students will break apart numbers and use arrays to multiply 2-digit by 1-digit numbers and two, 2-digit numbers.* **Students will use compensation to multiply numbers mentally.* **Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two, 2-digit numbers* **Students will multiply 2, 3, and 4-digit numbers by 1 digit numbers, OR two, 2-digit numbers, using the expanded and standard algoritms to find the product.* **Students will use different problem solving strategies when solving one or two-question multiplication word problems including 1) using estimation to check for reasonableness in calculations 2) identifying what information in a*	*--Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation 24 = 3 × 8 or 24 = 8 × 3.* **M04.B-O.1.1.2* *Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.* *--Example: Know that 3 × 4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects.* **M04.B-O.1.1.4* *Identify the missing symbol (+, –, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only).* **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.*

	problem is missing or is not needed and 3) identifying hidden questions to solve multistep problems with operations.	

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* *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 wil use place value blocks or grid paper with colored pencils to create arrays and find products for 2-digit numbers by 1-digit numbers, 2-digit numbers by multiples of 10, and eventually two, 2-digit numbers.* **Students will use basic facts and place value patterns to find products when one factor is 10, 100, and 1000.* **Students will use place value blocks to break apart arrays to find partial products of 2-digit times a 1-digit number multiplication problem.* **Students will use compensation (changing the numbers so the calculation is easy) to practice multiplying numbers mentally.* **Students will use rounding recording sheets to estimate solutions to multiplication problems.* **Students will use compatible numbers and rounding to estimate solutions to multiplication problems involving two, 2-digit numbers.* **Students will connect their concrete understanding of multiplication using place value blocks or arrays to the abstract paper and pencil method using the expanded algorithm, before eventually moving on to the standard algorithm.* *Students will multiply 2, 3, and 4-digit numbers by 1-digit numbers AND two, 2-digit number using the standard algorithm.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 5, CA Topic 6, CA Topic 7, and CA Topic 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?
AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;
• What are potential rough spots and student misunderstandings?
*Students have difficulty devising a number model to solve a given word problem task.
*Students are not able to distinguish whether a word problem involves multiplicative comparison or additive comparison
*Students have difficulty estimating and/or determining if the answer is reasonable.
*Students have difficulty or experience frustration with solving story problems.
*Students experience difficulty writing numerals from verbal descriptions. (e.g., writing one thousand two as 10002)
• How will students get the feedback they need?
Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;</td></tr>
<tr><td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Investigations with various</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)
Place value blocks; White</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 Montoring; Accountability during instruction</td></tr>
</table>

	manipulatives; White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	boards and dry erase markers; Center Activities; Laptops	via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **6: Dividing by 1-digit Divisors** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *Transfer of Learning* *Adaptation and flexibility* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards • Math PA Core State Standards CC.2.1.4.B.1 Apply place-value concepts to show an understanding of multi-digit whole numbers. CC.2.1.4.B.2 Use place-value understanding and properties of operations to perform multi-digit arithmetic CC.2.2.4.A.1 Represent and solve problems involving the four operations CC.2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples.	**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): ** Information in a problem can often be shown with a picture or diagram and used to understand and solve the problem.* ** One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem.* ** Some problems can be solved by writing and completing a number sentence or equation.* ** A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.* ** Computational fluency includes understanding the meaning and the appropriate use of numerical operations.* ** Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will make sense of and persevere in solving complex and novel mathematical problems.* ** Students will use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.* ** Students will communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.* ** Students will apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions..* ** Students will make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies.*

- 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:
   How can mental math strategies be used to estimate and calculate quotients, and when is it appropriate to estimate versus calculate?
   How do operations affect numbers, and how are the processes of addition, subtraction, multiplication, and division related?

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? *Things that students will master:* **Standard procedure for dividing multi-digit numbers and breaking the algorithm into simpler problems.* **Use basic facts, place value, and patterns to solve division problems with 4-digit dividends and 1-digit divisors.* **Use compatible numbers, rounding, multiplication facts, and place-value concepts to estimate quotients for 4-digit dividends and 1-digit divisors.* **Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders* **Use words and models to represent multiplication and division problems accurately.* **Draw pictures and write related number sentences to solve problems.* **Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity*	9. What discrete skill and processes should students be able to demonstrate? **M04.A-T.2.1.3* *Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders.* **M04.B-O.1.1.2* *Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.* *Example: Know that 3 × 4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects* **M04.B-O.1.1.3* *Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity.* **Given a word problem, students will solve the word problem using an appropriate strategy or strategies*

	7. What vocabulary should students know and be able to recall? *Tier 3 Vocab: Repeated Subtraction; Dividend, Divisor, Quotient, Remainder, Equivalence, Digit(s); Whole Number* *Operation, Multiply/Multiplication, Divide/Division, Place Value, Estimation, Rounding, Algorithm, Factor, Factor Pairs, Multiple, Product, Variable* *Tier 2 Vocab: use structure, look for patterns, communicate, check for reasonableness, reason quantitatively, make sense of problems, model with mathematics, use structure, make generalizations,* 8. What basic concepts should students know and be able to recall and apply? *What students should understand:* **Students will demonstrate an understanding of multi-digit whole numbers.* **Students will recognize that a whole number is a multiple of each of its factors.* **Students will perform multi-digit arithmetic.* **Students wil use place value understanding and properties of operations to perform multi-digit arithmetic.* **Students will use counters and repeated subtraction to divide whole numbers by 1-digit divisors resulting in quotients with remainders and understand how repeated subtraction models division.* **Students will use compatible numbers and rounding to estimate quotients.* **Students will estimate quotients of multi-digit problems using multiplication facts and place value concepts* **Students will use dry erase markers and marker boards to use words and/or illustrate models that represent multiplication and division problems accurately.* **Students will draw pictures and write related*	*and will share and compare the use of multiple strategies leading to the same answer.*

	number sentences to solve problems using a variety of problem solving strategies. **Students will use different problem solving strategies when solving word problems including drawing pictures and writing an equation AND identifying hidden questions to solve multistep problems with various operations.*	

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* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): **Students will use counters to model division with basic facts.* **Students will use place value blocks to model dividing beyond basic facts.* **Students will connect their concrete understanding of division as repeated subtraction with the abstract paper and pencil method using the standard algorithm to divide 4-digit dividends by 1-digit divisors.* **Students will identify the hidden question in a multi-step problem and will use the answer to the hidden question to solve the original problem.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 9 and CA Topic 10);*

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?** AIMSWEB Monitoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** *Students have difficulty devising a number model to solve a given word problem task. *Students have difficulty finding compatible numbers. *Students have difficulty determining a multiple of the divisor in order to begin dividing. *Students may struggle with which place to begin dividing and where to write the first digit in the quotient. *Students have difficulty understanding the value of the quotient. *Students have difficulty remembering the steps in the standard algorithm for long division. Students may not understand the relationship between multiplication and division. *Students have difficulty or experience frustration when solving story problems. *When solving problems that involve multiple steps, students may have difficulty identifying the "hidden questions". • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Investigations with various manipulatives; Place value blocks; White boards and dry erase markers; Counters; Place Value Charts; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	**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)* Place value blocks; White boards and dry erase markers; Counters; Place Value Charts; Center Activities; Laptops	**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 Montoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **7: Fractions** Grades: **4th**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *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.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering CC.2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. CC.2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples. CC.2.2.4.A.1 Represent and solve problems involving	**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 fraction describes the division of a whole (region, set, segment) into equal parts.* *The same fractional amount can be represented by an infinite set of different but equivalent fractions.* *There are an infinite number of fractions between any two fractions on the number line.* *Fractions are an integral part of our daily life and an important tool in solving problems.* *Mathematical explanations can be given using words, pictures, numbers, or symbols, and a good explanation should be correct, simple, complete, and easy to understand.* *Physical models can be used to clarify mathematical relationships.* *Justification for using precise language for selection of strategies, tools, and final answers is necessary in problem solving.* 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 develop understanding and fluency with reference to using factors and multiples.* ** Students will develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers.*

the four operations.
CC.2.2.4.A.1 -
Represent and solve problems involving the four operations.

- 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:
   How is a fraction different from a whole number?
   Why is it important to understand and be able to use equivalent fractions in mathematics or real life?
   How can we use physical models to describe mathematical relationships?
   How will my understanding of whole number factors help me understand and communicate equivalent fractions?
   Why can a fractional amount be decomposed into a sum of fractions in more than one way?
   What does it mean to add and subtract fractions and mixed numbers with like denominators?
   How are relationships represented mathematically?
   How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?

Acquisition

Students will know...	**Students will be skilled at... (be able to do)**
6. What facts should students know and be able to use to gain further knowledge? *Things that students will master:* **Identify factors and multiples of a given number.* **Identify prime and composite numbers.* **Read a numbers line and identify and write equivalent fractions.* **Use benchmark fractions to compare fractions with unlike denominators.* **Compare and order fractions* **Use common denominators and equivalent fractions to order fractions with unlike denominators.* **Use the number line and computational procedures to add and subtract fractions with like denominators.* **Identify and write mixed numbers as improper fractions and improper fractions as mixed numbers.* ** Use a number line or computational procedures to add or subtract mixed numbers.* **Decompose fractions and represent them as compositions of fractions in a variety of ways.*	9. What discrete skill and processes should students be able to demonstrate? **M04.A-F.1.1* *Find equivalencies and compare fractions.* **M04.A-F.1.1.1* *Recognize and generate equivalent fractions.* **M04.A-F.1.1.2* *Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols >, =, or < and justify the conclusions.* *M04.A-F.2.1* *Solve problems involving fractions and whole numbers (straight computation or word problems).* **M04.A-F.2.1.1* *Add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be simplified; and no improper fractions as the final answer).* **M04.A-F.2.1.2*

	7. What vocabulary should students know and be able to recall? *Tier 3 Vocab: fraction, denominator, numerator, benchmark, equivalent fractions, prime numbers, composite numbers; mixed number, improper fraction; equivalent sets; increment; proper fraction; unit fraction; whole number, factor, multiple* *Tier 2 Vocab: reason abstractly, use appropriate tools, make sense of problems, attend to precision, use structure, persevere in solving problems, perservere in problems solving, model with mathematics, make sense of problems, reason quantitatively, communicate, make generalizations* 8. What basic concepts should students know and be able to recall and apply? **Students will compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols >, =, or < and justify the conclusions* **Students will add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be simplified; and no improper fractions as the final answer)* **Students will decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation, and then justify decompositions (e.g., by using a visual fraction model)* **Students wil recognize or generate equivalent fractions.* **Students will add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping*	*Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (e.g., by using a visual fraction model).* *Example 1: 3/8 = 1/8 + 1/8 + 1/8 OR 3/8 = 1/8 + 2/8* *Example 2: 2 1/12 = 1 + 1 + 1/12 = 12/12 + 12/12 + 1/12* **M04.A-F.2.1.3* *Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be simplified; and no improper fractions as the final answers).* **M04.A-F.2.1.4* *Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).* **M04.A-F.2.1.5* *Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).* *Example: 5 × (1/4) = 5/4* **M04.A-F.2.1.6* *Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).* *Example: 3 × (5/6) = 15/6* **M04.A-F.2.1.7* *Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).* **M04.A-F.3.1.1* *Add two fractions with respective denominators 10 and 100.*

	with subtraction; fractions do not need to be simplified; and no improper fractions as the final answers) **Students will solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100)* **Students will multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number)* **Students will multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number)* **Students will solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100)* **Students will translate information from one type of display to another (table, chart, bar graph, or pictograph)* **Students will use "Draw a Picture" AND "Write an Equation" in order to problem solve.*	*Example: Express 3/10 as 30/100, and add 3/10 + 4/100 = 30/100 + 4/100 = 34/100.* **M04.B-O.2.1* *Develop and apply number theory concepts to represent numbers in various ways.* **M04.B-O.2.1.1* *Find all factor pairs for a whole number in the interval 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite* **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.*

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):

Communication and Collaboration *Technology Operations* *Critical Thinking*	**Students use counters to identify factors of a whole number.* **Students use a 'hundreds chart' to explore prime and composite numbers.* **Students will know how to find the multiples of a number.* **Students use fraction strips to learn how to find equivalent fractions.* **Students use number lines to identify and write equivalent fractions.* **Students use benchmark fractions to compare fractions with unlike denominators.* **Students use common denominators and equivalent fractions to order fractions with unlike denominators.* **Students use models, number lines, and computational procedures to add or subtract fractions with like denominators* **Students use fraction strips to identify and write mixed numbers as improper fractions and improper fractions as mixed numbers.* **Students use models, number lines, and computational procedures to add and subtract mixed numbers.* **Students decompose fractions and represent them them as compositions of fractions in a variety of ways.* **Students will write to explain whether an answer is correct or not.* **Students will use 'draw a picture AND write an equation' in order to problem solve.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CATopic 11 and CA Topic 12);*

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?** AIMSWEB Monitoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** *Students think that when generating equivalent

			fractions they need to multiply or divide either the numerator or denominator, such as, changing 1/2 to sixths. They would multiply the denominator by 3 to get 1/6, instead of multiplying the numerator by 3 also. Their focus is only on the multiple of the denominator, not the whole fraction. *It's important that students use a fraction in the form of one such as 3/3 so that the numerator and denominator do not contain the original numerator or denominator. Students think that it does not matter which model to use when finding the sum or difference of fractions. *They may represent one fraction with a rectangle and the other fraction with a circle. They need to know that the models need to represent the same whole.. *Students may be unable to identify all the factors of a whole number.. *Students may have difficulty distinguishing between a factor and a multiple. • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Investigations with various manipulatives; counters, 'hundreds charts'; fraction strips, number lines; White boards and dry erase	**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)* White boards and dry erase markers; counters; fraction strips, number lines; hundreds charts; Center Activities; Laptops	**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 Montoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;

	markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;		

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **8 - Fractions/Decimals** Grades: **4th**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *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.2.2.4.A.1 Represent and solve problems involving the four operations. CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering CC.2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10	**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 decimal is another name for a fraction.* *Decimal numeration is just an extension of whole number numeration.* *Every fraction can be represented by an infinite number of equivalent fractions, but each fraction is represented by the same decimal or an equivalent form. (use equivalent fractions to change a fraction to a decimal).* *Decimals are an integral part of our daily life and an important tool in solving problems.* *Mathematical explanations can be given using words, pictures, numbers, or symbols, and a good explanation should be correct, simple, complete, and easy to understand.* *Physical models can be used to clarify mathematical relationships.* *Justification for using precise language for selection of strategies, tools, and final answers is necessary in problem solving.* 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 understand how decimal numeration is related to whole number numeration.* *Students will understand how to identify factors and multiples fluently.*

denominators, e.g. 19/100)
CC.2.2.4.A.2
Develop and/or apply number theory concepts to find factors and multiples.

- PA Content Standards

Students will understand how to use decimals and fractions interchangeably.

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 decimal numeration related to whole number numeration?
   How are decimals used in the real world?
   How are fractions and decimals related?
   Why is it important to understand and be able to use equivalent fractions for real world problems involving decimals?
   How can we use physical models to describe mathematical relationships?
   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?
   Things that the student will master:
   **Use unit fractions and multiplication to describe fractions that are multiples of the unit fractions.*
   **Use models and then computational procedures to multiply a fraction by a whole number*
   **Use decimal models to understand how to write fractions as decimals and decimals as fractions.*
   **Locate and name fractions and decimals on a number line.*
   **Know how to compare and order decimals.*
   **Know how to add or subtract simple decimal problems to the tenths place or money to the cent.*
   **Use equivalent fractions to write fractions as decimals.*
   **Represent decimals to the hundredths.*
   **Read and write decimals to the hundredths in standard, expanded, and word form.*
   **Compare decimals to the hundredths and use greater than and less than symbols to order decimal numbers.*

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

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

   **M04.A-F.2.1.5*
   Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).
   Example: 5 × (1/4) = 5/4
   **M04.A-F.2.1.6*
   Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number).
   Example: 3 × (5/6) = 15/6
   **M04.A-T.1.1.1*
   Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right.
   Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens

	**Read, write, and compare decimals in tenths and hundredths using money.* **Use the 'Draw a Picture' strategy in order to problem solve.* 7. What vocabulary should students know and be able to recall? *Tier 3 Vocabulary: unit fraction, decimal point, tenth, hundredth, fraction, denominator, equivalent sets, Improper fraction, increment, mixed number, numerator, proper fraction, whole number* *Tier 2 Vocabulary: Reason quantitatively, justify, interpret, explain, check for reasonableness, communicate, represent, use structure, construct arguments, make generalizations, reason abstractly, make sense of problems, attend to precision, model with mathematics, communicate, persevere with problem solving* 8. What basic concepts should students know and be able to recall and apply? *What students should understand:* **Students will multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number)* **Students will multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number)* **Students will solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100)* **Students will recognize and generate equivalent fractions.* **Students will compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols >, =, or < and justify the*	*place.* **M04.A-F.3.1* *Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems).* **M04.A-F.3.1.1* *Add two fractions with respective denominators 10 and 100.* *Example: Express 3/10 as 30/100, and add 3/10 + 4/100 = 30/100 + 4/100 = 34/100.* **M04.A-F.3.1.2* *Use decimal notation for fractions with denominators 10 or 100.* *Example: Rewrite 0.62 as 62/100 and vice versa.* **M04.A-F.3.1.3* *Compare two decimals to hundredths using the symbols >, =, or <, and justify the conclusions* **M04.D-M.1.1.2* *Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit.* **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.*

	conclusions **Students will solve problems involving fractions and whole numbers (straight computation or word problems).* **Students will use decimal models to understand how to write fractions as decimals and decimals as fractions* **Students will locate and name fractions and decimals on a number line.* **Students will use equivalent fractions to write fractions as decimals.* **Students will represent decimals to the hundredths.* **Students will read and write decimals to the hundredths in standard, expanded, and word form.* **Students will compare decimals to the hundredths and use greater than and less than symbols to order decimal numbers.* **Students will read, write, and compare decimals in tenths and hundredths using money.* **Students will add and subtract simple decimal problems to the tenths place or money to the cent.* **Students will use the 'Draw a Picture' strategies in order to problem solve.* **Students will use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems).* **Students will use numbers and symbols to model the concepts of expressions and equations.*	

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	*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)

productively in an increasingly global and digital world. *Critical Thinking* *Communication and Collaboration* *Technology Operations*	(reference Stage 1, Item #4): **Students will use unit fractions and multiplication to describe fractions that are multiples of the unit fractions.* **Students will use models and then computational procedures multiply a fraction by a whole number* **Students will use decimal models to understand how to write fractions as decimals and decimals as fractions* **Students will learn how to locate and name fractions ad decimals on a number line.* **Students will understand how to use equivalent fractions to write fractions as decimals.* **Students will use models and place value charts to represent decimals to the hundredths.* **Students will read and write decimals to the hundredths in standard, expanded, and word form.* **Students will use models and place value charts to compare decimals to hundredths and will use greater than and less than symbols to order decimal numbers.* **Students will add and subtract simple decimal problems* **Students will use place value charts to read, write, and compare decimals in tenths and hundredths using money.* **Students will use the 'Draw a Picture' strategy in order to problem solve.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CA Topic 13);*

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* *Communication and Collaboration* *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?** AIMSWEB Monitoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** • Students think that when generating equivalent fractions they need to multiply or divide either the numerator or denominator, such as, changing 1/2 to

			sixths. They would multiply the denominator by 3 to get 1/6, instead of multiplying the numerator by 3 also. Their focus is only on the multiple of the denominator, not the whole fraction. • Students think that it does not matter which model to use when finding the sum or difference of fractions. • Students treat decimals as whole numbers when making comparison of two decimals. They think the longer the number, the greater the value. For example, they think that).03 is greater than 0.3. • Students believe that larger units will give the larger measure. • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Investigations with various manipulatives; 'hundreds charts'; fraction strips, decimal models; number lines; place value charts; White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	**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)* White boards and dry erase markers; fraction strips, decimal models, number lines; place value charts; Center Activities; Laptops	**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 Montoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **9: Measurement Units and Conversions** Grades: **4**

Teacher Team: **Lisa DeSanctis** 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? *Effective Communication Skills* *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.2.2.4.A.1 Represent and solve problems involving the four operations. CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit. CC.2.4.4.A.2 Translate information from one type of data display to another. CC.2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot.	**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): *Measurement attributes can be quantified and estimated using customary and non-customary units of measure.* *Data can be modeled and used to make inferences.* *Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.* *Distance, Capacity, Weight, and Mass and can be estimated and measured in different systems (customary and metric) using different units of measure in each system that are related to each other.* 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:

PA Content Standards	*How does the type of data influence the choice of display?* *How and why can data displays be manipulated?* *How can data be organized and represented to provide insight into the relationship between quantities?* *How can mathematics support effective communication?* *Why does "what" we measure influence "how" we measure?* *How precise do measurements and calculations need to be?*	
	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? **What are customary and metric units for measuring length, capacity, and weight and mass, and how are they related?* **What do area and perimeter mean and how can each be found?* **How can line plots and other tools help to solve measurement problems?* **Know relative sizes of measurement units within one system; including customary units (in., ft., yd., mi., oz., lb., and c., pt., qt., gal.), metric units (cm, m, km, g, kg, and mL, L), and time (sec., min., hr., day, wk., mo., and yr.) Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit A table of equivalencies will be provided* **Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit* **Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length) Whole numbers only The formulas will be provided* **Identify time (analog and digital) as the amount of minutes before or after the hour*	9. What discrete skill and processes should students be able to demonstrate? **M04.D-M.1.1.1* *Know relative sizes of measurement units within one system of units including standard units (in., ft., yd., mi., oz., lb., and c., pt., qt., gal), metric units (cm, m, km, g, kg, and mL, L), and time (sec, min, hr, day, wk, mo, and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided.* *Example 1: Know that 1 kg is 1,000 times as heavy as 1 g.* *Example 2: Express the length of a 4-foot snake as 48 in.* **M04.D-M.1.1.2* *Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit.* **M04.D-M.1.1.3* *Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided.*

	**Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of 1/2, 1/4, or 1/8)* **Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as 1/4, 2/4, 3/4)* **Translate information from one type of display to another (table, chart, bar graph, or pictograph)* **Apply the area and perimeter formulas for rectangles in real-world and mathematical problems(may include finding a missing side length)* **Solve real-world problems that involve money and giving change by counting.* 7. What vocabulary should students know and be able to recall? *Tier 3: length, inch (in), foot (ft), yard (yd), mile (mi), capacity, fluid ounce (oz), cups (c), pint (pt), quarts (qt), gallons (gal), weight, ounce (oz), pound (lb), ton (T), millimeter (mm), centimeter (cm), decimeter (dm), meter (m), kilometer (km), milliliter (mL), liter (L), mass, gram (g), kilogram (kg), perimeter, area, line plot; convert, conversion, distance, divide, multiply, equivalent, minute (min), second (sec), hour (hr), customary units, metric units, scale, time* *Tier 2: manipulate, reason abstractly, check for reasonableness, communicate, use structure, make sense of problems, attend to precision, use appropriate tools, reason quantitatively, persevere in problem solving, model with mathematics, represent, representation, model, justify, mathematical evidence, reasoning, interpret, explain.* 8. What basic concepts should students know and be able to recall and apply? **Students will estimate and use customary units to measure length (in., ft., yd, mi) and will be able to*	**M04.D-M.1.1.4* *Identify time (analog or digital) as the amount of minutes before or after the hour.* *Example 1: 2:50 is the same as 10 minutes before 3:00.* *Example 2: Quarter past six is the same as 6:15* **M04.D-M.2.1.1* *Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of 1/2, 1/4, or 1/8).* **M04.D-M.2.1.2* *Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as 1/4, 2/4, 3/4).* **M04.D-M.2.1.3* *Translate information from one type of display to another (table, chart, bar graph, or pictograph).* **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.*

	measure to the 1/8 of an inch. **Students will estimate with customary units of capacity (fl oz., cups, pints, quarts, gallons) and customary units of weight (oz., pounds, and Tons).* **Students will convert between customary units of length, capacity, and weight within a single system.* **Students will estimate and use metric units to the nearest centimeter (cm) and choose the most appropriate unit such as millimeter (mm), centimeter (cm), decimeter (dm), meter (m), and kilometer (km) for measuring length.* **Students will estimate fluently with metric units of capacity using millliliters (mL) and liters (L), and mass using grams (g) and kilgrams (kg).* **Students will convert between metric units of length, capacity, and mass within a single system.* **Students will compare several different units of time (seconds, minutes, hours, days, weeks, months, years, decades, century, and milllennium) and freely convert from one unit of time to another.* **Students will identiy time, using analog and/or digital clocks as the amount of minutes before or after the hour, and will solve word problems involving elapsed time.* **Students will apply the area and perimeter formulas for rectangles in real-world and mathematical problems, which may include finding a missing side length.* **Students will use diagrams to show data and analyze how the quantities are related to solve real-world measurment problems.* **Students will solve real-world problems that involve money and giving change by counting* **Students will construct line plots using given data and use the line plot to answer questions about the data set.* **Students will use different problem solving strategies when solving word problems including 1) working backwards, 2) writing to explain, and 3) solving a simpler problem and making a table.*	

	**Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*	

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* *Technology Operations*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): **Students will use rulers and yardsticks to estimate and measure length using inches, feet, yards, and miles. (Provide reinforcement of fraction equivalence along with opportunity to make a ruler that includes equivalent fractions at ⅛" intervals.)* **Students will estimate fluently with customary units of capacity (ounces, cups, pints, quarts, gallons) and weight (ounces, pounds and tons.)* **Students will convert between customary units of length, capacity, and weight.* **Students will estimate and measure length to the nearest centimeter, and choose the most appropriate unit (millimeter, centimeter, decimeter, meter, kilometer) for measuring length.* **Students will estimate fluently with metric units of capacity (milliliters/kiloliters) and mass (grams/kilograms).* **Students will convert between metric units of length, capacity, and weight within a single system.* **Students will compare several different units of time (seconds, minutes, hours, days, weeks, months, years decades, century, and milllennium) and freely convert from one unit of time to another.* **Students will identify time, using analog and/or digital clocks as the amount of minutes before or after the hour, and will solve word problems involving elapsed time.* **Students will apply the area and perimeter formulas for rectangles in real-world and mathematical problems, which may include finding a missing side length.* **Students will use diagrams to show data and analyze how the quantities are related to solve real-world measurment problems* **Students will solve real-world problems that involve money and giving change by counting.* **Students will construct line plots using given data and use the line plot to answer questions about the data set.* **Students will use different problem solving strategies when solving word problems including 1) working backwards, 2) writing to explain, and 3) solving a simpler problem and making a table.*

	**Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CATopic 14 and 15);*

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?** AIMSWEB Monitoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** *Students believe that larger units will give larger measures. Students should be given multiple opportunities to measure the same object with different measuring units. For example, have the students measure the length of a room with one-inch tiles, with one-foot rulers, and with yard sticks. Students should notice that it takes fewer yard sticks to measure the room than rulers or tiles and explain their reasoning. *When solving problems that require renaming of units of time, students revert to the base 10 system of renaming. For example, when subtracting 25 minutes from 2 hours, students fail to convert 1 hour to 60 minutes and instead write 2:00 – 0:25 and 1:75. *When measuring length with a ruler, students fail to

			interpret interval markings appropriately. For example, when measuring to the nearest ⅛", students fail to equate ¼" with 2/8" or ½" with 4/8". • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Investigations with various manipulatives; rulers, yardsticks, meter sticks, Judy Clocks, Measurment tools for customary AND metric units of capacity, Measurement tools and pan balance for metric units of mass, White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	**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)* Manipulatives; rulers, yardsticks, meter sticks, Judy Clocks, Measurment tools for customary AND metric units of capacity, Measurement tools and pan balance for metric units of mass, White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; On-line activities;	**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 Montoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;

Southern Lehigh School District

UbD Curriculum Template

Course: **Math** Unit: **10: Geometry** Grades: **4**

Teacher Team: **Lisa DeSanctis** Date: **July, 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   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.2.3.4.A.1
   Draw lines and angles and identify these in two-dimensional figures
   C.2.3.4.A.2
   Classify two-dimensional figures by properties of their lines and angles.
   CC.2.3.4.A.3
   Recognize symmetric shapes and draw lines of symmetry.
   CC.2.4.4.A.6
   Measure angles and use properties of adjacent angles to solve problems.
   CC.2.4.4.A.1
   Solve problems involving measurement and conversions from a larger unit to a

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):
   Geometric properties can be used to construct geometric figures.
   Geometric relationships can be described, analyzed, and classified based on properties, spatial reasoning and/or visualization.
   Geometry is the exploration of shapes and the relationships among these shapes
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 rrepresentations 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 be able to use spatial reasoning to recognize that geometric relationships can be described, analyzed,and classified.*

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?

smaller unit.

- PA Content Standards

How can geometric properties and theorems be used to describe, model, and analyze 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? ** Draw and identify points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.* **Classify 2-dimensional shapes by properties of their lines and angles, based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.* ** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry).* ** Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure.* ** Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)* 7. What vocabulary should students know and be able to recall? *Tier 3: point, line, plane, parallel lines, intersecting lines, perpendicular lines, line segment, ray, angle, right angle, acute angle, obtuse angle, straight angle, degree, unit angle, angle measure, protractor, polygon, side, vertex, triangle, quadrilateral, pentagon, hexagon, octagon, equilateral triangle, isosceles triangle, scalene triangle, right triangle, acute triangle, obtuse triangle, rhombus, trapezoid, parallelogram, rectangle, square, symmetric, line of symmetry, unit fraction, right angle,*	9. What discrete skill and processes should students be able to demonstrate? **M04.C-G.1.1.1* *Draw points, lines, line segments, rays, angles (right, acute, and obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.* **M04.C-G.1.1.2* *Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.* **M04.C-G.1.1.3* *Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry)* **M04.D-M.3.1.1* *Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure.* **M04.D-M.3.1.2* *Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)* ***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.*

	Tier 2: reason abstractly, make sense of problems, construct arguments, make generalizations, communicate, use appropriate tools, critique the reasoning of others, use appropriate tools, attend to precision, justify, explain, demonstrate, illustrate, communicate, interpret, explain 8. What basic concepts should students know and be able to recall and apply? **Students will identify and describe points, lines, and planes* **Students will describe parts of lines and types of angles* **Students will use unit angles and fractions of a circle to find angle measures* **Students will use a smaller angle to measure a larger angle by repeating the unit.* **Students will learn to use protractors to measure and draw angles* **Students will find unknown angle measures by adding and subtracting* **Students will identify polygons, including triangles, quadrilaterals, pentagons, hexagons, and octogons* **Students will identify and classify triangles and quadrilaterals,* **Students will determine if a plane figure has line symmetry, and if so, how mnay lines of symmetry it has.* **Students will problem solve by making and testing generalizations about commonalities and relationships between objects.*	

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): **Students will use centimeter grid paper to identify and describe points, lines, and planes.*

Communication and Collaboration *Technology Operations* *Critical Thinking*	**Students will use dot paper and geometric terms to describe parts of lines and types of angles.* **Students will use unit angles and fractions of a circle to find angle measures.* **Students will use pattern blocks to visualize a smaller angle which can be used to measure a larger angle by repeating the unit.* **Students will be able to use protractors to measure and draw angles* **Students will find unknown angle measures by adding and subtracting.* **Students will learn to identify polygons, including triangles, quadrilaterals, pentagons, hexagons, and octagons.* **Students will learn to identify and classify triangles and quadrilaterals.* **Students will use graph paper to determine if a plane figure has line symmetry, and if so, how many lines of symmetry it has.* **Students will use different problem solving strategies when solving word problems including testing generalizations about commonalities and relationships between objects.* **Students will participate in discussions during whole group instruction, and will analyze and evaluate the mathematical reasoning of others when problem solving.* **Students will work together with a partner using Pearson's Center Activities to complete differentiated activities according to their needs.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Fact Fluency Assessments; Homework for Completion Only; Tempting Tens; Common Assessment (CATopic 16);*

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?** AIMSWEB Montoring; Accountability during instruction via white boards and dry erase markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework; • **What are potential rough spots and student misunderstandings?** * Students are confused as to which number to use when determining the measure of an angle using a protractor because most protractors have a double set of numbers. * They should explain their reasoning by deciding first

			if the angle appears to be an angle that is less than the measure of a right angle (90°) or greater than the measure of a right angle (90°). If the angle appears to be less than 90°, it is an acute angle and its measure ranges from 0° to less than 90°. If the angle appears to be an angle that is greater than 90°, it is an obtuse angle and its measures range from greater than 90° to 180°. * Students believe a wide angle with short sides may seem smaller than a narrow angle with long sides. Students can compare two angles by tracing one and placing it over the other. • **How will students get the feedback they need?** Review of homework; Teacher feedback; Daily Teacher questioning; Daily teacher observation; Peer support; Pearson Computer Generated Lesson Quizzes;
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Investigations with various manipulatives, centimeter grid paper, protractors, Pattern blocks, Dot paper, White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Discussions; Class Practice; On-line activities;	**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):* Various manipulatives, centimeter grid paper, protractors, Pattern blocks, Dot paper, White boards and dry erase markers; Pearson center activities; Extension materials to enrich students; Computers	**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 Montoring; Accountability during instruction via white boards and dry ease markers; Fact Fluency Drills; Computer Generated Lesson Quizzes; Daily Common Core Review; Teacher Observation; Homework;