

## Curriculum Map: Common Core Math Grade 5

Course: Fifth-Math Subtopic: General

Grade(s): None specified

**Course Description:** Fifth grade students learn problem solving through the mathematical concepts of multiplication and division of whole numbers, explaining relationships and equivalencies among integers, fractions, decimals and percents, using patterns and relations to represent and analyze mathematical problems and number relationships using algebraic symbols, using spatial reasoning to recognize, describe and analyze geometric shapes and principles. They identify polygons and find the perimeter and area of triangles, parallelograms and trapezoids. Students evaluate simple algebraic expressions and use coordinate grids to represent points in the first quadrant that fit linear equations. Students learn Operations and Algebraic Thinking, Numbers and Operations in Base Ten, Numbers and Operations of Fractions, Measurement and Data, and Geometry through whole group instruction, small group instruction, including flexible learning groups, cooperative learning, and learning centers. The Mathematical Practice Standards apply across all mathematics courses and together with the content standards, prescribe that students experience mathematics as a coherent, useful and logical subject that makes use of their ability to make sense of problem situations.

**Course Textbooks, Workbooks, Materials Citations:** Buckle Down to the Common Core State Standards. (2011). New York: Triumph Learning  
Common Core Coach, Mathematics, 1st Edition, Grade 5. (2010). New York: Triumph Learning  
Crosswalk Coach for the Common Core State Standards, Mathematics, Grade 5. (2011). New York: Triumph Learning  
Measuring Up to the Pennsylvania Academic Standards. (2007), Saddle Brook, New Jersey: Peoples Education, Inc.  
McGraw-Hill Mathematics (Text Book, Daily Practice Homework Workbook, Reteach/Practice worksheets). (2002). New York: McMillan/McGraw-Hill  
Everyday Mathematics. (2012). Chicago: McGraw-Hill

**Curriculum Map Author(s):** Stephanie Baker, Tammy Bricker, Jamie Kamp, and Jamie Rizer

**Course Pacing Calendar:** (future work)

**Course Interdisciplinary Connections:** (future work)

**Course Notes:** (optional)

### Unit: Unit #1 Standards for Mathematical Practice

**Unit/Module Description:** In Grade 5, instructional time should focus on three critical areas: developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and developing understanding of volume.

**Unit/Module Big Ideas:**

1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.
2. Objects can be transformed in an infinite number of ways. Transformations can be described and analyzed mathematically.
3. Some questions can be answered by collecting, representing, and analyzing data and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it.
4. Numerical measures describe the center and spread of numerical data.

5. The likelihood of an event occurring can be described numerically and used to make predictions.
6. Numerical quantities and calculations can be estimated by using numbers that are close to the actual values, but easier to compute.
7. Some attributes of objects are measureable, e.g., length, mass, capacity, and can be quantified.
8. Measures can be estimated by using known referents.
9. Patterns exhibit relationships that can be extended, described, and generalized.
10. Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.
11. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.
12. Two- and three-dimensional objects can be described, classified, and analyzed by their attributes, and their location can be described quantitatively.
13. Spatial reasoning and visualization are ways to orient thinking about the physical world.

**Unit/Module  
Essential  
Questions:**

1. How will we make sense of problems and persevere in solving them?
2. How will we reason abstractly and quantitatively?
3. How will we construct viable arguments and critique the reasoning of others?
4. How will we model with mathematics?
5. How will we use appropriate tools strategically?
6. How will we attend to precision?
7. How will we look for and make use of structure?
8. How will we look for and express regularity in repeated reasoning?

**Unit/Module  
Key  
Terminology &  
Definitions:**

**Acute Angle** - an angle with a measure less than 90 degrees

**Acute Triangle**- a triangle that has three acute angles

**algorithm** -A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem in a finite number of steps.

**Area** - the measure, in square units, of the inside of a plane figure

**Array** - a rectangular arrangement of objects in rows and columns. Arrays are used in multiplication and division as it shows a great visual to show how multiplication can be shown as repeated addition and division can be shown as fair shares.

**Axis (axes)** - a perpendicular ray on a grid; plural axes

**Bar Graph** - a graph that uses bars of different heights to compare information

**Base** - the top or bottom of a three-dimensional figure

**Certain Outcome** - and outcome that will definitely occur every time

**Chord** - a line segment whose endpoints are on a circle

**Circle** - a round two-dimensional figure

**Circle Graph** - a data display that uses a circle divided into parts to represent different categories

**Circumference** - the distance around a circle

**Combination** - a group of items. Placing these items in a different order does not create a new combination.

**Common Denominator** - denominator that is the same number in two or more fractions

**Composite Number** - a whole number having more than two factors

**Coordinates** - the numbers in an ordered pair

**Cube** - a rectangular solid having 6 congruent square faces

<!--[if !supportLineBreakNewLine]-->

<!--[endif]-->

**Customary System** - This system of measurement is used most often in the United States . It includes linear measurement (length and distance), weight (how heavy an object is), capacity (the amount that a container can hold), and temperature (how hot or cold it is).

**Decimal** - a number with a decimal point

**Denominator** - in a fraction, the number below the fraction bar

**Diameter** - a line segment that has endpoints on a circle and passes through the center of the circle

**Dividend** - the number that divides the dividend

**Divisor** - the number that divides the dividend

**Digit** - Any of the numerals from 0 to 9

**Edge** - the line segment where two faces of a solid figure meet

**Equally Likely** - describes events that have the same probability of happening

**Equation** - a statement that two mathematical expressions are equal

**Equilateral Triangle** - a triangle that has three sides of the same length

**Equivalent** - having the same value

**Equivalent Rates** - rates that are equal, e.g., 60 miles per hour = 120 miles per two hours

**Estimate** - an answer that is close to, but not equal to, an exact answer

**Expanded Form** - a number written as the sum of the products of each digit and its place value. For example, the number 314 in expanded form is  $300 + 10 + 4$

**Exponent** - An Exponent is a mathematical notation that implies the number of times a number is to be multiplied by itself.

**Expression** - a variable, or any combination of numbers, variables, and symbols that represents a mathematical relationship. For example:  $24 \times 2 + 5$  or  $4a - 9$

**Face** - a plane figure that serves as one side of a solid figure

**Factor** - a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Fraction** - a number that names a part of a whole or part of a set

**Geometric Pattern** - a pattern made up of shapes

**Graph** - drawing that uses lines, points, pictures, or bars to show information

**Greatest Common Factor** - the largest factor that two or more numbers have in common

**Heptagon** - a polygon with 7 sides

**Histogram** - a bar graph in which the labels for the bars are numerical intervals

**Hypotenuse** - the longest side of a right triangle (which is also the side opposite of the right angle)

**Impossible Outcome** - an outcome that can never occur

**Inequality** - a mathematical sentence that contains a symbol that shows the terms on either side of the symbol are unequal. For example,  $3 + 4 < 6$

**Integer** - positive whole numbers, their opposites, and zero, e.g.... -3, -2, -1, 0, 1, 2, 3,...

**Intersecting Lines** - lines that meet or cross at a point

**Isosceles Triangle** – a triangle that has at least two sides of the same length

**Least Common Denominator** – the least common multiple of the denominators in two or more fractions

**Least Common Multiple** – the smallest number, other than zero, that is a common multiple of two or more numbers

**Least Likely** – a probability term that describes an event that is less likely to happen than any other event

**Leg (of a right triangle)** – either of the two sides that form the right angle in a right triangle

**Line** – a straight path extending in both directions with no endpoints

**Line Graph**-a data display that uses a line to show how something has changed over a period of time, or a trend

**Line of Symmetry** – a line on which a figure could be folded so that both halves match exactly

**Line Plot** – a graph showing the frequency of data on a number line

**Line Segment** – part of a line that has two endpoints

**Mean (average)** – the number found by dividing the sum of a set of numbers by the number of addends

**Measures of Central Tendency** – measures that give information about a set of data such as median, mode, and mean

**Median** – the middle number in an ordered set of data, or the average of the two middle numbers when the set has two middle numbers

**Metric System** - a decimal system of weights and measures.

**Mixed Number** – a number that has a whole number part and a fraction part

**Mode** – the number(s) that occurs most often in a set of data

**Most Likely** –a probability term that describes an event that is more likely to happen than any other event

**Multiple** – a number that is a result of multiplying a given number by a counting number

**Negative Number** – a number less than zero

**Nonagon** – a polygon with 9 sides

**Numerator** – in a fraction, the number above the fraction bar

**Obtuse Angle** – an angle with a measure more than 90 degrees

**Obtuse Triangle** – a triangle that has one obtuse angle

**Order of Operations** - Expressions are to be solved following the given order: Parenthesis, Exponents, Multiplication and Division (as you come to them left to right), Addition and Subtraction (as you come to them left to right)

**Ordered Pair** – a pair of numbers used to locate a point on a coordinate grid. The first number tells how far to move horizontally, and the second number tells how far to move vertically.

**Origin** – the point on a grid where the x-axis and the y-axis meet. The ordered pair that describes the origin is (0,0)

**Outcome** – the result of a probability experiment

**Parallel Lines** – lines that never intersect and are always the same distance apart

**Parallelogram** – a quadrilateral whose opposite sides are parallel and congruent

**Partial Quotient Division method** - The partial quotient method takes many steps to the quotient. At each step we find a partial answer. The partial answers are then added to find the

quotient.

**Pattern**- when certain numbers occur in a consistent, regular sequence.

**Perimeter** – the distance around a figure

**Perpendicular Lines** – lines that cross each other at a right angle

**Pictograph** – a graph that uses pictures to show and compare information

**Place Value** - The numerical value that a digit has by virtue of its position in a number.

**Power of Ten**- "Powers of 10" is a very useful way of writing down large or small numbers.

**Plane** – a flat surface that extends infinitely in all directions

**Polygon** – a closed figure made up of line segments that meet at their endpoints

**Prime Number** – a whole number other than 1 that has exactly two factors, 1 and itself

**Probability** – the likelihood that an event will occur

**Product** - the quantity obtained by multiplication

**Quadrants** – the four regions of a coordinate plane that are separated by the axes

**Quadrilateral** –a polygon with four sides and four angles

**Quotient** – the result of division

**Radius** –a line segment that has one endpoint on a circle and the other endpoint at the center of the circle

**Range** – the difference between the greatest and least numbers in a set of data

**Rate** – a ratio that compares two quantities having different

**Ratio** – a comparison of two numbers using division

**Ray** – a part of a line that has one endpoint and continues without end in one direction

**Rectangle** – a two-dimensional figure with 4 sides and 4 square corners

**Rectangular Prism** – a solid figure in which all 6 faces are rectangles

**Rectangular Pyramid** – a three dimensional figure with one rectangular base and four triangular faces

**Reflection (flip)** – a transformation that produces the mirror image of a figure

**Regular Polygon** - a polygon that has all sides congruent and all angles congruent

**Repeating Decimal** – a decimal that has a repeating sequence of numbers after the decimal point

**Remainder** - The number left over when one integer is divided by another: The remainder plus the product of the quotient times the divisor equals the dividend.

**Rhombus** – a parallelogram with 4 equal sides

**Right Angle** – an angle that measures exactly 90 degrees

**Right Triangle** – a triangle that has a 90 degree angle

**Rotation (turn)** – a movement of a figure that turns that figure around a fixed point

**Rounding** – expressing a number to the nearest 10, 100, 1,000 and so on

**Scalene Triangle** – a triangle with all sides of different lengths

**Similar Polygons** – polygons that have the same shape, but not necessarily the same size. Corresponding sides of similar polygons are proportional

**Square** – a rectangle with all 4 sides the same length

**Square Pyramid** – a three-dimensional figure with one square base and four triangular faces

**Straight Angle** – an angle with a measure of 180 degrees

**Symmetry** – a figure has symmetry if its parts match exactly when folded in half

**Term(s)** – part(s) of a rate, e.g.: in the rate 60 miles per hour, 60 miles and one hour are the terms

**Terminating Decimal** – a decimal that contains a finite number of digits

**Three-Dimensional Figure** – a figure that has length, width, and height

**Transformation** – the moving of a figure by a translation (slide), rotation (turn) or reflection (flip)

**Translation (slide)** – a movement of a figure to a new position without turning or flipping it

**Trapezoid** – a quadrilateral with exactly one pair of parallel sides

**Triangle** – a closed figure with 3 sides and 3 vertices

**Unit Price** – the price of a single item or amount

**Unit Rate** – a rate with the second term being one unit

**Variable** – a letter that stands for an unknown number in a mathematical expression or sentence

**Venn Diagram** – a diagram that shows relationships among sets of objects

**Vertex** – a point where lines, rays, sides of a polygon or edges of a polyhedron meet (corner)

**Volume** – the measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid. Its units are always "cubic".

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**X-axis** – the horizontal number line in a grid

**X-coordinate** – the first number in an ordered pair

**Y-axis** – the vertical number line in a grid

**Y-coordinate** – the second number in an ordered pair

**Unit/Module  
Student  
Learning  
Outcomes:**

1. Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

2. Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

3. Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-

dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

**Unit/Module Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- multiplication/division flash cards
- multiplication/division charts
- math journal
- graph paper
- base 10 blocks
- number line
- fraction strips/circles
- measuring cups/containers
- 2-D and 3-D chart
- three dimensional objects
- place value chart
- ruler/meterstick/yardstick
- protractor
- multiplication dice
- calculator
- bingo games

**Unit/Module Assignments:** optional

**Unit/Module Notes:** optional

## STANDARDS

STATE: [PA Common Core Standards \(2012\)](#)

- [CC.2.1.5.B.1 \(Advanced\)](#) Apply place value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.
- [CC.2.1.5.B.2 \(Advanced\)](#) Extend an understanding of operations with whole numbers to perform operations including decimals.
- [CC.2.1.5.C.1 \(Advanced\)](#) Use the understanding of equivalency to add and subtract fractions.
- [CC.2.1.5.C.2 \(Advanced\)](#) Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
- [CC.2.2.5.A.1 \(Advanced\)](#) Interpret and evaluate numerical expressions using order of operations.
- [CC.2.2.5.A.4 \(Advanced\)](#) Analyze patterns and relationships using two rules.
- [CC.2.3.5.A.1 \(Advanced\)](#) Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems.
- [CC.2.3.5.A.2 \(Advanced\)](#) Classify two-dimensional figures into categories based on an understanding of their properties.
- [CC.2.4.5.A.1 \(Advanced\)](#) Solve problems using conversions within a given measurement system.
- [CC.2.4.5.A.2 \(Advanced\)](#) Represent and interpret data using appropriate scale.
- [CC.2.4.5.A.4 \(Advanced\)](#) Solve problems involving computation of fractions using information provided in a line plot.
- [CC.2.4.5.A.5 \(Advanced\)](#) Apply concepts of volume to solve problems and relate volume to multiplication and to addition.

This Curriculum Map Unit has no Topics to display

## Unit: Unit #2 Operations and Algebraic Thinking

**Unit/Module Description:** Students study algebraic concepts to improve their abstract cognitive skills and develop mental discipline. They will write and interpret numerical expressions, and generate and analyze patterns and relationships. Students also expand their knowledge of numbers and equations, so they can use it in their everyday lives.

**Unit/Module  
Big Ideas:**

1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms
2. Numerical measures describe the center and spread of numerical data.  
<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->
3. Numerical quantities and calculations can be estimated by using numbers that are close to the actual values, but easier to compute.  
<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->
4. Patterns exhibit relationships that can be extended, described, and generalized.
5. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.
6. Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.  
<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Unit/Module  
Essential  
Questions:**

1. How is computation with fractions and decimals similar to and different from whole number computation?
2. How can an understanding of patterns, models, and relationships lead to an understanding of simple equations, and how can this pattern be generalized into an equation?
3. What are equations?
4. What happens when the same operation is performed on both sides of an equation?
5. What are function tables?
6. How can a function table be used to solve equations?
7. How does the order of operations affect the answer?
8. What operation comes first/second/next when solving a problem?
9. What are ordered pairs?
10. How does one graph ordered pairs in a coordinate plane?
11. Why are ordered pairs important when graphing?
12. How are numerical patterns generated using two different rules?

**Unit/Module  
Key  
Terminology &  
Definitions:**

**Combination** - a group of items. Placing these items in a different order does not create a new combination.

**Composite Number** - a whole number having more than two factors

**Coordinates** - the numbers in an ordered pair

**Equation** - a statement that two mathematical expressions are equal

**Estimate** - an answer that is close to, but not equal to, an exact answer

**Expression** - a variable, or any combination of numbers, variables, and symbols that represents a mathematical relationship. For example:  $24 \times 2 + 5$  or  $4a - 9$

**Factor** - a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Greatest Common Factor** - the largest factor that two or more numbers have in common



**Impossible Outcome** – an outcome that can never occur

**Inequality** – a mathematical sentence that contains a symbol that shows the terms on either side of the symbol are unequal. For example,  $3+4 \neq 6$

**Integer** – positive whole numbers, their opposites, and zero, e.g.... -3, -2, -1, 0, 1, 2, 3,...

**Multiple** – a number that is a result of multiplying a given number by a counting number

**Negative Number** – a number less than zero

**Ordered Pair** – a pair of numbers used to locate a point on a coordinate grid. The first number tells how far to move horizontally, and the second number tells how far to move vertically.

**Origin** – the point on a grid where the x-axis and the y-axis meet. The ordered pair that describes the origin is (0,0)

**Prime Number** – a whole number other than 1 that has exactly two factors, 1 and itself

**Quadrants** – the four regions of a coordinate plane that are separated by the axes

**Variable** – a letter that stands for an unknown number in a mathematical expression or sentence

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**X-axis** – the horizontal number line in a grid

**X-coordinate** – the first number in an ordered pair

**Y-axis** – the vertical number line in a grid

**Y-coordinate** – the second number in an ordered pair

**Unit/Module  
Student  
Learning  
Outcomes:**

1. Students will understand how to solve equations.
2. Students will understand how to use function tables to solve equations.
3. Students will understand ordered pairs and how to graph them in a coordinate plane.
4. Students will understand how to use integers in a function table and graph a line in the coordinate plane.
5. Students will understand how to identify and solve numerical expressions that contain parentheses, brackets, and/or braces.
6. Students will understand how to generate and interpret simple algebraic expressions without solving.
7. Students will understand how to generate two numerical patterns using two different rules.

**Unit/Module  
Student  
Performance  
Tasks:**

future work

**Unit/Module  
Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- Multiplication/Division Flashcards
- Multiplication/Division Chart
- Place Value Chart
- math journal
- graph paper

**Unit/Module  
Assignments:**

optional

**Unit/Module Notes:** optional

- Unit/Module Instructional Procedures & Activities:**
- Recognize how to simplify a numerical expression.
  - Explain the order for solving a numerical expression (multiplication, then division, then addition, then subtraction).
  - Explain the order for solving a numerical expression containing parentheses, then brackets, then braces.
  - Identify and solve numerical expressions that contain parentheses, brackets, and/or braces
  - Interpret a word problem into a numerical expression without evaluating.
  - Generate a simple algebraic expression representing the word problem.
  - Generate two numerical patterns using given rules.
  - Recognize the two rules and patterns within the table.

## STANDARDS

STATE: PA Common Core Anchors and Eligible Content (May 2012)

[M05.B-O.1.1.1 \(Advanced\)](#) Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions, and evaluate expressions containing these symbols.

[M05.B-O.1.1.2 \(Advanced\)](#) Write simple expressions that model calculations with numbers, and interpret numerical expressions without evaluating them. Example 1: Express the calculation "add 8 and 7, then multiply by 2" as  $2 \times (8 + 7)$ . Example 2: Recognize that  $3 \times (18,932 + 921)$  is three times as large as  $18,932 + 921$ , without having to calculate the indicated sum or product.

[M05.B-O.2.1.1 \(Advanced\)](#) Generate two numerical patterns using two given rules. Example: Given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences.

[M05.B-O.2.1.2 \(Advanced\)](#) Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules. Example: Given two patterns in which the first pattern follows the rule "add 8" and the second pattern follows the rule "add 2," observe that the terms in the first pattern are 4 times the size of the terms in the second pattern.

## Lesson Topic: Evaluating Numerical Expressions

**Core Lesson/Topic Description:** Students will write, interpret, and evaluate expressions using multiple grouping symbols.

**Core Lesson/Topic Big Ideas:** Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.

**Core Lesson/Topic Essential Questions:**

1. What operation comes first/second/next when solving a problem?
2. How does the order of operations affect the answer?

**Core Lesson/Topic Key Terminology & Definitions:**

**Expression** - a variable, or any combination of numbers, variables, and symbols the represents a mathematical relationship. For example:  $24 \times 2 + 5$  or  $4a - 9$

**Order of Operations** - Expressions are to be solved following the given order: Parenthesis, Exponents, Multiplication and Division (as you come to them left to right), Addition and Subtraction (as you come to them left to right)

**Core Lesson/Topic Student Learning Outcomes:** Students will understand how to identify and solve numerical expressions that contain parentheses, brackets, and/or braces.

**Core Lesson/Topic Instructional Procedures & Activities:** <!--[if !supportLists]-->

- Recognize how to simplify a numerical expression.
- Explain the order for solving a numerical expression (multiplication, then division, then addition, then subtraction).
- Explain the order for solving a numerical expression containing parentheses, then brackets, then braces.
- Identify and solve numerical expressions that contain parentheses, brackets, and/or braces.

**Core Lesson/Topic Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, www.commoncoresheets.com, measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal

**Core Lesson/Topic Assignments:** optional

**Core Lesson/Topic Notes:** optional

**Lesson Topic: Writing and Interpreting Numerical Expressions**

**Core Lesson/Topic Description:** Students will write and interpret numerical expressions.

**Core Lesson/Topic Big Ideas:** Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.

**Core Lesson/Topic Essential Questions:** [if !supportLists]-->

1. How do you interpret a word problem into a numerical expression ?
2. How do you generate a simple algebraic expression representing a word problem?

**Core Lesson/Topic Key Terminology & Definitions:** **Expression** - a variable, or any combination of numbers, variables, and symbols the represents a mathematical relationship. For example:  $4x + 2 + 5$  or  $4a - 9$

**Core Lesson/Topic Student Learning Outcomes:** Students will understand how to generate and interpret simple algebraic expressions without solving.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Interpret a word problem into a numerical expression without evaluating.
- Generate a simple algebraic expression representing the word problem.

<!--[if !supportLists]-->

**Core Lesson/Topic Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, www.commoncoresheets.com, measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal

**Core Lesson/Topic Assignments:** optional

**Core Lesson/Topic Notes:** optional

### Lesson Topic: Analyzing and Generating Numerical Expressions

**Core Lesson/Topic Description:** Students will generate and analyze patterns and relationships.

**Core Lesson/Topic Big Ideas:** Patterns exhibit relationships that can be extended, described, and generalized.

**Core Lesson/Topic Essential Questions:**

1. How are numerical patterns generated using two different rules?
2. How can an understanding of patterns, models, and relationships lead to an understanding of simple equations, and how can this pattern be generalized into an equation?

**Core Lesson/Topic Key Terminology & Definitions:** **Pattern-** when certain numbers occur in a consistent, regular sequence.

**Core Lesson/Topic Student Learning Outcomes:** Students will understand how to generate two numerical patterns using two different rules.

**Core Lesson/Topic Instructional Procedures & Activities:** <!--[if !supportLists]--> · Generate two numerical patterns using given rules.

**Core Lesson/Topic Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal

**Core Lesson/Topic Assignments:** optional

**Core Lesson/Topic Notes:** optional

### Unit: Unit #3 Numbers and Operations in Base Ten

**Unit/Module Description:** Students will understand the place value system. They will also perform operations with multi-digit whole numbers and with decimals to thousandths.

**Unit/Module Big Ideas:**

1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.
2. Numerical measures describe the center and spread of numerical data.
3. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of

expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

### Unit/Module Essential

#### Questions:

1. What relationships exist between the various strategies for division, and what makes some of these strategies more efficient than others?
2. How does one identify place value of whole numbers and decimals?
3. How can you find the value of a digit in a number?
4. How would one round and compare whole numbers and decimals?
5. What are the symbols used to compare numbers?
6. When do you round up/down?
7. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?
8. How do you use powers of ten to write numbers in expanded form?
9. How do you use place value to read and write decimals to the thousandths?

[if !supportLists]-->·

### Unit/Module Key Terminology & Definitions:

**Estimate** - an answer that is close to, but not equal to, an exact answer

**Expanded Form** - a number written as the sum of the products of each digit and its place value. For example, the number 314 in expanded form is  $300 + 10 + 4$

**Fraction** – a number that names a part of a whole or part of a set

**Greatest Common Factor** – the largest factor that 2 or more numbers have in common

**Inequality** – a mathematical sentence that contains a symbol that shows the terms on either side of the symbol are unequal. For example,  $3+4 \neq 6$

**Integer** – positive whole numbers, their opposites, and zero, e.g.... -3, -2, -1, 0, 1, 2, 3,...

**Least Common Multiple** – the smallest number, other than zero, that is a common multiple of two or more numbers

**Multiple** – a number that is a result of multiplying a given number by a counting number

**Negative Number** – a number less than zero

**Numerator** – in a fraction, the number above the fraction bar

**Quotient** – the result of division

**Rounding** – expressing a number to the nearest 10, 100, 1,000 and so on

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

### Unit/Module Student Learning Outcomes:

1. Students will understand how to read, write, and identify place value of whole numbers and decimals.
2. Students will understand how to round, compare, and order whole numbers and decimals.
3. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.

### Unit/Module

**Student Performance Tasks:** optional

**Unit/Module Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- multiplication/division flashcards
- number line
- place value chart
- multiplication dice

**Unit/Module Instructional Procedures & Activities:** future work

## STANDARDS

STATE: [PA Common Core Standards \(2012\)](#)

[CC.2.1.5.B.1 \(Advanced\)](#) Apply place value concepts to show an understanding of operations and rounding as they pertain to whole numbers and decimals.

[CC.2.1.5.B.2 \(Advanced\)](#) Extend an understanding of operations with whole numbers to perform operations including decimals.

STATE: [PA Common Core Anchors and Eligible Content \(May 2012\)](#)

[M05.A-T.1.1.1 \(Advanced\)](#) Demonstrate an understanding that in a multi-digit number, a digit in one place represents  $\frac{1}{10}$  of what it represents in the place to its left. Example: Recognize that in the number 770, the 7 in the tens place is  $\frac{1}{10}$  the 7 in the hundreds place.

[M05.A-T.1.1.2 \(Advanced\)](#) Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. Example 1:  $4 \times 10^2 = 400$   
Example 2:  $0.05 \div 10^3 = 0.00005$

[M05.A-T.1.1.3 \(Advanced\)](#) Read and write decimals to thousandths using base-ten numerals, word form, and expanded form. Example:  $347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (0.1) + 9 \times (0.01) + 2 \times (0.001)$

[M05.A-T.1.1.4 \(Advanced\)](#) Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols.

[M05.A-T.1.1.5 \(Advanced\)](#) Round decimals to any place (limit rounding to ones, tenths, hundredths, or thousandths place).

[M05.A-T.2.1.1 \(Advanced\)](#) Multiply multi-digit whole numbers (not to exceed 3-digit by 3-digit).

[M05.A-T.2.1.2 \(Advanced\)](#) Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.

[M05.A-T.2.1.3 \(Advanced\)](#) Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals).

## Lesson Topic: Using Place Value to Read and Write Decimals

**Core Lesson/Topic Description:** Students will understand the place value system.

**Core Lesson/Topic Big Ideas:** There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

**Core Lesson/Topic Essential Questions:** How do you use place value in order to read and write decimals to the thousandths?

**Core Lesson/Topic Expanded Form** - a number written as the sum of the products of each digit and its place

**Key Terminology & Definitions:**

value. For example, the number 314 in expanded form is  $300 + 10 + 4$

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to read, write, and identify place value of whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

[if !supportLists]-->

- Model decimals using concepts of base ten.
- Read and write decimals.
- Read and write decimals using fractions. (e.g.  $.35 = 35/100$  and thirty-five hundredths)
- Explain decimals in standard form, word form and expanded form.
- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- place value chart

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Comparing Decimals**

**Core Lesson/Topic Description:**

Students will understand the place value system.

**Core Lesson/Topic Big Ideas:**

There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

**Core Lesson/Topic Essential Questions:**

1. How does one identify place value of whole numbers and decimals?
2. How can you find the value of a digit in a number?
3. How would one round and compare whole numbers and decimals?
4. What are the symbols used to compare numbers?
5. When do you round up/down?
6. Why is it important to align numbers when one adds, subtracts, multiplies, divide, and compare whole numbers and decimals?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**Decimal** - a number with a decimal point

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to read, write, and identify place value of whole numbers and decimals.
2. Students will understand how to round, compare, and order whole numbers and decimals.
3. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Compare decimals using models, pictures, and numbers.
- Use appropriate symbol to compare decimals.
- Compare decimals to common benchmarks (e.g. 1, 0.5, 0.50, 0.500 and 1)
- Compare decimals using equivalent fractional form.
- Justify decimal comparisons using standard form, word form, and expanded form.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- number line
- place value chart

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Multiplying and Dividing by Powers of Ten**

**Core Lesson/Topic Description:**

Students will understand the place value system.

**Core Lesson/Topic Big Ideas:**

There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

**Core Lesson/Topic Essential Questions:**

In a multi-digit number, what relationship exists between a given digit, and the digit to its left and its right?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**Digit** - Any of the numerals from 0 to 9

**Exponent** - An Exponent is a mathematical notation that implies the number of times a number is to be multiplied by itself.

**Place Value** - The numerical value that a digit has by virtue of its position in a number.

**Power of Ten**- "Powers of 10" is a very useful way of writing down large or small numbers.

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
2. Students will understand that when we multiply or divide by powers of ten the exponent indicates how many places the decimal point is moving.



**Core Lesson/Topic Instructional Procedures & Activities:**

[if !supportLists]-->

- Explain that the value of a digit is determined by where in the number the digit occurs. Model tenths, hundredths, and thousandths.
- Explain that the value of a digit decreases by a multiple of 10 as it moves to the right and increases by a multiple of 10 as it moves to the left in a number.
- Look for patterns in what occurs when multiplying or dividing whole numbers by 10.
- Generate a model that represents a multi-digit number to manipulate and investigate the place value relationships.
- Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
- Recognize 10, 100, 1000, etc as powers of ten
- Identify the pattern and determine a rule when numbers are multiplied by 10, 100, 1000, etc.
- Identify the pattern and determine a rule when numbers are divided by 10, 100, 1000, etc.
- Use whole number exponents to denote powers of 10. (e.g.  $1000 = 10 \times 10 \times 10 = 10^3$ )
- Use tools such as tables to record results when multiplying or dividing with powers of ten.
- Identify and analyze patterns within tables when multiplying or dividing with powers of ten.
- Generalize a rule for multiplying or dividing by powers of ten with whole number exponents.
- Explain patterns in the number of zeroes in placement of the decimal when numbers are multiplied or divided by powers of ten.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core State Standards; Common Core Coach; Crosswalk Coach; Study Island; Otter Creek; [www.commoncoresheets.com](http://www.commoncoresheets.com); Measuring Up; McGraw-Hill Mathematics (textbook, Daily Practice Homework workbook, Reteach/Practice worksheets); Everyday Math

- math journal
- place value chart
- base 10 blocks

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

(optional)

**Lesson Topic: Multiplying Whole Numbers**

**Core Lesson/Topic Description:**

Students will perform operations with multi-digit whole numbers and with decimals to hundredths.

**Core Lesson/Topic Big Ideas:**

1. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Core Lesson/Topic Essential Questions:**

1. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**algorithm** -A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem in a finite number of steps.

**Factor** - a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Place Value** - The numerical value that a digit has by virtue of its position in a number.

**Product** - the quantity obtained by multiplication

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.
2. Students will fluently multiply three-digit by two-digit whole numbers using the standard algorithm.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Recall how to illustrate and explain the calculations of multi-digit whole numbers (e.g. equations, arrays, area models, partial products, etc.)
- Apply knowledge of numbers (including place value) to compose/decompose numbers when operating
- Justify the connection between previously learned strategies and the standard algorithm for multiplication.
- Fluently (accurately, efficiently, and flexibly) multiply using the standard algorithm.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- multiplication/division flashcards
- place value chart
- multiplication dice

**Core Lesson/Topic Assignments:** optional

**Core Lesson/Topic Notes:** optional

**Lesson Topic: Dividing Whole Numbers**

**Core Lesson/Topic Description:** Students will understand the place value system. They will also perform operations with multi-digit whole numbers and with decimals to thousandths.

**Core Lesson/Topic Big Ideas:**

1. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Core Lesson/Topic Essential Questions:**

1. What relationships exist between the various strategies for division, and what makes some of these strategies more efficient than others?
2. How does one identify place value of whole numbers and decimals?
3. How can you find the value of a digit in a number?

4. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**Array** - a rectangular arrangement of objects in rows and columns.

Arrays are used in multiplication and division as it shows a great visual to show how multiplication can be shown as repeated addition and division can be shown as fair shares.

**Dividend** - the number that is being divided

**Divisor** - the number that divides the dividend

**Partial Quotient Division method** - The partial quotient method takes many steps to the quotient. At each step we find a partial answer. The partial answers are then added to find the quotient.

**Quotient** – the result of division

**Remainder** - The number left over when one integer is divided by another: The remainder plus the product of the quotient times the divisor equals the dividend.

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Explain the inverse relationship between multiplication and division.
- Recall how to illustrate and explain the division of multi-digit whole numbers (e.g. equations, arrays, area models, partial quotients, etc.)
- Apply knowledge of numbers (including place value) to compose/decompose numbers when operating.
- Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- multiplication/division flashcards

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Multiplying/Dividing Decimals**

**Core Lesson/Topic Description:**

Students will understand the place value system. They will also perform operations with multi-digit whole numbers and with decimals to thousandths.

**Core Lesson/Topic Big Ideas:**

1. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Core Lesson/Topic Essential Questions:**

1. How does one identify place value of whole numbers and decimals?
2. How can you find the value of a digit in a number?
3. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**Decimal** - a number with a decimal point

**Dividend** - the number that is being divided

**Divisor** - the number that divides the dividend

**Factor** - a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Product** - the quantity obtained as a result of a multiplication problem.

**Quotient** - the result of division

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Recall place value and comparison of decimals.
- Apply the patterns of multiplication of whole numbers to multiplication of decimals.
- Model multiplication of decimals with concrete and pictorial models.
- Use the standard algorithm to multiply decimals.
- Apply the patterns of division of whole numbers to division of decimals.
- Model division of decimals with concrete and pictorial models.
- Multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- number line
- place value chart

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Adding/Subtracting Decimals**

**Core Lesson/Topic Description:**

Students will understand the place value system. They will also perform operations with multi-digit whole numbers and with decimals to thousandths.

**Core Lesson/Topic Big Ideas:** 1. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Core Lesson/Topic Essential Questions:**

1. How does one identify place value of whole numbers and decimals?
2. How can you find the value of a digit in a number?
3. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?

**Core Lesson/Topic Key Terminology & Definitions:**

**Decimal** - a number with a decimal point

**Place Value** - The numerical value that a digit has by virtue of its position in a number.

Whole Numbers – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to add, subtract, multiply, and divide whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Recall place value and comparison of decimals.
- Model addition and subtraction of decimals to thousandths using concrete (base ten blocks) and pictorial (hundred grids) representations.
- Apply place value knowledge to add and subtract decimal numbers to the thousandths place.
- Add and subtract decimals to hundredths using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- number line
- place value chart

**Core Lesson/Topic Assignments:** optional

**Core Lesson/Topic Notes:** optional

### Lesson Topic: Rounding Decimals Using Place Value

**Core Lesson/Topic Description:** Students will understand the place value system.

**Core Lesson/Topic Big Ideas:**

1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.

**Core Lesson/Topic Essential Questions:**

1. How does one identify place value of whole numbers and decimals?
2. How can you find the value of a digit in a number?
3. How would one round and compare whole numbers and decimals?
4. What are the symbols used to compare numbers?
5. When do you round up/down?
6. Why is it important to align numbers when one adds, subtracts, multiply, divide, and compare whole numbers and decimals?
7. How do you use place value to read and write decimals to the thousandths?

[if !supportLists]-->

**Core Lesson/Topic Key Terminology & Definitions:**

**Estimate** - an answer that is close to, but not equal to, an exact answer

**Place Value** - The numerical value that a digit has by virtue of its position in a number.

Rounding – expressing a number to the nearest 10, 100, 1,000 and so on

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to read, write, and identify place value of whole numbers and decimals.
2. Students will understand how to round, compare, and order whole numbers and decimals.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Create a visual representation of the decimal. (e.g. number lines, grids, and benchmark numbers)
- Explain that when you round a number, you have a choice between two options - a higher number or a lower number.
- Apply strategies to determine which of the two rounding options is closer to the actual number
- Use place value understanding to round decimals to any place.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- base ten blocks
- number line
- place value chart

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Unit: Unit #4 Numbers and Operations of Fractions**

**Unit/Module Description:** Students will use equivalent fractions as a strategy to add and subtract fractions. Students will also apply and extend previous understandings of multiplication and division to multiply and divide fractions.

**Unit/Module  
Big Ideas:**

1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms.
2. There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

<!--[if !supportLineBreakNewLine]-->  
<!--[endif]-->

**Unit/Module  
Essential  
Questions:**

1. How is computation with fractions and decimals similar to and different from whole number computation?
2. What are prime and composite numbers?
3. What is GCF?
4. What is LCM?
5. How does greatest common factor and least common multiple relate to adding and subtracting fractions?
6. How would one compare fraction and mixed numbers, and fractions and decimals?
7. How do equivalent fractions relate to simplest form?
8. How does one convert fractions to mixed numbers or fractions to mixed numbers?
9. How would one compare fraction and mixed numbers, and fractions and decimals?
10. Can one add and subtract fractions with different denominators?
11. How does one interpret division of a unit fraction by a whole number?

**Unit/Module  
Key  
Terminology &  
Definitions:**

**Common Denominator** - denominator that is the same number in two or more fractions

**Decimal** - a number with a decimal point

**Denominator** - in a fraction, the number below the fraction bar

**Dividend** - the number that divides the dividend

**Divisor** - the number that divides the dividend

**Equation** - a statement that two mathematical expressions are equal

**Equivalent** - having the same value

**Equivalent Rates** - rates that are equal, e.g., 60 miles per hour = 120 miles per two hours

**Estimate** - an answer that is close to, but not equal to, an exact answer

**Expression** - a variable, or any combination of numbers, variables, and symbols that represents a mathematical relationship. For example:  $24 \times 2 + 5$  or  $4a - 9$

**Factor** - a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Fraction** - a number that names a part of a whole or part of a set

**Greatest Common Factor** - the largest factor that two or more numbers have in common

**Inequality** - a mathematical sentence that contains a symbol that shows the terms on either side of the symbol are unequal. For example,  $3 + 4 < 6$

**Least Common Denominator** - the least common multiple of the denominators in two or more fractions

**Least Common Multiple** - the smallest number, other than zero, that is a common multiple of two or more numbers

**Mixed Number** – a number that has a whole number part and a fraction part

**Multiple** – a number that is a result of multiplying a given number by a counting number

**Negative Number** – a number less than zero

**Numerator** – in a fraction, the number above the fraction bar

**Prime Number** – a whole number other than 1 that has exactly two factors, 1 and itself

**Quotient** – the result of division

**Rate** – a ratio that compares two quantities having different

**Ratio** – a comparison of two numbers using division

**Repeating Decimal** – a decimal that has a repeating sequence of numbers after the decimal point

**Rounding** – expressing a number to the nearest 10, 100, 1,000 and so on

**Term(s)** – part(s) of a rate, e.g.: in the rate 60 miles per hour, 60 miles and one hour are the terms

**Terminating Decimal** – a decimal that contains a finite number of digits

**Unit Price** – the price of a single item or amount

**Unit Rate** – a rate with the second term being one unit

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Unit/Module  
Student  
Learning  
Outcomes:**

1. Students will understand how to find GCF and LCM.
2. Students will understand how to find equivalent fractions.
3. Students will understand how to write fractions in simplest form.
4. Students understand how to compare fractions, mixed numbers, and decimals.
5. Students will understand how to add, subtract, multiply, and divide fractions and mixed numbers.
6. Students will understand how to solve word problems involving fractions and mixed numbers.

**Unit/Module  
Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- fraction strips/circles
- fraction flash cards
- fraction bingo
- place value chart

**Unit/Module  
Assignments:**

optional

**Unit/Module  
Notes:**

optional

**STANDARDS**

STATE: PA Common Core Standards (2012)

[CC.2.1.5.C.1 \(Advanced\)](#) Use the understanding of equivalency to add and subtract fractions.

[CC.2.1.5.C.2 \(Advanced\)](#) Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

STATE: PA Common Core Anchors and Eligible Content (May 2012)

[M05.A-F.1.1.1 \(Advanced\)](#) Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and



representations.) Example:  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$

[M05.A-F.2.1.1 \(Advanced\)](#)

Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers).

[M05.A-F.2.1.2 \(Advanced\)](#)

Multiply a fraction (including mixed numbers) by a fraction.

[M05.A-F.2.1.3 \(Advanced\)](#)

Demonstrate an understanding of multiplication as scaling (resizing).

[M05.A-F.2.1.4 \(Advanced\)](#)

Divide unit fractions by whole numbers and whole numbers by unit fractions.

### Lesson Topic: Add/Subtract Fractions (including Mixed Numbers)

#### Core

#### Lesson/Topic Description:

Students will use equivalent fractions as a strategy to add and subtract fractions.

#### Core

#### Lesson/Topic Big Ideas:

There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

#### Core

#### Lesson/Topic Essential Questions:

1. How is computation with fractions and decimals similar to and different from whole number computation?
2. What are prime and composite numbers?
3. What is GCF?
4. What is LCM?
5. How does greatest common factor and least common multiple relate to adding and subtracting fractions?
6. How do equivalent fractions relate to simplest form?
7. How does one convert fractions to mixed numbers or fractions to mixed numbers?
8. How would one compare fraction and mixed numbers, and fractions and decimals?
9. Can one add and subtract fractions with different denominators?

#### Core

#### Lesson/Topic Key Terminology & Definitions:

**Common Denominator** - denominator that is the same number in two or more fractions

**Denominator** - in a fraction, the number below the fraction bar

**Equivalent** - having the same value

**Factor** – a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Fraction** – a number that names a part of a whole or part of a set

**Greatest Common Factor** – the largest factor that 2 or more numbers have in common

**Least Common Denominator** – the least common multiple of the denominators in two or more fractions

**Least Common Multiple** – the smallest number, other than zero, that is a common multiple of two or more numbers

**Mixed Number** – a number that has a whole number part and a fraction part

**Multiple** – a number that is a result of multiplying a given number by a counting number

**Numerator** – in a fraction, the number above the fraction bar

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to find GCF and LCM.
2. Students will understand how to find equivalent fractions.
3. Students will understand how to write fractions in simplest form.
4. Students understand how to compare fractions, mixed numbers, and decimals.
5. Students will understand how to add, subtract, multiply, and divide fractions and mixed numbers.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Recall adding and subtracting of fractions including mixed numbers with like denominator
- Recall creating equivalent fraction.
- Compare fractions with like and unlike denominators.
- Create equivalent fractions with unlike denominator including mixed numbers.
- Decompose mixed numbers into the sum of a whole number and a proper fraction in order to add and subtract more efficiently.

<!--[if !supportLists]-->

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- fraction strips/circles
- fraction flash cards
- fraction bingo
- place value chart

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Multiply Fractions**

**Core Lesson/Topic Description:**

Students will apply and extend previous understandings of multiplication to multiply fractions.

**Core Lesson/Topic Big Ideas:**

There are some mathematical relationships that are always true and these relationships are used as the the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

**Core Lesson/Topic Essential Questions:**

How does one convert fractions to mixed numbers or fractions to mixed numbers?

**Core Lesson/Topic Key Terminology & Definitions:**

**Denominator** - in a fraction, the number below the fraction bar

**Equivalent** - having the same value

**Factor** – a whole number that divides evenly into another whole number. For example, 1, 3, 5, and 15 are factors of 15

**Fraction** – a number that names a part of a whole or part of a set

**Mixed Number** – a number that has a whole number part and a fraction part

**Numerator** – in a fraction, the number above the fraction bar

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to write fractions in simplest form.
2. Students understand how to compare fractions, mixed numbers, and decimals.
3. Students will understand how to add, subtract, multiply, and divide fractions and mixed numbers.
4. Students will understand how to solve word problems involving fractions and mixed numbers.

**Core Lesson/Topic Instructional Procedures & Activities:**

- <!--[if !supportLists]-->
- Use repeated addition to multiply a unit fraction by a whole number. (e.g.  $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ )
  - Interpret the product of a fraction multiplied by a whole number. (e.g.  $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$  is the same as  $\frac{2}{3} \times 4 = \frac{8}{3}$ )
  - Create a visual model of multiplication of a fraction by a whole number.
  - Create a story context for multiplying a fraction by a whole number. (e.g. Kelly needs  $\frac{2}{3}$  of a yard of ribbon to make her bow. She wants to make 4 bows. How much ribbon does she need?)

**Core Lesson/Topic Materials:**

- Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek
- math journal

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Divide Fractions**

**Core Lesson/Topic Description:**

Students will apply and extend previous understandings of division to divide fractions.

**Core Lesson/Topic Big Ideas:**

There are some mathematical relationships that are always true and these relationships are used as the rules of arithmetic and algebra and are useful for writing equivalent forms of expressions and solving equations and inequalities.

**Core Lesson/Topic Essential Questions:**

1. How does one convert fractions to mixed numbers or fractions to mixed numbers?
2. How does one interpret division of a unit fraction by a whole number?

**Core Lesson/Topic Key Terminology & Definitions:**

**Denominator** - in a fraction, the number below the fraction bar

**Dividend** - the number that divides the dividend

**Divisor** - the number that divides the dividend

**Equivalent** - having the same value

**Fraction** – a number that names a part of a whole or part of a set

**Mixed Number** – a number that has a whole number part and a fraction part

**Numerator** – in a fraction, the number above the fraction bar

**Quotient** – the result of division

**Whole Numbers** – the counting numbers plus zero; 1, 2, 3, 4 ...

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to find equivalent fractions.
2. Students will understand how to write fractions in simplest form.
3. Students understand how to compare fractions, mixed numbers, and decimals.
4. Students will understand how to add, subtract, multiply, and divide fractions and mixed numbers.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Explain dividing a unit fraction by a whole number results in equal parts that are smaller than the original fraction.
- Create models and use equi-partitioning to demonstrate dividing a unit fraction by a whole number.
- Connect fact families to dividing a unit fraction by a whole number.
- Explain the relationship between multiplication, division, and reciprocals.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

## Unit: Unit #5 Measurement and Data

**Unit/Module Description:**

Students learn to collect, represent, interpret, and analyze data and assess the reliability of conclusions based on sample data using and applying the basic principles of statistical analysis. They will also be able to convert like measurement units within a given measurement system; understand concepts of volume and relate volume to multiplication and to addition.

**Unit/Module Big Ideas:**

1. Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.
2. Numerical measures describe the center and spread of numerical data.
3. The likelihood of an event occurring can be described numerically and used to make predictions.
4. Some attributes of objects are measurable, e.g., length, mass, capacity, and can be quantified.
5. Measures can be estimated by using known referents.
6. Some questions can be answered by collecting, representing, and analyzing data and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it.

**Unit/Module Essential Questions:**

1. How can we measure volume?
2. When is an estimated measurement more appropriate than an actual measurement?
3. How can we gather, record, and organize information, and how does the type of data influence the choice of display?

4. How do we measure capacity, weight, or mass?
5. What unit of measurement is used to measure how long/heavy an object is?
6. When is it proper to use a bar graph, histogram, circle graph, line graph?
7. How does data help when interpreting graphs?
8. What operations are used when converting measurements?
9. What operation is used when converting from a cup to a gallon?

**Unit/Module  
Key  
Terminology &  
Definitions:**

**Acute Angle** - an angle with a measure less than 90 degrees

**Area** - the measure, in square units, of the inside of a plane figure

**Bar Graph** - a graph that uses bars of different heights to compare information

**Certain Outcome** - and outcome that will definitely occur every time

**Circle Graph** - a data display that uses a circle divided into parts to represent different categories

**Circumference** - the distance around a circle

**Combination** - a group of items. Placing these items in a different order does not create a new combination.

**Diameter** - a line segment that has endpoints on a circle and passes through the center of the circle

**Equally Likely** - describes events that have the same probability of happening

**Graph** – drawing that uses lines, points, pictures, or bars to show information

**Histogram** – a bar graph in which the labels for the bars are numerical intervals

**Impossible Outcome** – an outcome that can never occur

**Least Likely** – a probability term that describes an event that is less likely to happen than any other event

**Line Graph**-a data display that uses a line to show how something has changed over a period of time, or a trend

**Line Plot** – a graph showing the frequency of data on a number line

**Mean (average)** – the number found by dividing the sum of a set of numbers by the number of addends

**Median** – the middle number in an ordered set of data, or the average of the two middle numbers when the set has two middle numbers

**Measures of Central Tendency** – measures that give information about a set of data such as median, mode, and mean

**Mode** – the number(s) that occurs most often in a set of data

**Most Likely** –a probability term that describes an event that is more likely to happen than any other event

**Obtuse Angle** – an angle with a measure more than 90 degrees

**Outcome** – the result of a probability experiment

**Perimeter** – the distance around a figure

**Pictograph** – a graph that uses pictures to show and compare information

**Probability** – the likelihood that an event will occur

**Radius** –a line segment that has one endpoint on a circle and the other endpoint at the center of the circle

**Range** – the difference between the greatest and least numbers in a set of data

**Straight Angle** – an angle with a measure of 180 degrees

- Unit/Module Student Learning Outcomes:**
1. Students will understand how to measure objects.
  2. Students will understand how to convert units of measurement including length, capacity, and weight/mass.
  3. Students will understand how to collect and organize data in plots and graphs.
  4. Students will understand how to draw conclusions and make predictions from data displays.

**Unit/Module Materials:** Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- measuring cups/containers
- ruler/yardstick/meterstick/tape measure
- protractor
- graph paper
- 

## STANDARDS

STATE: PA Common Core Standards (2012)

[CC.2.4.5.A.1 \(Advanced\)](#) Solve problems using conversions within a given measurement system.

[CC.2.4.5.A.2 \(Advanced\)](#) Represent and interpret data using appropriate scale.

[CC.2.4.5.A.4 \(Advanced\)](#) Solve problems involving computation of fractions using information provided in a line plot.

[CC.2.4.5.A.5 \(Advanced\)](#) Apply concepts of volume to solve problems and relate volume to multiplication and to addition.

STATE: PA Common Core Anchors and Eligible Content (May 2012)

[M05.D-M.1.1.1 \(Advanced\)](#) Convert among different-sized measurement units within a given measurement system. A table of equivalencies will be provided. Example: Convert 5 cm to meters.

[M05.D-M.2.1.1 \(Advanced\)](#) Solve problems involving computation of fractions by using information presented in line plots.

[M05.D-M.2.1.2 \(Advanced\)](#) Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.

[M05.D-M.3.1.1 \(Advanced\)](#) Apply the formulas  $V = l \times w \times h$  and  $V = B \times h$  for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. Formulas will be provided.

[M05.D-M.3.1.2 \(Advanced\)](#) Find volumes of solid figures composed of two non-overlapping right rectangular prisms.

## Lesson Topic: Converting Units of Measure to Solve Problems

**Core Lesson/Topic Description:** Students will be able to convert like measurement units within a given measurement system.

**Core Lesson/Topic Big Ideas:** Measurement conversions can be used in solving multi-step, real world problems.

**Core**

**Lesson/Topic Essential Questions:**

What operations are used when converting measurements?

**Core Lesson/Topic Key Terminology & Definitions:**

**Customary System** - This system of measurement is used most often in the United States . It includes linear measurement (length and distance), weight (how heavy an object is), capacity (the amount that a container can hold), and temperature (how hot or cold it is).

**Metric System** - a decimal system of weights and measures.

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to convert units of measurement including length, capacity, and weight/mass.

**Core Lesson/Topic Instructional Procedures & Activities:**

[if !supportLists]--> <!--[endif]-->

- Recall standard measurement units in the customary and metric system. (e.g. length, mass, and liquid volume/capacity)
- Convert among units of time: second, minute, hour, day, week, month, year
- Solve multi-step, real-world problems involving conversion of standard measurement units.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- measuring cups/containers
- ruler/yardstick/meterstick/tape measure
- graph paper

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Line Plots**

**Core Lesson/Topic Description:**

Students learn to collect, represent, interpret, and analyze data and assess the reliability of conclusions based on sample data using and applying the basic principles of statistical analysis.

**Core Lesson/Topic Big Ideas:**

Some questions can be answered by collecting, representing, and analyzing data and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it.

**Core Lesson/Topic Essential Questions:**

1. How can we gather, record, and organize information, and how does the type of data influence the choice of display?
2. How does data help when interpreting graphs?

**Core Lesson/Topic Key Terminology & Definitions:**

**Bar Graph** - a graph that uses bars of different heights to compare information

**Circle Graph** - a data display that uses a circle divided into parts to represent different categories

**Graph**– drawing that uses lines, points, pictures, or bars to show information

**Histogram** – a bar graph in which the labels for the bars are numerical intervals

**Line Graph**-a data display that uses a line to show how something has changed over a period of time, or a trend

**Line Plot** – a graph showing the frequency of data on a number line

**Pictograph** – a graph that uses pictures to show and compare information

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to collect and organize data in plots and graphs.
2. Students will understand how to draw conclusions and make predictions from data displays.

**Core Lesson/Topic Instructional Procedures & Activities:**

- Measure a set of objects to a given fractional unit. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ )
- Create a line plot based on collected fractional measurements knowing that a line plot shows consecutive measurements along the axis within a given range.
- Solve problems involving operations with fractions by analyzing a line plot.

<!--[if !supportLists]-->

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- ruler/yardstick/meterstick/tape measure
- graph paper

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

### Lesson Topic: Understanding and Measuring Volume

**Core Lesson/Topic Description:**

Students will understand concepts of volume and relate volume to multiplication and to addition.

**Core Lesson/Topic Big Ideas:**

1. Some attributes of objects are measurable, e.g., length, mass, capacity, and can be quantified.
2. Measures can be estimated by using known referents.

**Core Lesson/Topic Essential Questions:**

1. How can we measure volume?
2. When is an estimated measurement more appropriate than an actual measurement?

**Core Lesson/Topic Key Terminology & Definitions:**

**Volume** - the measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid. It's units are always "cubic".

**Core Lesson/Topic**



**Student Learning Outcomes:**

Students will understand how to measure objects.

**Core Lesson/Topic Instructional Procedures & Activities:**

[if !supportLists]-->

- Calculate volume by using the formula(s)  $V = l \times w \times h$  and  $V = b \times h$
- Measure volume of a rectangular prism using cubic units.
- Measure volume by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- Explore attributes of cubic objects including nonstandard units
- Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
- Explain that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- measuring cups/containers
- ruler/yardstick/meterstick/tape measure
- graph paper

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

## Unit: Unit #6 Geometry

**Unit/Module Description:**

Students sharpen their thinking skills through the study of spatial relations, the process of logical reasoning and deductive thinking. Students will be able to graph points on the coordinate plane to solve real-world and mathematical problems. They will also be able to classify two-dimensional figures into categories based on their properties.

**Unit/Module Big Ideas:**

1. Objects can be transformed in an infinite number of ways. Transformations can be described and analyzed mathematically.
2. Two- and three-dimensional objects can be described, classified, and analyzed by their attributes, and their location can be described quantitatively.
3. Spatial reasoning and visualization are ways to orient thinking about the physical world.

**Unit/Module Essential Questions:**

1. How can we use 2- and 3-shapes and attributes to describe real world solids and solve problems?
2. How would one classify geometric figures?
3. What is a quadrilateral?
4. What is a polygon?
5. How would one classify a figure based on its properties?

6. What are the three classifications of the triangles by their sides/angles?
7. What is the difference between a reflection, rotation, and translation?
8. How would one graph a transformation?

**Unit/Module  
Key  
Terminology &  
Definitions:**

Acute Angle- an angle with a measure less than 90 degrees

Acute Triangle- a triangle that has three acute angles

Base - the top or bottom of a three-dimensional figure

Chord - a line segment whose endpoints are on a circle  
Cube - a rectangular solid having 6 congruent square faces

Diameter - a line segment that has endpoints on a circle and passes through the center of the circle

Edge - the line segment where two faces of a solid figure meet

Equilateral Triangle - a triangle that has three sides of the same length  
Face - a plane figure that serves as one side of a solid figure

Pattern – a pattern made up of shapes  
Geometric Heptagon – a polygon with 7 sides

Hypotenuse – the longest side of a right triangle (which is also the side opposite of the right angle)

Intersecting Lines – lines that meet or cross at a point

Isosceles Triangle – a triangle that has at least two sides of the same length

Leg (of a right triangle) – either of the two sides that form the right angle in a right triangle

Line – a straight path extending in both directions with no endpoints  
Line of

Symmetry – a line on which a figure could be folded so that both halves match exactly

Line Segment – part of a line that has two endpoints  
Nonagon – a polygon with 9 sides

Obtuse Angle – an angle with a measure more than 90 degrees  
Obtuse Triangle – a triangle that has one obtuse angle

Parallel Lines – lines that never intersect and are always the same distance apart

Parallelogram – a quadrilateral whose opposite sides are parallel and congruent

Perpendicular Lines – lines that cross each other at a right angle

Plane – a flat surface that extends infinitely in all directions  
Polygon – a closed figure made up of line segments that meet at their endpoints

Quadrilateral – a polygon with four sides and four angles

Ray – a part of a line that has one endpoint and continues without end in one direction

Rectangle – a two-dimensional figure with 4 sides and 4 square corners  
Rectangular

Prism – a solid figure in which all 6 faces are rectangles  
Rectangular Pyramid – a three dimensional figure with one rectangular base and four triangular faces

Reflection (flip) – a transformation that produces the mirror image of a figure

Regular Polygon - a polygon that has all sides congruent and all angles congruent

Rhombus – a parallelogram with 4 equal sides

Right Angle– an angle that measures exactly 90 degrees

Right Triangle– a triangle that has a 90 degree angle

Rotation (turn) – a movement of a figure that turns that figure around a fixed point

Scalene Triangle – a triangle with all sides of different lengths

Similar Polygons – polygons that have the same shape, but not necessarily the same size. Corresponding sides of similar polygons are proportional

Square – a rectangle with all 4 sides the same length

Square Pyramid – a three-dimensional figure with one square base and four triangular faces

Straight Angle – an angle with a measure of 180 degrees

Symmetry – a figure has symmetry if its parts match exactly when folded in half

Three-Dimensional Figure – a figure that has length, width, and height

Transformation – the moving of a figure by a translation (slide), rotation (turn) or reflection (flip)

Translation (slide) – a movement of a figure to a new position without turning or flipping it

Trapezoid – a quadrilateral with exactly one pair of parallel sides Triangle – a closed figure with 3 sides and 3 vertices

Vertex – a point where lines, rays, sides of a polygon or edges of a polyhedron meet (corner)

**Unit/Module  
Student  
Learning  
Outcomes:**

1. Students will understand how to identify geometric figures.
2. Students will understand how to classify figures based on their properties.
3. Students will understand how to classify angles, triangles, quadrilateral, and other polygons.
4. Students will understand how to graph and identify transformations.

**Unit/Module  
Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- three-dimensional objects
- graph paper
- protractor
- 2D and 3D charts
- 

**STANDARDS**

STATE: PA Common Core Standards (2012)

[CC.2.3.5.A.1 \(Advanced\)](#) Graph points in the first quadrant on the coordinate plane and interpret these points when solving real world and mathematical problems.

[CC.2.3.5.A.2 \(Advanced\)](#) Classify two-dimensional figures into categories based on an understanding of their properties.

STATE: PA Common Core Anchors and Eligible Content (May 2012)

[M05.C-G.1.1.1 \(Advanced\)](#) Identify parts of the coordinate plane (x-axis, y-axis, and the origin) and the ordered pair (x-coordinate and y-coordinate). Limit the coordinate plane to quadrant I.

[M05.C-G.1.1.2 \(Advanced\)](#) Represent real-world and mathematical problems by plotting points in quadrant I of the coordinate plane, and interpret coordinate values of points in the context of the situation.

[M05.C-G.2.1.1 \(Advanced\)](#) Classify two-dimensional figures in a hierarchy based on properties. Example 1: All polygons have at least 3 sides, and pentagons are polygons, so all pentagons have at least 3 sides. Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram, as a quadrilateral, and as a polygon.

**Lesson Topic: Classify Two-Dimensional Figures**

**Core Lesson/Topic Description:**

Students will be able to classify two-dimensional figures into categories based on their properties.

**Core Lesson/Topic Big Ideas:**

Two-dimensional objects can be described, classified, and analyzed by their attributes, and their location can be described quantitatively.

**Core Lesson/Topic Essential Questions:**

1. How would one classify geometric figures?
2. What is a quadrilateral?
3. What is a polygon?
4. How would one classify a figure based on its properties?
5. What are the three classifications of the triangles by their sides/angles?

**Core Lesson/Topic Key Terminology & Definitions:**

Acute Angle- an angle with a measure less than 90 degrees

Acute Triangle- a triangle that has three acute angles

Base - the top or bottom of a three-dimensional figure

Chord - a line segment whose endpoints are on a circle Cube - a rectangular solid having 6 congruent square faces

Diameter - a line segment that has endpoints on a circle and passes through the center of the circle

Equilateral Triangle;- a triangle that has three sides of the same length

Hypotenuse – the longest side of a right triangle (which is also the side opposite of the right angle)

Intersecting Lines – lines that meet or cross at a point

Isosceles Triangle – a triangle that has at least two sides of the same length

Leg (of a right triangle) – either of the two sides that form the right angle in a right triangle

Line – a straight path extending in both directions with no endpoints Line of

Symmetry – a line on which a figure could be folded so that both halves match exactly

Line Segment – part of a line that has two endpoints Nonagon – a polygon with 9 sides

Obtuse Angle – an angle with a measure more than 90 degrees Obtuse Triangle – a triangle that has one obtuse angle

Parallel Lines – lines that never intersect and are always the same distance apart

Parallelogram – a quadrilateral whose opposite sides are parallel and congruent

Perpendicular Lines – lines that cross each other at a right angle

Plane – a flat surface that extends infinitely in all directions Polygon – a closed figure made up of line segments that meet at their endpoints

Quadrilateral – a polygon with four sides and four angles

Ray – a part of a line that has one endpoint and continues without end in one direction

Rectangle – a two-dimensional figure with 4 sides and 4 square corners Rectangular

Regular Polygon - a polygon that has all sides congruent and all angles congruent

Rhombus – a parallelogram with 4 equal sides

Right Angle– an angle that measures exactly 90 degrees

Right Triangle– a triangle that has a 90 degree angle

Scalene Triangle – a triangle with all sides of different lengths

Similar Polygons – polygons that have the same shape, but not necessarily the same size. Corresponding sides of similar polygons are proportional

Square – a rectangle with all 4 sides the same length

Straight Angle – an angle with a measure of 180 degrees

**Core Lesson/Topic Student Learning Outcomes:**

1. Students will understand how to identify geometric figures.
2. Students will understand how to classify figures based on their properties.
3. Students will understand how to classify angles, triangles, quadrilateral, and other polygons.

**Core Lesson/Topic Instructional Procedures & Activities:**

- <!--[if !supportLists]-->
- Describe properties of a variety to shapes including but not limited to triangles, quadrilaterals (parallelograms, trapezoids, rectangles, rhombuses, squares), pentagons, hexagons, and octagons.
  - Identify whether a shape has a specified property.
  - Recognize that some shapes are subcategories of other shapes.
  - Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
  - Organize a hierarchy of polygons
  - Reason about attributes of shapes to determine whether or not they belong in given categories.
  - Justify categorization of two-dimensional figures. Classify two-dimensional figures based on properties.

**Core Lesson/Topic Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- graph paper
- 2D charts

**Core Lesson/Topic Assignments:**

optional

**Core Lesson/Topic Notes:**

optional

**Lesson Topic: Coordinate Graphs**

**Core Lesson/Topic Description:**

Students will be able to graph points on the coordinate plane to solve real-world and mathematical problems.

**Core Lesson/Topic Big Ideas:**

All points in a plane can be described in terms of its location using an ordered pair.

**Core Lesson/Topic Essential Questions:**

1. Why is the origin important in coordinate graphing?
2. How is a point located on a coordinate plane?

**Core Lesson/Topic Key Terminology & Definitions:**

Line – a straight path extending in both directions with no endpoints Line of

Perpendicular Lines – lines that cross each other at a right angle

Plane – a flat surface that extends infinitely in all directions Polygon – a closed figure made up

of line segments that meet at their endpoints

Point- an exact location

**Core  
Lesson/Topic  
Student  
Learning  
Outcomes:**

1. Students will understand how to identify geometric figures.
2. Students will understand how to classify figures based on their properties.
3. Students will understand how to classify angles, triangles, quadrilateral, and other polygons.
4. Students will understand how to graph and identify transformations.

**Core  
Lesson/Topic  
Instructional  
Procedures &  
Activities:**

- Identify quadrant I on a coordinate plane
- Identify the origin, x and y axes on a coordinate plane
- Explain why the origin is important in coordinate graphing
- Recognize that any point in the plane can be described in terms of its location using an ordered pair in which the first number corresponds to the x value and the second number corresponds to the y value
- Recognize that coordinates give information about the distance of a point from the origin along each axis.
- Locate the point on a coordinate plane that corresponds to a given ordered pair
- Determine the coordinate of a given point
- Explain attributes of a coordinate plane
- Use an ordered pair to locate a specific point on a coordinate grid.
  
- Interpret the location of a point on a coordinate grid by writing its corresponding ordered pair
- Describe the movement required to move from one point to another on a coordinate plane using specific vocabulary.
- Identify coordinates of missing points in geometric figures based on knowledge of attributes of polygons.
- Analyze how moving a point in a geometric figure will change its properties.

<!--[endif]-->

**Core  
Lesson/Topic  
Materials:**

Buckle Down to the Common Core Standards, Common Core coach, Crosswalk Coach, Study Island, [www.commoncoresheets.com](http://www.commoncoresheets.com), measuring Up, McGraw-Hill Mathematics (Textbook, Daily Practice Homework Workbook, Reteach/Practice worksheets), Everyday Math, Otter Creek

- math journal
- graph paper

**Core  
Lesson/Topic  
Assignments:**

optional

**Core  
Lesson/Topic  
Notes:**

optional