Grade 5

Unit	Unit Title	Lesson	Day
3.1	**Representing & Interpreting Data Using Fractions**	**1**	**1 - 5**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2,1/4,1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers (found in the line plot), find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*	•Make a line plot to display a data set of measurements in fractions of (1/2,1/4,1/8). •Use operations on fractions for this grade (add & sub fractions with unlike denominators, including mixed numbers; multiply fractions, divide unit fractions by whole number, divide whole number by unit fractions) to solve problems involving information presented in line plots. •(Investigations Lesson only) Understand how to find the range and median of a set of data using a line plot.	**SMP1** Make sense of problems and persevere in solving them. **SMP2** Reason abstractly and quantitatively. **SMP6** Attend to precision.	•How can a line plot help you find the average with data given in fractions? •How is finding the average and distributing equally the same or different? •What is the range (median) of this set of data? (Investigations Snap-in) •Which is longer? Shorter? •How many times longer is..? •What is the combined weight of… ? •What are (1-3) comparative statements you can write about the data in the line plot?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
•Solve problems using all four operations on fractions. •Understand how to read data on a graph or chart.	Data Line plot Equally Average Range & Median (Investigations Snap-ins only)	•Inappropriate use of the operations. Incorrectly reading the line plot: •Key may state that the "x" means more than one. •Confusing the numbers on the horizontal line with the value of the "x". For example, Which grade read the most books? Students may choose 5 because that is the greatest number they see along the horizontal line, but the third grade may have the most "x's", meaning the third grade read the most.	**Oncore** Lesson 85 Student pages 169 – 170 **K-5 Math Resources** *Fractions on a Line Plot* *Sacks of Flour* **Measurement and Data** *www.CommonCoreSheets.com* Line Plots: Pencils, Keys (½ and ¼ only; no 1/8) **Investigations Snap-in**

			Unit 9 Session 1.6A p. C108-114

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Teachers will guide students to make a line plot to display a data set of measurements in fractions (1/2, ¼, 1/8). Teachers will provide practice using the operations on fractions for this grade to solve problems involving information presented in line plots. Please note that the Measurement and Data worksheets (Pencils and Keys) only use the fractions ½ and ¼ AND the Investigations Snap-ins includes questions with the vocabulary terms range and median. If time allows, the teacher may choose to use these materials and teach this vocabulary along with how to find the range and median using a line plot. Remember that when finding the median using a line plot, the data is already in order from least to greatest and the students can cross out data from lowest then highest, etc. until they are left with one or two numbers in the center. With two numbers, students then calculate the average of the two. The OnCore materials ask for the "average". In this case they refer to the (mean) without using that vocabulary term. They expect the student to add all the pieces of data (example #1 = 20/4 = 5) and then divide the total by the number of seed (9) for and answer of 5/9 inch. Remembering that the / in a fraction represents division.	Students will make a line plot to display a set data set of measurements in fractions of unit ½, ¼, 1/8. They will use the operations that are relevant to their grade level to solve problems involving information presented in the line plots. Students will practice this standards using various materials. They will learn how to find the average of a set of data (mean) like the teacher uses to determine their grades. Finding the average by adding all the pieced of collected data together and dividing the total by the number of pieces of data. If time allows, students will be introduced to the terms range and median and how to find the range and median using a line plot. Students will be careful of possible misconceptions, like not using a key if one is provided or incorrectly reading the data in the line plot.

Unit: 3.2	Unit Conversion/Elapsed Time	Days : 10

Essential Questions
How can you compare and convert customary units of length? How can you compare and convert customary units of capacity? How can you compare and convert customary units of weight? How can you compare and convert customary metric units? In metric conversions what happens to the digits of a number when that number is multiplied or divided by a multiple of 10? Why? When comparing and converting units how do you determine if you should multiply or divide? How can you solve elapsed time problems by converting units of time?

Content to be Learned	Skills
Convert measurement units within a given system. Convert, for example centimeters to meters, inches to yards. Convert units of time to solve lapsed time problems by converting units of time.	Students must be taught to realize they when converting they need to consider the unit. They need to remember to multiply to convert from a larger unit to a smaller unit and to divide to convert from a smaller unit to a larger unit. Essential vocabulary must be embedded. Length: Inch, foot, yard, mile Capacity: fluid ounce, cup, pint, quart, gallon Weight: ounce, pound, ton Centimeter, decimeter, gram, kilogram, kilometer, liter, meter, milligram, milliliter, millimeter Time: A.M., P.M., seconds, minutes, hours, days, weeks, months, years, elapsed time. MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP5 Use appropriate tools strategically.
Assessments	**Standards**
	5.MD.1 Convert among different-sized standard measurement units within a given measurement system (cm to m, inches to feet), and use these conversions in solving multi-step real world problems.

Sample Instructional Activities	Resources
Teacher will provide word problem examples and facilitate so that as students learn to relate measurements they develop the ability to reason abstractly and quantitatively. Multistep measurement problems make it necessary for attendance to precision.	**OnCore Lessons 78 – 84** **Student Pages 155 – 168** **Investigations Snap-Ins Unit 6,Session 3A.8. 3A.9** **Student pages C91-97** **K-5 Math Resources on-line**

Grade 5

Unit	Unit Title	Lesson	Day
3.3	**Geometry – Two-Dimensional Shapes**	**1 of 2**	**1 - 3**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have 4 right angles and squares are rectangles, so all square have 4 right angles.*	•Identify and classify polygons. •Recognize that attributes belonging to a category of two-dimensional figures (shapes) also belong to all subcategories of that category. •Classify and draw triangles (and quadrilaterals) using their properties.	**SMP3** Construct viable arguments and critique the reasoning of other. **SMP4** Model with mathematics. **SMP6** Attend to precision.	•How do you identify and classify polygons? •How can you classify triangles? •How can you classify quadrilaterals? •How can you use the strategy *act it out* to approximate whether the sides of a figure are congruent?

5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
•Recognize line segments and angles. •Classify an angle as right, acute, or obtuse. •Understand opened and closed plane figures. •Meaning of congruent sides and vertex.	Attributes, category, subcategory Polygon, regular polygon Triangle , quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon, decagon Types of triangles (by sides): equilateral, isosceles, scalene, (by angle) acute, obtuse, right	That a square is a rectangle. Meaning of vocabulary words.	**OnCore** Lessons 97 – 99 Student pages 193 – 198 **Investigations Unit 5** Session 1.1, 1.2, 1.4 – 1.6 **K-5 Math Resources** Identifying Quadrilaterals Quadrilateral Tangram Challenge

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to identify, classify and name polygons by their number of sides. They will help students to classify and draw triangles and rectangles given their attributes of number of sides or angle sizes. Teachers will help students to understand that attributes belonging to a category of 2-D figures also belong to subcategories of that category. Teachers will use OnCore Lessons, Investigations as needed, and K-5 Math Resources as time allows.	Students will become proficient at classifying triangles (according to side lengths and angles measures) and classifying quadrilaterals according to their attributes. They will learn to use the strategy *act it out* to determine whether the sides of a figure are congruent. Students will understand that attributes belonging to a category of 2-dimensional figures (shapes) also belong to all subcategories of that shape. See 5.G.3 Example.

Grade 5

Unit	Unit Title	Lesson	Day
3.3	**Geometry – Two-Dimensional Shapes**	**2 of 2**	**4 - 5**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.G.4 Classify two-dimensional figures in a hierarchy based on properties.	Classify two-dimensional figures in a systematic order based on properties.	**SMP3** Construct viable arguments and critique the reasoning of other. **SMP4** Model with mathematics. **SMP6** Attend to precision.	Can you draw a diagram that shows the relationship and hierarchy of quadrilaterals or triangles?

5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
•Recognize parallel and perpendicular lines. •Understand the meaning of congruent sides and angles of a plane figure.	Parallel line Perpendicular line *Types of quadrilaterals:* Parallelogram, rectangle, rhombus, square, trapezoid *Types of triangles (by sides):* equilateral, isosceles, scalene, (by angle) acute, obtuse, right	Misinterpreting vocabulary words.	**OnCore** Lesson 100 Student pages 199- 200 **Investigations Unit 5** Session 1.3 **Investigations Snap-in** Unit 5 Session 2.7A *Assessment for both G.3&G.4.* **K-5 Math Resources** *Triangle Hierarchy Diagram* *Quadrilateral Hierarchy Diagram*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to classify 2-dimensional figures (mainly triangles and quadrilaterals) in a hierarchy based on their properties. Quadrilaterals may be ordered by their number of parallel sides and/or right angles, Triangles by the number of congruent sides and/or type of angles. Understanding this hierarchy also helps students to understand the relationship between the shapes. Teachers will use the OnCore Lesson 100 along with Session 1.3. If time allows, the K-5 Math Resource Activities. Assessment may be considered.	Students will learn to classify 2-D figures (triangles and quadrilaterals) in a hierarchy based on their properties. They will become familiar with a diagram that shows the relationship between quadrilaterals and the number of their parallel sides and/or right triangles. Students will study the properties of triangles to place them in a hierarchy based one these results. They will practice using the OnCore and Investigations student pages along with the K-5 Math Resource activities where they will construct a diagram of triangle and quadrilateral hierarchies'.

Unit:3.4	Understanding Volume/Three-Dimensional Shapes	Days :15

Essential Questions

- **What is the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions?**
- **How can you use a formula to find the volume of a rectangular prism?**
- **What is the relationship between V = b x h and V = l x w x h?**
- **How can you use the strategy make a table to compare the volumes?**
- **How do you calculate the volume of non-overlapping (composite) right rectangular prisms?**
- **How would you find the volume "a real world problem solving example"?**
- **What happens to the volume of a box when all the dimensions double? Or all dimensions are halved ?**
- **What could the dimensions of a 2 x 2 x 3 box be if you want the volume of the box to be double the size?**
- **How does understanding place value help you in using the standard algorithm?**
- **What strategies would you use to help you determine what the largest product or smallest product would be if given 4**
- **single digits?**

Content to be Learned	Skills
• Understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying • the dimensions. • Use a formula to find the volume of a rectangular prism. • Relate multiplication and addition to finding the volume of a rectangular prism. • Understand the relationship between the two volume formulas V = b x h and V = l x h x w • Understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying • the dimensions. • Use a formula to find the volume of a rectangular prism. • Relate multiplication and addition to finding the volume of a rectangular prism. • Understand the relationship between the two volume formulas V = b x h and V = l x h x w • Show fluency in multiplication of multi-digit whole numbers using the standard algorithm.	• Understand the concept of volume. • Use a formula to find the area or a rectangle. • Multiply whole numbers. Understand and correctly use the formulas for volume. Know Area , Volume , Formula, Non-overlapping, Composite, Place value, Standard algorithm • SMP2 Reason abstractly and quantitatively. • SMP4 Model with mathematics. • SMP7 Look for and make use of structure.

Assessments	Standards
	5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. b. Apply the formula V= l x w x h and V = b x 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. **C. Recognize volume as additive. Find volume of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.** **5.NBT.5 Fluentlymultiply multi-digit whole numbers using the standard algorithm.**
Sample Instructional Activities	**Resources**
Teachers will guide students to understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions. They will help students to relate multiplication and addition to finding the volume. Teachers will provide real world problem solving tasks that make use of both volume formulas. Using both volume formulas (V = l x w x h or V = b x h) will guide students to understand the relationship between the two. Teachers have available the OnCore lessons 91 & 92 or K-5 Math Resources listed to help students master this concept.	**On-Core Book** **K-5 Math Resources** **Investigations Snap-Ins** **Worksheets/Problems Developed by the teacher.** **Make the Largest Product** **Make the Smallest Product** **Envision Enrichment 7.4A Slippery Digits**

Grade 5

Unit	Unit Title	Lesson	Day
4.1	**Measuring Volume Using Concrete Models**	**1 of 2**	**1 - 3**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	•Define volume as an attribute of solid figures. •Measure volumes by counting unit cubes. •Estimate volume by using improvised units, such as toothpastes boxes.	**SMP2** Reason abstractly and quantitatively. **SMP4** Model with mathematics.	•How can you use an everyday object to estimate the volume of a rectangular prism? •What is the difference in volume between the two structures you constructed? •How you can find the volume of an open box? In general, which shaped box has the greatest volume?

5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Understand the concept of volume.	Unit cubes Cubic cm Cubic in Cubic ft Improvised units Volume	Miscounting the number of cubes or units because they are difficult to see in illustration.	**OnCore** Lesson 89 Student pages 177 & 178 **K-5 Math Resources** *3D Structures* (See Investigations Unit 2 Quick Images) *Four Open Boxes* (Similar to Maximum Volume Task below) **Portfolio Tasks** *Maximum Volume Tier 1 & 2* *Nikimoto Pearl Company*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to define volume as an attribute of solid figures, measure volumes by counting unit cubes. They will help students to estimate volume by using improvised units, such as toothpaste boxes. Teachers may utilize the OnCore Lessons, K- 5 Math Resources , and the portfolio tasks that are provided. They will notice that the K-5 Math Resource *3D Structures* is similar to the Investigations Unit 2 *Quick Images* and the *Four Open Boxes* relates to the portfolio task *Maximum Volume*.	Students will understand and define volume as an attribute of solid figures. They will measure volume by counting unit cubes, labeling their results as cubic cm, cubic in, or cubic ft depending on the situation. Students will estimate the volume of a container by using improvised units, like toothpaste boxes.

Grade 5

Unit	Unit Title	Lesson	Day
4.1	**Measuring Volume Using Concrete Models**	**2 of 2**	**4 – 5**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. **a.** Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the area of the base by the height. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.	•Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes. •Find the volume of the same rectangular prism by multiplying the edge lengths. •Understand that you will find an equivalent volume measure for the same rectangular prism by multiplying the area of the base by the height. Knowing the area of the base . •Multiplication of three whole numbers can be represented using the associative property.	**SMP2** Reason abstractly and quantitatively. **SMP4** Model with mathematics. SMP6 Attend to precision.	•How can you find the volume of a right rectangular prism using unit cubes? •How can you find the volume of a right rectangular prism by multiplying the side lengths? •How can you find the volume of a right rectangular prism if you know the area of its base? •Why do you express volume in cubic units? •Can you explain how the associative property may help you multiply three whole numbers?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
•Use unit cubes to build rectangular prisms. •Multiply whole numbers. •Calculate the area of a rectangular polygon.	Right rectangular prism Unit cube Cubic units Associative property Base Area	•The tallest container always has the greater volume.	**OnCore** Lesson 90 Student pages 179 & 180 **Investigations** Unit 2 SAB pg. 43 **NCTM Illuminations** http://illuminations.nctm.org/activitydetail.aspx?id=6

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to understand that they can find the volume of a right rectangular prism (with whole number side lengths) by packing it with cubes, by multiplying the edge lengths, and most importantly in this unit that if they know the area of the base (or how many cubes fill the base) then they can find the volume by filling the prism with layers equivalent to the area of the base and adding the number or layers or multiplying the area of the base (number of cubes) by the number of layers. This is an introduction to the formula, which is used in next unit.	Students will develop an understanding of how to find the volume of a right rectangular prism as they begin to understand how the formula for volume (which is used in the next lesson) was developed. They will calculate volume by adding the number of cubes, multiplying the side lengths and most importantly understand that they can find the area of the base (by multiplying or adding the cubes) and multiply that area (bottom layer) by the number of layers it takes to fill the prism.

Grade 5

Unit	Unit Title	Lesson	Day
4.2	**Measuring Volume Using Formulas** **Fluently Multiply Multi-digit Whole Numbers ..**	**1 of 3**	**1 - 3**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. **b.** Apply the formula V= *l* x *w* x *h* and V = *b* x *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.	•Understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions. •Use a formula to find the volume of a rectangular prism. •Relate multiplication and addition to finding the volume of a rectangular prism. •Understand the relationship between the two volume formulas V = b x h and V = l x h x w.	•**SMP2** Reason abstractly and quantitatively. •**SMP4** Model with mathematics. •**SMP7** Look for and make use of structure.	•What is the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions? •How can you use a formula to find the volume of a rectangular prism? •What is the relationship between V = b x h and V = l x w x h? •How can you use the strategy *make a table* to compare the volumes?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
•Understand the concept of volume. •Use a formula to find the area or a rectangle. •Multiply whole numbers.	Area Volume Formula	Not labeling cubic units. Understanding the difference between mass, weight and volume. Volume being the amount of space a 3-D object takes up.	**OnCore** Lesson 91 & 92 Student pages 181-184 **K-5 Math Resources** *Ordering Rectangular Prisms by Volume* *Designing a Toy Box* *Designing a Cereal Box*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying the dimensions. They will help students to relate multiplication and addition to finding the volume. Teachers will provide real world problem solving tasks that make use of both volume formulas. Using both volume formulas (V = l x w x h or V = b x h) will guide students to understand the relationship between the two. Teachers have available the OnCore lessons 91 & 92 or K-5 Math Resources listed to help students master this concept.	Students will understand the relationship between finding the volume of a rectangular prism using unit cubes and multiplying dimensions. They will solve real world problems using the volume formulas (V = l x w x h or V = b x h) and through this problem solving understand the relationship between the two formulas. Students will practice this concept using materials provided by the classroom teacher. Which may include the OnCore student pages 181 – 184 or the K-5 Math Resource activities.

Grade 5			
Unit **4.2**	**Unit Title** **Measuring Volume Using Formulas** **Fluently Multiply Multi-digit Whole Numbers ..**	**Lesson** **2 of 3**	**Day** **4 - 7**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. **c.** Recognize volume as additive. Find volume of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	•Calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prism. •Determine the volume in cubic centimeters of real world applications. •Understand how the dimensions of a box change as the volume changes (doubles or halves). Or you double or half just one	•**SMP2** Reason abstractly and quantitatively. •**SMP4** Model with mathematics. •**SMP7** Look for and make use of structure.	•How do you calculate the volume of non-overlapping (composite) right rectangular prisms? •How would you find the volume "a real world problem solving example"? •What happens to the volume of a box when all the dimensions double? Or all dimensions are halved ? •What could the dimensions of a 2 x 2 x 3 box be if you want the volume of the box to be double the size?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
Understand and correct use the formulas for volume.	Non-overlapping Composite	Expect the volume to double if you double all the side lengths or equal half if you half the side lengths.	**OnCore** Lesson 93 Student Pages 185 & 186 **Investigations** Snap-ins Unit 2 Session 1.5A Student pages C9-13 Unit 2 Session 2.4A Assessment Student pages C14 – 19

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Teachers will guide students to calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prism. They will provide real world applications for the students to determine the volume in cubic centimeters. Teachers will provide examples that will lead students to understand how the volume of a box will change when the dimensions are doubled or halved and how the dimensions of a box would change if you want the volume to be double in size using the Investigations Snap-in materials. Teachers may also use OnCore Lesson 93.	Students will calculate the volume of solid figures composed of non-overlapping (composite) right rectangular prisms. They will solve real world applications and determine the volume in cubic centimeters. They will practice this concept using both the OnCore and Investigations materials. Students will understand how the volume of a box will change when the dimensions are doubled or halved and how the dimensions of a box would change if you want the volume to be double the size using the Investigations Snap-in materials.

Grade 5

Unit	Unit Title	Lesson	Day
4.2	**Measuring Volume Using Formulas** **Fluently Multiply Multi-digit Whole Numbers ..**	**3 of 3**	**8 - 10**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	•Show fluency in multiplication of multi-digit whole numbers using the standard algorithm.	•**SMP2** Reason abstractly and quantitatively. •**SMP7** Look for and make use of structure.	•How does understanding place value help you in using the standard algorithm? •What strategies would you use to help you determine what the largest product or smallest product would be if given 4 single digits?

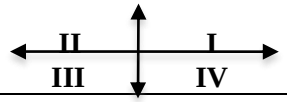
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Fluently multiply single digit numbers.	Place value Standard algorithm	•Incorrectly regrouping. •Incorrectly lining up numbers**.**	**Worksheets/Problems** Developed by the teacher. **K-5 Math Resources** *Make the Largest Product* *Make the Smallest Product* **Envision** Enrichment 7.4A *Slippery Digits*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to show fluency in multiplication of multi-digit whole numbers using the standard algorithm. The few materials provided will help the teachers know if the student has understanding, but practice examples with the algorithm will need to be provided by the teacher. This standard has been practiced throughout the year, and teachers may find that not ALL students will be considered fluent by the end of the year, some will need interventions through the end of the year.	Some students will show fluency in multiplication of multi-digit whole numbers using the standard algorithm. Other students may need continued intervention to become fluent with the algorithm by the end of the year. The materials provided will help the teachers know how the students are progressing with their understanding of multiplication but the students will need to be provided with practice examples to show their fluency with the algorithm.

Unit	Unit Title	Lesson	Day
4.3	**Geometry – Graphing /Coordinate Plane**	**1 of 2**	**1 - 6**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	•How to construct and label a coordinate grid, including the name of the Quadrants I, II, III, & IV even though they will only be working in Quadrant I (where (x,y) are both positive numbers). •Understand that the intersection of the x- and y-axis forms the point of origin with coordinates (0,0) •Understand that the x-axis runs horizontally and the y-axis runs vertically. •Understand that an ordered pair is always written in the form (x,y). •When graphing an ordered pair, you always start at the origin and move "x" number of spaced along the x-axes (left or right) and then move up (or down) vertically the number of "y" spaces. •Given a point in Quadrant I, write the corresponding ordered pair.	**SMP4** Model with mathematics. **SMP5** Use appropriate tools strategically. **SMP6** Attend to precision.	•What do you call the horizontal line and vertical line of a coordinate graph? •What is the name and the coordinates of the ordered pair at the intersection of the x-axis and the y-axis? •How do you graph a given ordered pair (x,y) on the coordinate grid? •How do you name a point in the first quadrant of the coordinate grid? •How do you label the quadrants (I,II,III,IV) of the coordinate graph? ***Though this is not required by the standard the term quadrant is used on their student pages so we felt it should be addresses here. 

5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
Name and locate points on a number line.	Perpendicular Axes, x-axis, y-axis Coordinate system; x-coordinate & y-coordinate Origin (0,0) Ordered pairs Quadrant (I, II, III, IV)	•Graphing along the axes, when one of the ordered pairs is a 0. •Given a coordinate grid with all 4 quadrants, many students will label the quadrants clockwise from QII, instead of counter-clockwise from QI. (Grade 5 students only work in QI).	**OnCore** Lesson 94 Student pages 187 – 188 **K-5 Math Resources** Coordinate Grid Geoboards Coordinate Shapes Coordinate Grid Tangram *Geometric Shapes on the Coordinate Grid (5.G.2)*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)

Teachers will guide students to understand the functions of the coordinate system. Beginning with the perpendicular number lines, called axes. Teachers will explain to students that the horizontal number line is called the “x-axis” and the vertical number line the “y-axis”. They will help students to understand that the point where the axes meet is called the origin and is labeled with the ordered pairs (0,0). Teachers will show students how the coordinate grid is divided into Quadrant I, II, III, and IV (which runs counterclockwise, and causes misconceptions). They do not have to explain how the coordinates are represented in each Quadrant; at this grade students should just be aware that they exist, though all their graphing will be done in Quadrant I. Teachers will understand that ordered pairs are always in the form (x,y) and that when graphing an ordered pair you always start at the origin and move “x” number of spaced along the x-axes (left or right) and then move up (or down) vertically the number of “y” spaces. They will assist students to write the corresponding ordered pair for a given point in Quadrant I. Teachers will use OnCore lesson 94 along with the K-5 Math Resources. They will find that most students enjoy these activities. If additional “fun” activities are needed consider looking for “line designs” and “string art” patterns for Quadrant I online.	Students will understands the functions of the coordinate system beginning with the perpendicular number lines, called axes. Students understand that the horizontal number line is called the “x-axis” and the vertical number line the “y-axis”. They will understand that the point where the axes meet is called the origin and is labeled with the ordered pairs (0,0). Students will know how the coordinate grid is divided into Quadrant I, II, III, and IV (which causes misconceptions because they run counterclockwise). At this point they are only responsible to know the name and place of each quadrant, though they will only be graphing in Quadrant I. Students will understand that ordered pairs are always in the form (x,y) and that when graphing an ordered pair you always start at the origin and move “x” number of spaced along the x-axes (left or right) and then move up (or down) vertically the number of “y” spaces. They will write the corresponding ordered pair for a given point in Quadrant I. Students will enjoy practicing this concept using On Core student pages and the K-5 Math Resource Activities.

Lesson Focus			
1. Standards Addressed	**2. Content to be Learned**	**3. Mathematical Practices**	**4. Essential Question**
5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	•Plot the data of two related quantities given in the table on the coordinate grid. Understand how the data in a table can be written as ordered pairs. •Precisely construct a line graph with title, labels and intervals. •Understand how a line graph relates to plotting points on a grid. •Analyze and display data in a line graph and in the first quadrant of a coordinate grid. •Interpret what the relative steepness of the graph or parts of the graph means. Explain how one quantity changes in relation to another.	**SMP2** Reason abstractly and quantitatively. **SMP4** Model with mathematics. **SMP5** Use appropriate tools strategically. **SMP6** Attend to precision.	•How do you write the data in a table as ordered pairs? •How can you use a coordinate grid to display the data you have collected in an experiment? •When do you use a line graph? •What does the ordered pair tell you about "Outdoor Temperatures, Windows Repaired, etc:? •What does the graph tell you about your data? •What does it mean to describe the relative steepness of the graph?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
Plot points on a coordinate grid.	Table, Line graph Scale, interval Plotting Rate of changes Steepness, steady rate	Students are sometimes confused with a line graph that is very steep (up from left to right). They see this as "going up a hill" instead of speed increasing.	**OnCore** Lesson 95 & 96 Student pages 189 -192 **Investigations** Unit 8 Investigation 1 Session 1.1-1.5 *Growth Patterns*

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Teachers will guide students to represent and interpret real world mathematical data on a coordinate grid (in the first quadrant). They will help students to understand how a line graph relates to plotting points on a grid as students plot the two sets of related quantities collected in tables. Teachers will stress the importance of the relative steepness of the line graph or parts of the graph. They will help students understand the relative steepness of the graph to see how one quantity changes in relation to the other. Teachers will us OnCore Lessons 95 & 96 along with Investigations Unit 8 Sessions 1.1 – 1.5 *Growth Patterns.*	Students will represent and interpret real world mathematical data on a coordinate grid (Quadrant I). They will understand the relationship between plotting points on a grid and a line graph. Students will analyze the graphs and answer questions. They will visualize and understand the relative steepness of the line graph or parts of the graphs and how one quantity changes in relation to the other. Students will practice using OnCore student pages 189 – 192 along with the Investigations Unit 8 student pages that coordinate with Sessions 1.1 to 1.5.

Grade 5

Unit	Unit Title	Lesson	Day
4.4	Patterns, Rules & Graphing Ordered Pairs	1	1 - 10

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and the given rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*	•Generate two numerical patterns using two given rules.. •Given a "function" table generate the rule that is needed to find the unknown terms. •Identify relationships between corresponding terms. For example, the terms could be the number of teams and the number of players. Therefore, identify the relationship between the number of teams and the number of players. •Form ordered pairs consisting of corresponding terms from the two patterns in the table. *For example, (1.8) could represent 1 team, 8 players.* •Graph the relationship between two numerical patterns (ordered pair) on a coordinate grid *Note: the graph of the ordered pairs should form a straight (linear) line.*	**SMP2** Reason abstractly and quantitatively. **SMP7** Look for and make use of structure.	•How do you generate a numerical pattern if given a rule? •How can you identify a relationship between two numerical patterns? •Given a partially completed function table how do you determine that rule that will help you complete the table? •How do you write a set of ordered pairs using the function table? Points on a grid? •How do you graph the relationship between two numerical patterns? Show how this relationship provides you with ordered pairs? •What do you expect the graph of these ordered pairs to look like? Why?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
•Graphing on a number line. •Recognizing patterns on hundreds charts, calendar, extending sequencing, etc. •Solve expressions and equations.	Pattern Rule Expression, equation *Function* table	Unable to identify the relationship. Writing rules.	**OnCore** Lessons 4 – 6 Student pgs 7 - 12 **Investigations**Unit 8 *Growth Patterns* Sessions 2.1 – 2.8 (as needed) **www.mathworksheetsland.com** Generating Math Patterns from Rules Math Patterns/Matching ***K-5Math Resources*** *Addition on the Coordinate Plane* *Subtraction on the Coordinate Plane* *Function Table & Coordinate Plane*

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
Teachers will guide students to complete the pattern in a " function" table by generating the rule as well as complete a "function" table given a rule ((See the K-5 Math Resources). They will help students to write a rule by identifying the relationship between corresponding terms. *For example, to identify the relationship between the number of teams and the number of players.* Teachers will then show students how to form ordered pairs from the corresponding terms in the table. *For example, (1.8) would represent 1 team, 8 players on the team, (2,6) as 2 team, 16 players.* Recognizing the rule as for every team there are 8 players: 8 x #teams = total players or 8t=p. Writing rules is a very difficult concept for students to comprehend and most students will need to start with examples that are easy to visualize. Teachers will direct students on how to graph the relationship in the table using the ordered pairs. *Note: The graph of the ordered pairs should form a straight (linear) line.* Teachers will use the OnCore lessons 4 – 6, the K-5 Math Resources (which also include two pages of blank tables and graphs), the mathland worksheets and if time allows they may choose one or two of the lessons from Investigations Unit 8. These materials may be used in any order you prefer, the K-5 Addition and Subtraction on the Coordinate Plane and the mathland worksheets are example of materials that I believe match the wording in the standard; in these examples the students are given a rule then they generate the numerical patterns in a table. **NOTE:** Unit 5.5 Evaluating Expressions/Order of Operations only has 5 days allotted. If 10 days are not needed in this unit, feel free to start Unit 5.5 earlier ☺	Students will complete the pattern in a " function" table by generating the rule as well as complete a "function" table given a rule ((See the K-5 Math Resources). They will help write a rule by identifying the relationship between corresponding terms. *For example, to identify the relationship between the number of teams and the number of players.* Students will learn to form ordered pairs from the corresponding terms in the table. *For example, (1.8) would represent 1 team, 8 players on the team, (2,6) as 2 team, 16 players.* Writing rules is a very difficult concept for students to comprehend and most students will need to start with very easy examples. Students will then learn graph the relationship in the table using the ordered pairs. *Note: The graph of the ordered pairs should form a straight (linear) line.* Students will practice this standard using OnCore, Investigations, K-5 Math Resource Activities and mathland worksheets, depending on which materials the teacher chooses to utilize.

Grade 5

Unit	Unit Title	Lesson	Day
4.5	**Working with Numerical Expression Order of Operations**	**1 of 2**	**1 – 5**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	•Use parentheses ( ), brackets [ ], or braces { }, called grouping symbols, in numerical expressions, and evaluate (using order of operations) expressions with these symbols. •Understand that you evaluate the expression within the grouping symbols as the first order of preference in order of operations. •Understand that when an expression is written using all three of the grouping symbols (parentheses, brackets, braces) you solve first what is in the parentheses, then the brackets and finally the braces. Though all three symbols are seldom used at one time.	**SMP4** Model with mathematics. **SMP6** Attend to precision.	•In what order must operations be evaluated to find the solution to a problem? •In what order must operations be evaluated to find a solution when the expression uses all three grouping symbols; parentheses, brackets, and braces?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
Evaluate expressions using the order of operations for addition, subtraction, multiplication and division. (Multiply and divide from left to right, then add and subtract from left to right).	Order of operation Evaluate Numerical expressions Grouping symbols: Parentheses ( ) Brackets [ ] Braces { }	When using the Mnemonic PEMDAS to remember the order of operations many students and adults forget to include multiply and divide **from left to right** and add and subtract **from left to right.** You do not do all the multiplication (then divide) or addition (then subtract), solve which comes first (M or D) then (A or S) from left to right.	**OnCore** Lesson 1 & 2 pages 1 – 4 **Investigations Snap-in** Unit 1 Session 2.4A pages C2 – C5 Unit 7 C103 **K-5 Math Resources** Target Number Dash **Game 24** *(like Target Number Dash)* **http://en.wikipedia.org/wiki/24_Game** **Directions using playing cards. Game may also be purchased on-line and at Lakeshore Learning.**

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Teachers will guide students to use parentheses, brackets, or braces (also called grouping symbols) in numerical expressions. Students should be familiar with using the order of operations for multiplication, division, addition and subtractions but will need to be reminded that they multiply and divide from left to right and then add and subtract from left to right. This often causes misconceptions. Teachers will explain to students that when evaluating expressions, parentheses is the first order of operations in the rule PEMDAS (exponents will be included next year). They will show students that when using all three of the grouping symbols (parentheses, brackets or braces) you solve first what is in parentheses, then the brackets and finally the braces { [( )] }. Though all of these three symbols are seldom used at one time. Teachers will use OnCore Lesson 1 & 2, the Investigations Snap-in 2.4A (which also includes a few examples for Lesson 2 CCSS 5.OA.2). There does not appear to be enough time allocated for this standard, but for those teachers who have completed the lessons earlier they may want to include the K-5 Math Number Dash or the Game 24 (which is very similar). The directions to 24 using playing cards have been included or the actually game can be purchases. I think you will find it a worthwhile investment.	Students will use parentheses, brackets, or braces (also called grouping symbols) in numerical expressions. Students should be familiar with using the order of operations for multiplication, division, addition and subtractions but will need to be reminded that they multiply and divide from left to right and then add and subtract from left to right. This often causes misconceptions. They will learn that when evaluating expressions, parentheses is the first order of operations in the rule PEMDAS (exponents will be included next year). Students will understand that when using all three of the grouping symbols (parentheses, brackets or braces) you solve first what is in parentheses, then the brackets and finally the braces { [( )] }. Students will practice using OnCore and the Investigations Snap-in student pages. If time allows teachers will introduce the students to the K-5 Math Number Dash or the Game 24 (which is very similar). Students will find this game very challenging until they begin to learn and use strategies that they about factors of 24.

Grade 5

Unit	Unit Title	Lesson	Day
4.5	**Working with Numerical Expressions** **Order of Operations**	**2 of 2**	**5 – 10**

Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without actually calculating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 + 921) is three times as large as (18932 + 921), without having to calculate the product.*	•Write numerical expressions to match the words (verbal expression). •Write words (verbal expression) to match the numerical expression.	**SMP4** Model with mathematics. **SMP6** Attend to precision.	•How can you write a numerical expression to describe a situation? •How do you write words (verbal expression) to match this numerical expression? •How do you write a numerical expression to match these words (verbal expression)? •Without performing any operations what can you tell me about the value of _____ expression?
5. Prerequisite Knowledge	**6. Essential Vocabulary**	**7. Possible Misconceptions**	**8. Necessary Materials**
•Understand the meaning of addition, subtraction, multiplication and division. •Understand the many uses of vocabulary for these operations. For example, you could read the following expression (5 + 7) as "five plus seven" or "the sum of 5 and 7"	Word (verbal expression) Numerical expression ***Note: The term verbal expression is not explicitly used in this standard but it is used to algebra to distinguish between a numerical (number) expression and word.***	Writing directions from left to right instead of following the order of operations, even when writing verbal expressions.	**Oncore** Lesson 3 Student pages 5 & 6 **K-5 Math Resources** Verbal Expressions www.mathworksheetsland.com Evaluating Expressions: ***Guided Lesson***, Practice and Matching

Instruction	
9. Instruction Practices (What are the teachers doing)	**10. Learning Practices (What are the students doing)**
Teachers will guide students to write simple expressions that record calculations with numbers, and interpret numerical expressions ***without actually calculating them***. They will help students to write numerical expressions to match the words (verbal expressions; term used in algebra but not required here) and to write words (verbal expressions) to match a numerical expression. Teachers will direct students to understand the many uses of vocabulary for the operations. For example you can read (5+7) as "five plus seven" or "the sum of 5 and 7". Teachers should read the **Guided Lesson** that is included from www.mathworksheetsland.com before instructing this lesson. They will gain an understanding of how to read an expression that is in parentheses, remembering that the parentheses tells you to you complete that operations (find the sum, difference, product or quotient) before moving onto the next operation when solving an expression. Teachers will use OnCore, they may refer back to some of the Investigations student pages in Lesson 1 (CCSS 5.OA.1), the K-5 Math Resource and the Practice and Matching page that has been included form www.mathworksheetsland.com. Please note, more time will need to be considered for this unit for next year. Only 5 days *has been allocated.	Students will write simple expressions that record calculations with numbers, and interpret numerical expressions **without actually calculating them.** They will learn to write numerical expressions that match words (verbal expressions) and visa versa to write words (verbal expressions) that match a numerical expression. Students will be aware of the different vocabulary that is used to define the four mathematical operations. They will gain an understanding of how to read an expression that is in parentheses remembering that the parentheses tells you to complete that operation first (find the sum, difference, product or quotient) before moving onto the next operation when solving an expression. They will practice this standard using OnCore, K-5 Math Resources and the practice and matching pages from www.mathworksheetsland.com as provided by their teachers and time allows.