## Unit Summary

In this unit students will develop a coordinate system for the first quadrant of the coordinate plane and use it to solve problems. Students use the familiar number line as an introduction to the idea of a coordinate and construct two perpendicular number lines to create a coordinate system on the plane. They see that just as points on the line can be located by their distance from 0 , the plane's coordinate system can be used to locate and plot points using two coordinates. They then use the coordinate system to explore relationships between points, ordered pairs, patterns, lines, and the rules that generate them. This study culminates in an exploration of the coordinate plane in real world applications.

| Title of Unit <br> Coordinate Grids <br> (2 Weeks) | Subject Area <br> Math |
| :--- | :--- |
| Common Core State Standards |  |
| 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 y-coordinate, y-axis and y-coordinate). |  |

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.

| Essential Questions-Student Targets | I Can statements |
| :--- | :--- |
| How does graphing points on the coordinate | I can represent real world and mathematical |
| system help in solving real-world problems? |  |
| problems by graphing points in the first quadrant of |  |
| How are coordinates used to determine location on | of poordinate plane, and interpret coordinate values |
| two-dimensional surfaces? |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |



## Unit Summary

In this unit students classify two-dimensional shapes in a hierarchy based on properties. Students will build upon their prior knowledge of angle measures, the interior angles of a polygon, the identification of the angles in a triangle as well as identifying parallel and perpendicular lines, and lines of symmetry. Students build their experiences in earlier grades to describe attributes of shapes. They explore more shapes and are not limited to quadrilaterals.

| Title of Unit <br> Properties of Polygons <br> (2 weeks) | Subject Area <br> $5^{\text {th }}$ Grade Math |
| :--- | :--- |
| Comen |  |

## Common Core State Standards

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 four right angles and squares are rectangles, so all squares have four right angles.
5.G.4 Classify two-dimensional figures in a hierarchy based on properties.

| Essential Questions-Student Targets <br> How are quadrilaterals alike and different? | I Can statements <br> I can explain that attributes belonging to a category <br> of two-dimensional figures also belong to all <br> subcategories of that category. |
| :--- | :--- |
| Why is a square ALWAYS a rectangle? <br> How can plane figures be categorized and <br> classified? | I can classify two-dimensional figures in a hierarchy |
| based on properties. |  |$|$| Academic Vocabulary <br> two-dimensional figures, angles (reflex, right, <br> acute, obtuse, straight), parallelograms, properties <br> of polygons, hierarchy of classification of 2- <br> dimensional figures |  |
| :--- | :--- |

$\left.\begin{array}{|l|l|}\hline \text { Formative } \\ \text { (These would be daily checks for student } \\ \text { understanding of the skill taught. This would drive } \\ \text { further instruction. This would determine small } \\ \text { groups and/or whole group re-teaching. ) }\end{array} \quad \begin{array}{l}\text { Summative } \\ \text { (attached) }\end{array}\right\}$

## Unit Summary

The students' understanding of the patterns in the base ten system are extended from Grade 4's work with place value of multi-digit whole numbers and decimals from hundredths to the thousandths place. In Grade 5, students deepen their knowledge through a more generalized understanding of the relationships between and among adjacent places on the place value chart, e.g. 1 tenth times ANY digit on the place value chart moves it one place value to the right. Exponential notation in base 10 is learned, and used when writing numbers in expanded form with base 10 .

| Title of Unit |  |
| :--- | :--- |
| Decimal Place Value | Subject Area <br> (4 weeks) |
| th |  |

## Common Core State Standards

5.NBT. 1 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.
5.NBT. 2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 , and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10 . Use whole-number exponents to denote powers of 10 .
5.NBT. 3 Read, write, and compare decimals to thousandths.

| 5.NBT.3a Read and write decimals to thousandths using base- 10 numerals, number names, and expanded form, e.g., $347.392=3 \times 100+4 \times 10+7 \times 1+3 \times(1 / 10)+9 \times(1 / 100)+2 \times(1 / 1000)$ |  |
| :---: | :---: |
| 5.NBT.3b Compare two decimals to thousandths $>,=$,and < symbols to record the results of compar | ased on meanings of the digits in each place, using ons. |
| 5.NBT. 4 Use place value understanding to round decimals to any place |  |
| Essential Questions-Student Targets <br> How does the place value of a number's position relate to other numbers in a base 10 system? <br> How does a decimal point delineate value in a number? <br> How are real-world numbers modeled in the base 10 system? | I Can statements <br> I can explain 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. <br> I can explain patterns in the number of zeros of the product when multiplying a number by powers of 10 <br> I can explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10 . <br> I can use whole number exponents to denote powers of 10 . <br> I can read, write, and compare decimals to the thousandths. <br> I can read and write decimals to thousandths using base 10 numerals, number names, and expanded form. <br> I can compare two decimals to thousandths based on meanings of the digits in each place, using >,=,and< symbols to record the results of comparisons. <br> I can use place value understanding to round decimals to any place. |
|  | Student Vocabulary <br> Expanded notation, exponents, scientific notation, thousandths |
| Assessments |  |


| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | Summative <br> (attached) |
| :--- | :--- |
|  |  |
|  |  |
|  |  |

## Unit Summary

This unit is an introduction to algebraic thinking for $5^{\text {th }}$ graders. The work the students will experience is exploratory and not considered a level of mastery. The application of the associative and distributive properties will be explored. Students will build on their knowledge of order of operations from prior grades. Students will solve expressions with parentheses, brackets, and braces. Symbols are used with whole numbers, fractions, or decimals when students add, subtract, multiply, and divide. They will write simple expressions and calculate them numerically e.g., (9+8)x2.


Common Core State Standards
5.OA. 1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA. 2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7 , then multiply by two" as $2 \mathrm{x}(8+7)$.
Recognize that $3 \mathrm{x}(18932+921)$ is three times as large as $18932+921$, without having to calculate the indicated sum or product.
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 the ordered pairs on a coordinate plane. For example, given the 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.


| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | Summative <br> (attached) |
| :--- | :--- |
|  |  |
|  |  |
|  |  |

## Unit Summary

In this unit students apply patterns of base 10, use skills to evaluate if answers are reasonable or not, use distributive and associative properties, as well as basic multiplication and division skills. All of these are applied when solving multi-digit problems.

| Title of Unit | Subject Area <br> $5^{\text {th }}$ Grade Math |
| :--- | :--- |
| Multi-Digit Operations |  |

Common Core State Standards
5.NBT. 5 Fluently multiply multi-digit whole numbers using the standard algorithm
5.NBT.6 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.
5.NBT. 7 Add, subtract, 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.


|  | Resources <br> Common Core, ATLAS, Curriculum Crafter, <br> Georgia Math, Everyday Mathematics, Allendale <br> Math, New York State Common Core |
| :--- | :--- |

## Unit Summary

In this unit for addition and subtraction, the focus is on building fluency with fractions that have unlike denominators using equivalent fractions. Anchored in their understanding of equivalent fractions and the use of fraction models, students begin adding and subtracting fractions with unlike denominators with informal strategies. Students will solve word problems using these informal strategies supported by the use of both continuous and discrete visual models.

## Title of Unit

Fraction Addition and Subtraction
Subject Area
$5^{\text {th }}$ Grade Math

## Common Core State Standards

5.NF. 1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
5.NF. 2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonable of answers.

## Essential Questions-Student Targets <br> How and why do we use equivalent fractions when adding and subtracting fractions with unlike denominators? <br> How does estimation help determine the reasonableness of an answer when adding and subtracting fractions?

I Can statements
I can use equivalent fractions as a strategy to add
and subtract fractions.
I can add and subtract fractions with unlike
denominators (including mixed numbers) by
replacing given fractions with equivalent fractions
with like denominators.
I can use benchmark fractions and number sense of
fractions to estimate mentally and assess the
reasonableness of answers.
I can solve word problems involving addition and
subtraction of fractions referring to the same whole.

|  |  | Student Vocabulary <br> equivalent fractions, benchmark fractions, mixed <br> numbers, proper/improper fractions |
| :--- | :--- | :--- |
| Assessments |  |  |
| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | (attached) |  |

## Unit Summary

This unit includes a progression that begins with solving real world problems using array models and area of rectangles and informal sense making strategies. Early in the unit students multiply unit fractions times a whole number, then gradually move toward fluently multiplying a fraction times a fraction. Along the way students need to generalize the fact that multiplying a given number by a fraction greater than one yields a product greater than the given number, whereas multiplying a given number by fraction yields a value less than the given number.

| Title of Unit |  |
| :--- | :--- |
| Fraction Multiplication | Subject Area <br> $5^{\text {th }}$ Grade Math |
| Common Core State Standards |  |

5.NF. 3 Interpret a fraction as division of the numerator by the denominator ( $\mathrm{a} / \mathrm{b}=\mathrm{a}$ divided by b ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g. by using visual fraction models or equations to represent the problem. For example, interpret $3 / 4$ as the result of dividing 3 by 4 , noting that $3 / 4$ multiplied by 4 equals 3 , and that when 3 wholes are shared equally among 4 people each has a share of size $3 / 4$. If 9 people want to share a $50-$ pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?
5.NF. 4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
5.NF.4a Interpret the product (a/b)xq as a parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations a $\mathrm{xq} / \mathrm{b}$. For example, use a visual fraction model to show (2/3) x (4/5) $=8 / 15$. (In general, $(\mathrm{a} / \mathrm{b}) \mathrm{x}(\mathrm{c} / \mathrm{d})=\mathrm{ac} / \mathrm{bd}$.)
5.NF.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5.NF. 5 Interpret multiplication as scaling.
5.NF.5a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
5.NF.5b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a / b=\left(n^{*} a\right) /\left(n^{*} \mathrm{~b}\right)$ to the effect of multiplying $\mathrm{a} / \mathrm{b}$ by 1 .
5.NF. 6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

| Essential Questions-Student Targets |
| :--- | :--- |
| How do you model multiplying and dividing |
| fractions? |
| How do you know when the answer to a |
| multiplication problem with at least one fraction |
| will be greater of less than the number you started |
| out with? |$\quad$| I Can statements |
| :--- |
| I can interpret a fraction as division of the numerator |
| by the denominator (a/b = a divided by b). |
| I can solve word problems involving division of |
| whole numbers leading to answers in the form of |
| fractions or mixed numbers. |
| I can interpret the product $(\mathrm{a} / \mathrm{b}) * \mathrm{q}$ as parts of a |
| partition of q and bequal parts; equivalently, as the |
| result of a sequence of operations a*q/b. In general, |
| (a/b) * (c/d) = ac/bd. |
| I can find the area of a rectangle with fractional side |
| lengths by tiling it with unit squares of the |
| appropriate unit fraction side lengths. |


| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | Summative <br> (attached) |
| :--- | :--- |
|  |  |
|  |  |
|  |  |

## Unit Summary

For division of fractions, students are only expected to find quotients for a unit fraction and a whole number using what they already know about the meaning of division ( 6 divided by 2 means how many groups of 2 can you get from 6?), the relationship between multiplication and division ( I can find the answer to 12 divided by 4 , by asking what do I have to multiply by 4 to give me 12 ?) and their experiences modeling operations.

| Title of Unit <br> Fraction Division | Subject Area <br> $5^{\text {th }}$ Grade Math |
| :--- | :--- |

## Common Core State Standards

5.NF. 7 Apply and extend previous understandings of division to unit fractions by whole numbers and whole numbers by unit fractions.
5.NF.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1 / 3)$ divided by 4 , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1 / 3)$ divided by $4=$ $1 / 12$ because ( $1 / 12$ ) x $4=1 / 3$.
5.NF.7b Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 divided by (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 divided by $(1 / 5)=20$ because $20 \times(1 / 5)=4$.
5.NF.7c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share $1 / 2$ pound of chocolate equally? How many $1 / 3$ cup servings are in 2 cups of raisins?

| Essential Questions-Student Targets <br> How do you model dividing fractions? | I Can statements <br> I can interpret division of a unit fraction by a non- <br> zero whole number, and complete such quotients |
| :--- | :--- |
|  | I can interpret division of a whole number by a unit <br> fraction, and compute such quotients. |
|  | Student Vocabulary <br> fractions as a division problem |
|  | Assessments |
| Formative | Summative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) |

## Unit Summary

In this unit students will extend their understanding of geometric attributes and the measurement of these attributes from one and two dimensions to the three-dimensional attribute of volume and volume measure. They will find the volume of right rectangular prisms first by filling the shape with unit cubes and counting, then by developing formulas to calculate from given dimensions.


Common Core State Standards
5.MD. 3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
5.MD.3a 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.
5.MD.3b A solid figure which can be packed without gaps or overlaps using $n$ unit cubes is said to have a volume of $n$ cubes.
5.MD. 4 Measure volumes by counting unit cubes, using cubic cm , cubic in, cubic ft , and improvised units.
5.MD. 5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
5.MD.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as products as volumes, e.g., to represent the associative property of multiplication.
5.NBT.5b Apply the formulas $\mathrm{V}=1 \mathrm{xw} \mathrm{xh}$ and $\mathrm{V}=\mathrm{b} \times \mathrm{h}$ 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.
5.MD.5c Recognize volume as an additive. Find volumes of solid figures composed of two nonoverlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

| Essential Questions-Student Targets <br> How can volume be modeled, measured and calculated? <br> How are measurements of volume, area, and perimeter similar and different? <br> When do you use addition verses multiplication with measurement calculations and problem solving? <br> How is converting like measurement units within a measurement system helpful in solving problems? | I Can statements <br> I can measure volumes by counting unit cubes, using cubic cm , cubic ft , and improvised units. <br> I can show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. <br> I can represent threefold whole-number products as volumes to represent the associative property of multiplication. <br> I can model and justify the formula of volume of rectangular prisms <br> I can find volume of rectangular prisms using a variety of methods and use these techniques to solve real world and mathematical problems. <br> I can model the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes. <br> I can apply the formulas $\mathrm{V}=1 \mathrm{x} \mathrm{w} \mathrm{xh}$ for rectangular prisms to find volumes of right rectangular prisms with whole-number side lengths. <br> I can use the additive nature of volume to find volumes of solid figures composed of two nonoverlapping right rectangular prisms by adding the volumes of the non-overlapping parts. |
| :---: | :---: |
|  |  |
|  | Student Vocabulary <br> customary units, metric units, square units, cubic units, volume of rectangular prisms, volume formulas, area of base of a right rectangular prism, conversion within same measurement system |


| Assessments |  |  |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | Summative <br> (attached) |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

## Unit Summary

The learner will convert measurements within a given measurement system (inches to feet, meters to millimeters, etc.) This also includes volume (cubic centimeters to liters, cups to gallons). The learner will utilize these conversions and apply them to real-world, multi-step word problems.

| Title of Unit <br> Metric and Standard Measurement and Volume <br> (2 Week Unit) | Subject Area <br> $5^{\text {th }}$ Grade Math |
| :--- | :--- |
| Common Core State Standards |  |
| MD. 1 Convert among different-sized standard measurement units within a given measurement system <br> (e.g., convert 5 cm to 0.05 m ), and use these conversions in solving multi-step, real-world problems. |  |
|  |  |
|  |  |
|  |  |


|  |  |
| :---: | :---: |
|  |  |
| Essential Questions-Student Targets <br> How do you convert lengths between different units of measure? <br> How do you convert volume between units of measure? | ```I Can statements I can convert like measurement units within a given measurement system. I can convert among different-sized standard measurement units within a given measurement system. I can use measurement conversions in solving multi- step, real-world problems.``` |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Common Misconceptions: When solving problems that require regrouping units, students use their knowledge of regrouping the numbers as with whole numbers. Students need to pay attention to the unit of measurement which dictates the regrouping and the number to use. The same procedures used in regrouping whole numbers should not be taught when solving problems involving measurement conversions | Student Vocabulary: conversion/convert, metric customary measurement, relative size From previous grades: liquid volume, mass, kilometer (km), meter (m), centimeter (cm), kilogram (km), gram (g), liter (L), milliliter (mL), Inch (in), foot (ft), yard (yd), mile (mi), ounce (oz), Pound (lb), cup ©, pint (pt), quart (qt), gallon (gal) |
| Note: When converting in the metric system, have student extend their knowledge of the base-ten system as they multiply or divide by powers of ten. Teaching conversions should rely on the relationship of the measurements, not merely rote memorization. |  |
| Asses | sments |


| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching.) | Summative <br> (attached) |
| :--- | :--- |
| Common Formative <br> (This should be a common assessment across the <br> grade level to promote professional learning <br> community's conversation. This would be a grade- <br> level check for understanding that will determine if <br> you are able to move forward instruction or re-teach. <br> This would be several times per skill.) |  |
|  |  |

## Unit Summary

The learner will be able to read, interpret, and create line plots, as well as compare and analyze data.

| Title of Unit <br> Line Plots | Subject Area <br> $5^{\text {th }}$ Grade Math |
| :--- | :--- |
| Common Core State Standards |  |
| 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 <br> operations on fractions for this grade to solve problems involving information presented in the line plots. <br> For example, given different measurements of liquid in identical beakers, find the amount of liquid each <br> beaker would contain if the total amount in all the beakers were redistributed equally. |  |
| Essential Questions-Student Targets <br> How can we use a line plot to show fractional parts <br> of a whole? | I Can statements <br> I can make a line plot to display a data set of <br> measurements in fractions of a unit $(1 / 2,1 / 4,1 / 8)$. |
| How can the information on the line plot be used to <br> re-distribute the items equally? <br> How can we manipulate the data on a line plot to <br> answer questions? | I can use operations on fractions for this grade to <br> solve problems involving information presented in |
| line plots. |  |


|  |  | Student Vocabulary <br> line plot, redistribute |
| :--- | :--- | :--- |
| Assessments |  |  |
| Formative <br> (These would be daily checks for student <br> understanding of the skill taught. This would drive <br> further instruction. This would determine small <br> groups and/or whole group re-teaching. ) | Summative <br> (attached) |  |

