

Grade 5 Math Unit 3

Content Area: **Mathematics**
Course(s):
Time Period: **Trimester 3**
Length: **59 days**
Status: **Published**

Brief Summary of Unit

In this unit, students gain a conceptual understanding of the relative sizes of measurement units within a measurement system and reason about converting from one unit of measurement to another. Students will also apply their understanding of converting measurement units to solve multi-step word problems. Next, students will convert measurement units of length, mass, weight, capacity, and time. Next in this unit, students make line plots for data expressed in fractions of a unit with unlike denominators and use their understanding of fraction operations to solve problems about data presented in line plots.

Students will be taught to use their understanding of the attributes of two-dimensional figures to show hierarchical relationships between categories of figures using visual models such as trees, Venn diagrams, and tree diagrams. Students will be formally introduced to grouping symbols and to use the order of operations to evaluate numerical expressions with and without parentheses. Students are introduced to the coordinate plane in the first quadrant and learn vocabulary terms related to the coordinate plane. They will use the coordinate plane to solve both mathematical and real-world problems, including problems involving geometric shapes graphed in the coordinate plane and problems involving finding horizontal and vertical distances between points. Finally, students will analyze numerical patterns and describe the relationship between corresponding terms of two different numerical patterns.

Revision Date: August 2024

Essential Questions/Enduring Understandings

Essential Questions:

- What strategies can you use to estimate measurements?
- What happens to a measurement when you change its unit of measure to a related unit?
- What is the difference between an equation and an expression?
- In what kinds of real-world situations might we use equations and expressions?
- Why is it important to follow an order of operations?
- How is data collected and displayed on a line plot?
- What strategies help when solving problems with line plots?

- How can you classify two-dimensional figures?
- How does the coordinate system work?
- How do coordinate grids help you organize information?
- How can we represent numerical patterns on a coordinate grid?

Enduring Understandings:

- Students will understand that you can use division to convert from smaller to larger units of measurement within the same measurement system.
- Students will understand that you can use your understanding of operations on fractions to solve problems about data presented in line plots.
- Students will understand that you can classify two-dimensional figures into categories and subcategories based on their properties.
- Students will understand that grouping symbols, such as braces, brackets, and parentheses, show the order in which parts of an expression should be evaluated, knowing how to use grouping symbols and the order of operations will allow you to correctly evaluate, write, and interpret expressions.
- Students will understand that the coordinate plane is a two-dimensional space formed by two perpendicular number lines, knowing about the coordinate plane will help you graph and interpret points to solve real-world and mathematical problems.

Students Will Know/Students Will be Skilled At

Students will know:

- How to convert from one measurement unit to another.
- How to solve multi-step problems involving conversions between measurement units.
- How to make a line plot of measurement data expressed in fractions of a unit.
- How to solve problems based on data shown in a line plot.
- How to classify two-dimensional figures based on their attributes, for example, a square is also a rhombus, but not all rhombuses and rectangles are squares.
- How to use a Venn diagram and tree diagram to organize two-dimensional figures based on shared properties.
- How to Evaluate expressions, for example: $48 \div (6 + 10)$ had a value of 3.
- How to Write a numerical expression to represent a phrase, for example: subtract 5 from 12, then

multiply by 4 can be written as $(12-5) \times 4$.

- How to write ordered pairs for points in the coordinate plane.
- How to graph points in the coordinate plane.
- How to find the vertical and horizontal distance between two points in the coordinate plane.
- How to graph quantities that represent real-world situations in the coordinate plane and interpret the coordinates of a point in terms of a real-world context.
- How to generate a numerical pattern using a rule.
- How to describe the relationship between corresponding terms of two number patterns.

Students will be skilled at:

- Converting from one measurement unit to another, for example 48 inches = 4 feet.
- Solving multi-step problems involving conversions between measurement units.
- Making a line plot of measurement data expressed in fractions of a unit.
- Solving problems based on data shown in a line plot.
- Classifying two-dimensional figures based on their attributes, for example, a square is also a rhombus, but not all rhombuses and rectangles are squares.
- Using a Venn diagram and tree diagram to organize two-dimensional figures based on shared properties.
- Evaluating expressions, for example: $48 \div (6 + 10)$ had a value of 3.
- Writing a numerical expression to represent a phrase, for example: subtract 5 from 12, then multiply by 4 can be written as $(12-5) \times 4$.
- Writing ordered pairs for points in the coordinate plane.
- Graphing points in the coordinate plane.
- Finding the vertical and horizontal distance between two points in the coordinate plane.
- Graphing quantities that represent real-world situations in the coordinate plane and interpret the coordinates of a point in terms of a real-world context.
- Generating a numerical pattern using a rule.
- Describing the relationship between corresponding terms of two number patterns.

Learning Plan

Daily Warm-ups (5-10 minutes):

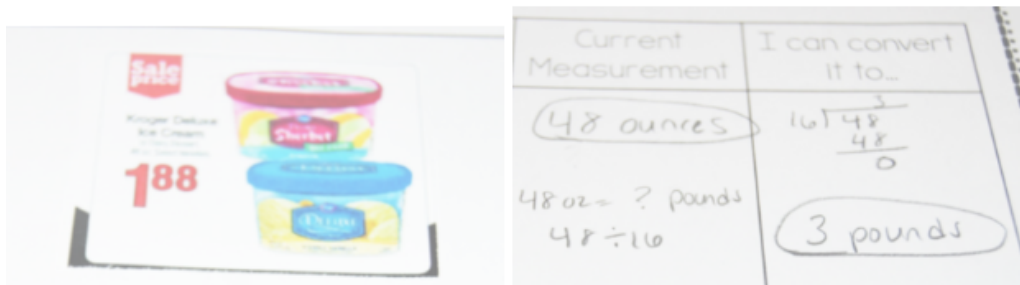
*As an opening to each math lesson, the instructor can use these different routines

- Number Talks- District Created Resource (Linked Below in Materials)
- Number Bounce- Begin this routine by telling your students that you will count forward or backward by ones starting with a specific number and ending with a specific number. Let your students know that when you tap them, they will have to say the next number. Here is one example using the start number 213 and the end number 235. Start counting forward by ones like: 213, 214, 215, 216. Next, tap a student on the shoulder. The student says 217. Then continue counting: 218, 219, 220. Tap a different student. The student says 221. Continue to count in this way until I have given most of the students an opportunity to answer. The student who says the last number in the sequence says, “235. Bounce” and gets the opportunity to do a 20-second celebratory dance. This routine also works well for fractions and decimals.
- Base Ten Toss- A beach ball or bean bag is recommended when implementing this routine. Begin this routine by telling your students that they will count in base ten language until they reach a base ten decade with no ones (example: 3 tens 0 ones or 30, 4 tens 0 ones or 40). For this routine, students stand in a circle. After one student counts in base ten language (ex. 7 tens 5 ones...75), he or she passes a beach ball or bean bag to the person standing next to them. When a student says a base ten decade with no ones (ex. 8 tens 0 ones...80) they get the opportunity to toss the beach ball to any classmate of their choice. For example: Count forward starting with 5 tens 9 ones...59. Next person 6 tens 0 ones..60, next person 6 tens 1 one...61, etc. This routine works for larger numbers and decimals as well. Students can add on hundreds (ex. 6 hundreds 9 tens and 8 ones...698) or hundredths (ex. 6 tens 7 ones and 37 hundredths...67.37). For more of a challenge, they can count backward.
- Amazing Race: Students work in pairs to decompose a given number in as many different ways as they can. You should provide each partner pair with a blank piece of paper or this [sheet](#). You can give your students 5 – 10 minutes to record as many different ways to represent the number as possible. After the time is up, 1 or 2 partner pairs can randomly be selected to share what they recorded, in front of the class. This routine can easily be adapted to fractions or decimals. For example, you can write $\frac{7}{10}$ or 0.7 as the number of the day. Students get a chance to be as creative as possible when recording. When you first start this routine, your students may only have 2 or 3 different ways. That’s OKAY..... If you consistently use this routine your students will evolve and ultimately fill the page! As a quick tip, you can award team points to partner pairs that had the most inventive and correct ways. It is very important to check for accuracy.
- Number Strings- This routine helps to build students’ mental math capabilities. The teacher writes a problem horizontally on the board in a whole group or small setting. The students mentally solve the problem and share with the whole group how they solved it. They must justify and defend their reasoning. The teacher records the students’ thinking in an open number line and poses extended questions to draw out deeper understanding for all. The teacher can have students share other students’ strategies to the whole group or with turn and talk. Eventually provide a few number sentences on the board to solve within 20 and multiplication to see and model how you can use mental math strategies to solve them in a snap just like they would on a fact test, then let them try solving in a snap as you point to each number sentence.

1. Fifth graders need to be fluent in multiplying and dividing to twelve. This is a skill that should be worked on throughout the year utilizing the Ready Math Program and supplemental resources that are located under materials.

2. Convert Measurement Units- Guide students to gain a conceptual understanding of the relative sizes of measurement units within a measurement system and reason about converting from one unit of measurement to another. Instruct students to convert measurement units of length, capacity, weight, and mass in both the metric and customary systems of measurement, as well as units of time. Students should be taught to multiply and divide with whole numbers, decimals, and fractions in order to convert measurements.

- a. Complete Lesson 25, Sessions 1-4 (4 days)
- b. Students will build on their knowledge of converting larger units to smaller units and convert smaller units of measure to larger units. Students can use models to create equivalent measurements and notice patterns.
- c. Students should have exposure to the relationship between units to realize division can be used to convert from a smaller unit of measure to a larger one.
- d. Provide real-world context so students can act out/model the problems for understanding.
- e. Students should have a reference sheet with the measurements listed.
 - d. Possible strategies include but are not limited to:
 - i. Begin with working with larger units of measure converted into smaller units. Discuss why multiplication is used. Show concrete or pictorial models so students can see that there are more smaller units in a larger unit.
 - ii. One way to provide students extra practice in converting measurements is to give them a recipe in specific units like ounces and have them convert it to pounds.
 - iii. Find grocery store circulars. Have students look through and find items that give their unit of measurement and have students convert it to a larger/smaller unit.



e. Students should be exposed to problems like the following:

Complete each conversion by dragging and dropping the correct number into each box.

0.07

0.7

70

700

7,000

$7 \text{ mm} = \boxed{} \text{ cm}$

$7 \text{ cm} = \boxed{} \text{ m}$

$\boxed{} \text{ m} = 7 \text{ km}$

Which **two** conversions are correct?

- A. $7 \text{ mm} = 70 \text{ cm}$
- B. $7 \text{ cm} = 0.07 \text{ m}$
- C. $7,000 \text{ m} = 7 \text{ km}$
- D. $0.7 \text{ cm} = 70 \text{ mm}$
- E. $7 \text{ m} = 7,000 \text{ km}$

f. Lesson Vocabulary: There is no new vocabulary. Review the following key terms: convert, customary system, metric system

3. Solve Word Problems Involving Conversions- Students should be taught to apply their understanding of converting measurement units to solve multi-step word problems. Instruct students to convert measurement units of length, mass, weight, capacity, and time. In their problem-solving work, instruct students to multiply and divide with whole numbers, decimals, and fractions. Students should be taught to recognize problem situations in which they may choose which unit they want to work with.

- a. Complete Lesson 26, Sessions 1-4 (4 days)
- b. Provide students with a reference sheet of measurements.
- c. Possible strategies include but are not limited to:
 - i. Students should have experiences solving multi-step word problems with conversions.
 - ii. **Possible Task:** What time was it 2011 minutes after the beginning of January 1, 2011?

Solution: January 1, 2011 begins at 12:00 AM. To find the time 2011 minutes later will require changing units since time is told in hours and minutes. There are 60 minutes in an hour so to see how many hours there are in 2011 minutes we can perform the division problem $2011 \div 60$. Since

$30 \times 60 = 1800$, we can write: $2011 = 30 \times 60 + 211$

Next, there are three groups of 60 in 211, with a remainder of 31 so we get: $2011 = 30 \times 60 + 3 \times 60 + 31$

Using the distributive property this last expression is equivalent to $2011 = (30 + 3) \times 60 + 31$

So 2011 minutes is the same as 33 hours and 31 minutes. Now 33 hours is one day and an additional 9 hours so this means that 2011 minutes is one day, nine hours, and thirty-one minutes. So 2011 minutes after the beginning of 2011 it is January 2 and it is 9:31 AM.

iii. [Converting Fractions of a Unit to a Smaller Unit](#) Task

d. Students should be exposed to the following problems:

Tanya buys 12 water bottles. Of those bottles, 5 hold 300 milliliters each and 7 hold 1.5 liters each.

Part A

How much water, in milliliters, does Tanya buy?

Enter your answer in the box.

Part B

How much water, in liters, does Tanya buy?

Enter your answer in the box.

Tom has a water tank that holds 5 gallons of water.

Part A

Tom uses water from a full tank to fill 6 bottles that each hold 16 ounces and a pitcher that holds $\frac{1}{2}$ gallon.

How many ounces of water are left in the water tank?

Enter your answer in the box.

 ounces

Part B

Tom drinks 4 pints of water a day.

How many full tanks of water will he drink in 30 days?

Enter your answer in the box.

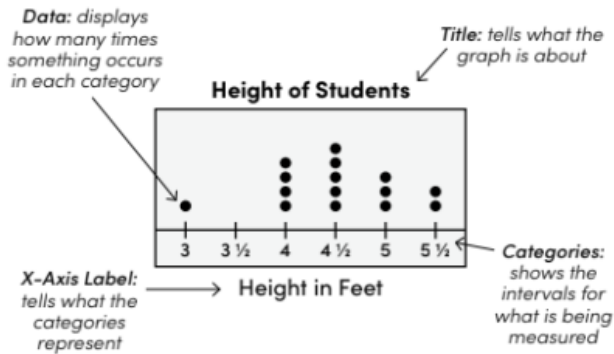
 full tanks of water

e. Lesson Vocabulary: There is no new vocabulary. Review the following key terms: customary system, metric system

4. Make Line Plots and Interpret Data- Instruct students to make line plots for data expressed in fractions of a unit with unlike denominators and use their understanding of fraction operations to solve problems about data

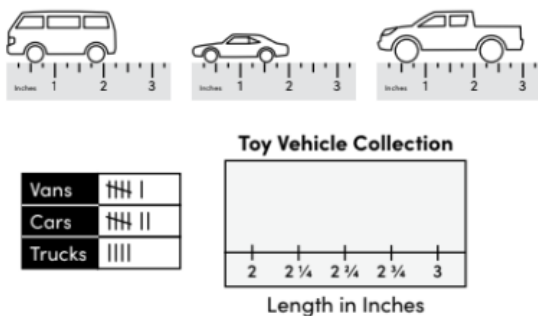
presented in line plots. Students should be taught to understand how different visualizations can highlight aspects of data. Students should be taught to ask questions and interpret data visualizations to describe and analyze patterns. Students should be taught to develop strategies to collect, organize, and represent data of various types and from various sources and to communicate results digitally through a data visual (chart, story board, visual presentation.) Students should be taught to collect and clean data to be analyzable (make sure each entry is formatted correctly, deal with missing it incomplete data.) Students should be taught to use appropriate visualizations and analyze data across samples. (double line plot, double bar graph)

- Complete Lesson 27, Sessions 1-4 (4 days)
- Have students provide context for line plots. It will help students develop the skill of interpreting data and drawing meaningful conclusions. For example, when working with a line plot about young athletes' heights, knowing the age of the athletes can help students explain clusters of data points or outliers. (From Mix and Math 360°)
- As students work with line plots, they learn that each dot on a line has two pieces of information that go along with it.



- When learning to create line plots, students will notice that the structure of the x-axis is similar to the structure of a number line or ruler. They each show intervals that are partitioned into equal parts.

One of the most challenging parts of creating a line plot for students is figuring out how to set up the x-axis. Students need practice using data sets to determine the lowest/highest values and how to divide the x-axis into equal parts so that each data point can be graphed.



- The more students engage with line plots, the better they become at using them to solve problems and make sense of data. Ask simple questions that allow students to identify a graph's unique characteristic like: outliers, common data, etc.

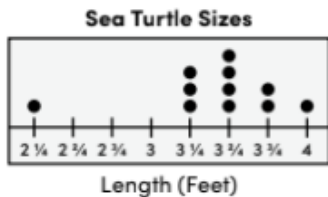
As students become familiar with the characteristics of a line plot and its context, they should be directed to

examine patterns or trends and use these to draw more complex conclusions.

How many turtles are $3\frac{1}{4}$ feet long?

How much longer is the longest turtle than the shortest turtle?

Give a possible reason to explain the outlier in the data.



f. Allow students to have opportunities to use Google forms, Google Sheets and other forms of technology to create and interpret line plots.

Possible strategies include but are not limited to:

i. Using coins to create line plots is the perfect way to engage students and encourage them to apply their learning to real-life problems. This line plot activity uses money earned from a lemonade sale and asks students to graph the earnings.

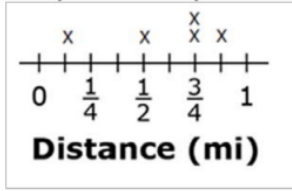


ii. Students can measure their feet using $\frac{1}{2}$ and $\frac{1}{4}$ inches and then use stickers to plot the points on the line plot. A variation of this would be for students to measure a jump to the nearest $\frac{1}{2}$ foot and plot that on a line plot.



g. Students should be exposed to these types of problems:

Jonah recorded the distance, in miles, that he ran each day for 5 days on the line plot shown.



Enter the total distance, in miles, that Jonah ran all 5 days.

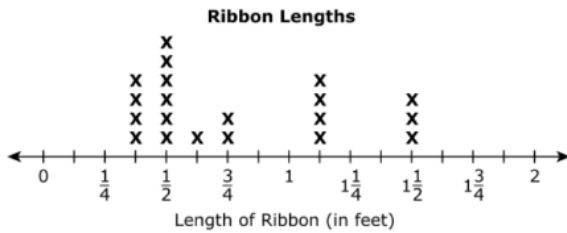
Elijah ate trail mix nine different times. Each X on the line plot represents an amount that he ate.



How much total trail mix, in cups, did Elijah eat?

- A. $\frac{9}{2}$
- B. $\frac{15}{2}$
- C. $\frac{9}{4}$
- D. $\frac{15}{4}$

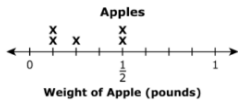
Sara uses ribbon to make hair bows. The length of each ribbon Sara uses is represented on the line plot shown.



What is the difference, in feet, between one of the pieces of ribbon that has the longest length and one of the pieces of ribbon that has the shortest length?

Enter your answer in the boxes.

The line plot shows the weights, in pounds, of five apples.



All five of these apples will be cut into pieces and placed in equal amounts, in pounds, into three containers for making applesauce. Each container holds 1 pound when full.

Select the diagram that shows the weight, in pounds, of apple pie should be placed in each container so that all three containers have same weight.

- A.
- B.
- C.
- D.

h. Lesson Vocabulary: There is no new vocabulary. Review the following key terms: scale (on a graph), line plot

5. Understand Categories of Two-Dimensional Figures- Students should be taught to use their understanding of the attributes of two-dimensional figures to show hierarchical relationships between categories of figures using visual models such as trees, Venn diagrams, and tree diagrams. Instruct students to describe how attributes belonging to a category of two-dimensional figures belong to all the subcategories of that category. Students should be taught to focus on hierarchical relationships between categories of shapes that are entirely contained within another category (category/subcategory relationships). Guide students to look at an example in which two categories have no overlap.

a. Complete Lesson 28, Sessions 1-3 (3 days)

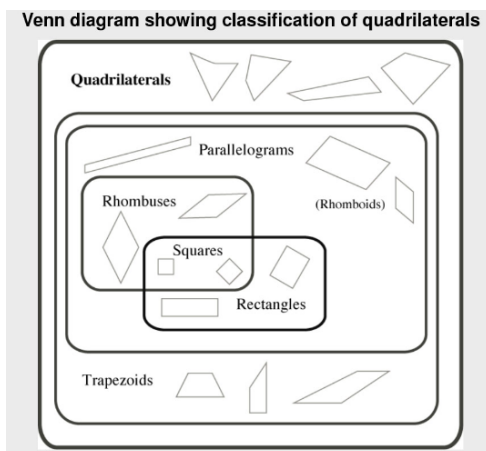
b. Possible strategies include but are not limited to:

i. **Potential Task:** Decide whether each of these statements is always, sometimes, or never true. If it is sometimes true, draw and describe a figure for which the statement is true and another figure for which the statement is not true.

-A rhombus is a square. - A triangle is a parallelogram. - A square is a parallelogram. - A square is a rhombus. - A parallelogram is a rectangle. - A trapezoid is a quadrilateral.

ii. Provide students with a geoboard and rubber bands. Share clues for students to build the shape on the geoboard and then name the shape. One shape clue could be: This shape has four sides. All four sides are equal in length. This shape has two pairs of parallel sides. This shape has four right angles. (Square)

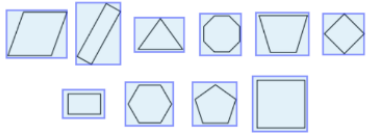
iii. Use a Venn diagram and have students place physical shapes in it and discuss why certain shapes overlap others.



c. Students should be exposed to the following types of problems:

Students in Mrs. Johnson's class drew several different two-dimensional figures as shown. Mrs. Johnson said that some of the figures appear to be rectangles.

Select the **four** figures that could be classified as rectangles.



One student drew a square. Another student drew a rhombus that was not a square.

Select the **three** properties that both figures have.

- A. They have four right angles.
- B. They have four sides that are the same length.
- C. They have two pairs of parallel sides.
- D. They have opposite angles that are the same measure.
- E. They have four angles that are the same measure.

Students in Mrs. Johnson's class drew several different two-dimensional figures.

Select the **four** two-dimensional figures that are rectangles.

- A.
- B.
- C.
- D.
- E.
- F.

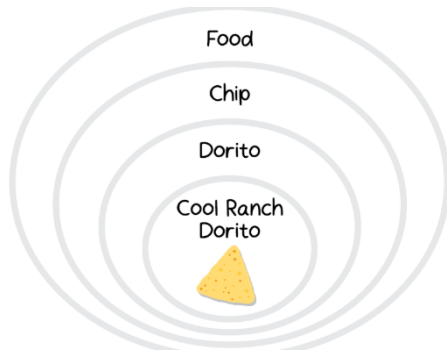
d. Lesson Vocabulary: category, hierarchy, subcategory, tree diagram, Venn diagram, Review the following key term: attribute

6. Classify Two Dimensional Figures- Students should be taught to use their properties, categories, and subcategories to classify shapes into Venn diagrams and tree diagrams, including Venn diagrams that have regions that partially overlap.

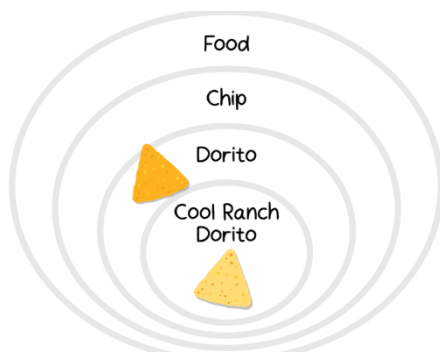
- a. Complete Lesson 29, Sessions 1-3 (3 days)
- b. Students will learn more about shapes and how they are classified.
- c. Hierarchies of shapes may sound complicated, but it is really just creating groups based on characteristics. Most students don't know what a hierarchy is or how it functions. Before asking students to create hierarchies using shapes, you introduce hierarchies using objects they were familiar with and were easy to talk about!
 - i. There are many ways to do this activity and you can modify it however you'd like. In this

situation it is shown with regular Doritos, Cool Ranch Doritos, Oreo cookies, and baby utensils. (You can use anything you have on hand.) (From Mix and Math 360°)

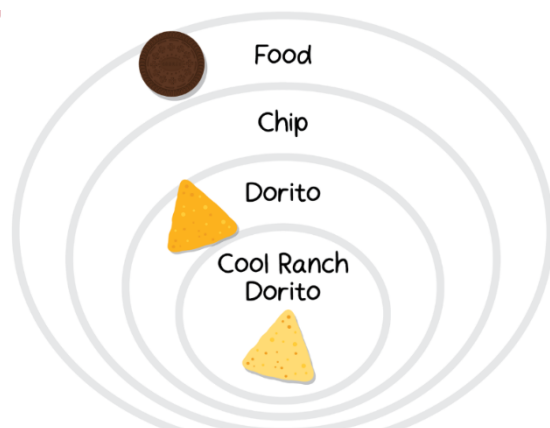
- ii. Start by asking students what the most general name would be for the Cool Ranch Dorito. Students should ultimately come up with the word “food.” Then ask them to get a little more specific. You can agree upon “chip.” Even more specific, it would be “Dorito.” Lastly, the most specific you could get with labeling the object would be “Cool Ranch Dorito.”



- iii. Next, determine where the other three objects would fall in the hierarchy you are creating. A regular Dorito could be categorized as food. It could also be categorized as a chip and as a Dorito too. BUT it cannot be classified as a Cool Ranch Dorito, so it falls just outside the center circle of our hierarchy.

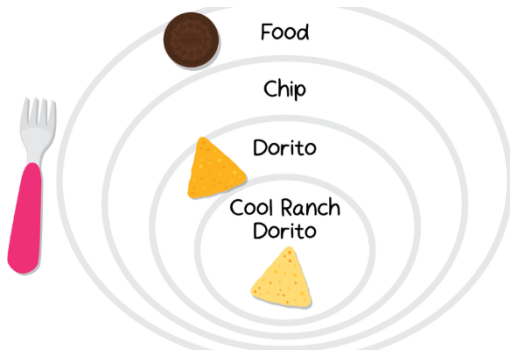


- iv. The Oreo cookie can be categorized as food, but it cannot be categorized as a chip. Because it cannot be categorized as a chip, you don't need to check with any of the further categories because all other categories in the hierarchy have the same characteristics as chips, which we've already identified the cookie doesn't have.



- v. Lastly, talk about the baby fork. This item didn't make it inside any of the categories because it is not a food item, which means it cannot be any of the subcategories of our hierarchy, which are

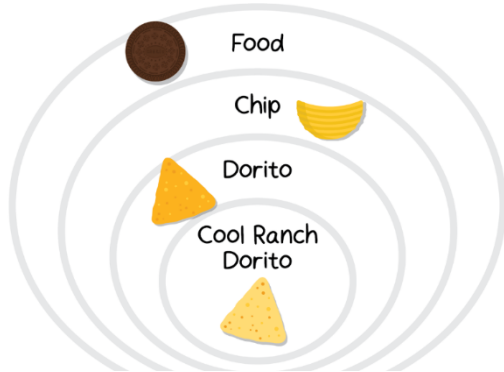
all foods.



vi. At this point, you have created a hierarchy with your chips, which you can constantly refer back to when you start working with polygons. One of the things that is the most confusing for students to grasp is the idea that all squares are rectangles but not all rectangles are squares. This is challenging for most adults to wrap their brains around too!

vii. Going back to your Hierarchy of Chips... Are all Doritos chips? YES! Are all chips Doritos? No. Get students talking about why that is, referring back to their hierarchy as needed.

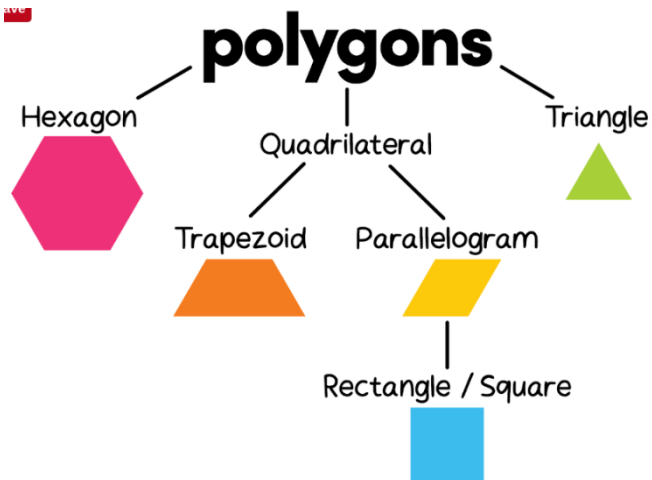
U.S. NAVY



viii. Students know that rectangles have two pairs of sides of equal lengths, two pairs of parallel sides, and four right angles. A square has all of those same attributes, so a square is just a specific type of rectangle, just like a Dorito is a specific type of chip. There is something additional that sets squares apart from all the other rectangles and that is that all four sides are equal.

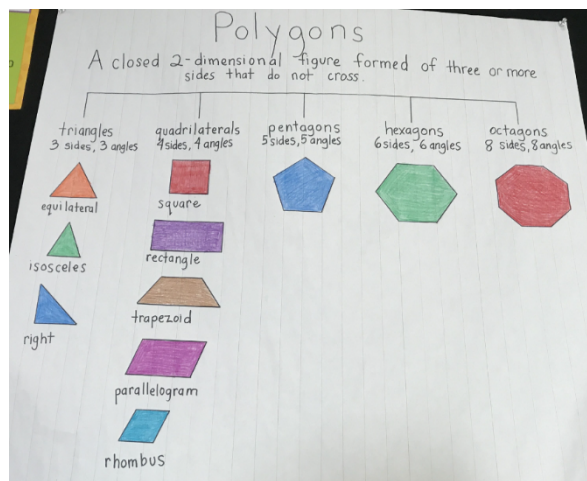
When students understand what a hierarchy is and you can have these types of discussions about the groups within the hierarchy, try replacing the chips with pattern blocks or cutouts of other shapes and begin doing the same activity but this time instead of talking about the characteristics of random objects, talk about the attributes of shapes.

ix. You can do this with the big category circles like you did with the food and household objects, or you can create a hierarchy that looks more like a flow chart. This layout is especially useful when you have shapes that begin splitting off into different categories.



e. Possible strategies include but are not limited to:

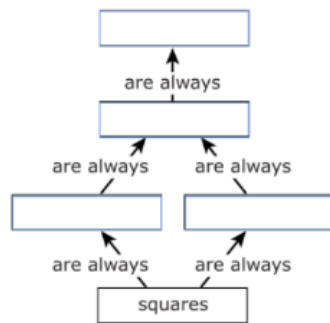
- i. [What do these shapes have in common?](#) Task
- ii. [What is a trapezoid?](#) Task
- iii. Students should have practice in creating tree diagrams and answering questions based on the tree diagrams.



f. Students should be exposed to the following types of problems:

Drag and drop the names to complete the diagram that shows the relationship among the figures listed. Each category will be used only once.

| | |
|----------------|----------------|
| rhombuses | rectangles |
| parallelograms | quadrilaterals |



Which figure is always a rectangle?

- A. square
- B. rhombus
- C. quadrilateral
- D. parallelogram

g. Lesson Vocabulary: trapezoid (exclusive), trapezoid (inclusive), Review the following key terms: attribute, category, hierarchy, polygon, subcategory, tree diagram, Venn diagram

7. Evaluate, Write, and Interpret Expressions- Formally introduce students to grouping symbols and to using the order of operations to evaluate numerical expressions with and without parentheses. Instruct students to use grouping symbols to write numerical expressions, such as $2 \times (5+8)$, in order to find solutions to problems. Students should be taught to recognize the importance of the placement of grouping symbols and understand that numerical expressions such as $2 \times (5+8)$ and 2×5 have different values. Instruct students to evaluate and write expressions that include whole numbers and fractions. Students should be taught to use their understanding of mathematical vocabulary (minus, the sum of, the difference of, times, divided by) and the structure of expressions to interpret numerical expressions without evaluating them.

- a. Complete Lesson 30, Sessions 1-4 (4 days)
- b. Students will practice how to evaluate and write expressions. Provide examples with whole numbers and fractions.
- c. Provide context to the problem so the students understand how expressions are used in the real world.

For example: Bethany sells soap and lotions at the craft fair. Each item costs \$7. Write a word phrase that describes the calculations you would do to find how much money Bethany makes by selling 32 soaps and 21 lotions. Then write and evaluate an expression to find how much money she makes. Show your work.

d. Possible strategies include but are not limited to:

i. Possible Problem to pose to the students:

1. Evaluate the following numerical expressions.

a. $2 \times 5 + 3 \times 2 + 4$

b. $2 \times (5 + 3 \times 2 + 4)$

c. $2 \times 5 + 3 \times (2 + 4)$

d. $2 \times (5 + 3) \times 2 + 4$

e. $(2 \times 5) + (3 \times 2) + 4$

f. $2 \times (5 + 3) \times (2 + 4)$

Can the parentheses in any of these expressions be removed without changing the value of the expression?

ii. Possible Problem to pose to the students:

1. Eric is playing a video game. At a certain point in the game, he has 31500 points. Then the following events happen, in order:

- He earns 2450 additional points.
- He loses 3310 points.
- The game ends, and his score doubles.
- Write an expression for the number of points Eric has at the end of the game. Do not evaluate the expression. The expression should keep track of what happens in each step listed above.
- Eric's sister Leila plays the same game. When she is finished playing, her score is given by the expression: $3(24500 + 3610) - 6780$

Describe a sequence of events that might have led to Leila earning this score.

iii. [Using Operations with Parentheses](#) Task

iv. [Comparing Products](#) Task

v. [Seeing is Believing](#) Task

vi. [Words to Expressions 1](#) Task

e. Students should be exposed to the following problems:

Enter your answer in the box.

$$3 \times (8 + 16) \div 4 = \boxed{}$$

Suzanne wrote the expression shown.

$$5 \times (12 - 6) \div 2$$

What is the value of the expression?

- A. 15
- B. 27
- C. 45
- D. 57

Which expression represents the statement "12 divided by 3, then add 5"?

- A. $12 \div (3 + 5)$
- B. $3 \div 12 + 5$
- C. $12 \div 3 + 5$
- D. $3 + 12 \div 5$

Drag and drop a phrase to correctly complete the sentence.

The value of the expression $4 \times (8,721 - 6,721)$ is the value of the expression $8,721 - 6,721$.

f. Lesson Vocabulary: evaluate, grouping symbol, Review the following key term: expression

8. Understand the Coordinate Plane- Students should be introduced to the coordinate plane in the first quadrant and learn vocabulary terms related to the coordinate plane. Instruct students that a coordinate plane is determined by a pair of perpendicular number lines called axes. Students should be taught to identify the coordinates, or ordered pair of numbers, for the location of a point graphed in the coordinate plane. Students should also be taught to graph ordered pairs as points in the coordinate plan.

a. Complete Lesson 31, Sessions 1-3 (3 days)

- b. Although students can often “locate a point,” these understandings are beyond simple skills. For example, initially, students often fail to distinguish between two different ways of viewing the point (2, 3), say, as instructions: “right 2, up 3”; and as the point defined by being a distance 2 from the y -axis and a distance 3 from the x -axis. In these two descriptions the 2 is first associated with the x -axis, then with the y -axis.
- c. Possible strategies include but are not limited to:
- i. Students can play the game **Battleship**. The students will need grid paper and colored pencils; some color for the ships and (for example) red for explosions on their ships and their enemy’s ships. This is how they will keep track of what ordered pairs have been called.

Students begin by folding the grid paper in half. They need to draw coordinate axes on both the top half and the bottom half and label the x and y axes with the numbers 1–10 on each axis. The students will need to draw in 5 ships on ordered pairs and label the ordered pairs. They should draw:

- Two ships that are sitting on 2 ordered pairs,
 - One ship that is sitting on 3 ordered pairs,
 - One ship that is sitting on 4 ordered pairs, and
 - One ship sitting on 5 ordered pairs.
- Remind them the bottom half has their boats or (Navy) and the top half has their opponent’s boats.

Students play in pairs sitting opposite each other and take turns calling out ordered pairs. Players should keep a list of the ordered pairs they call out written in (x,y) form on a piece of paper that both players can see so there is no disagreement later on about what has been called (it is common for students to transpose the coordinates). Then they are to mark the ordered pair they call out on the top coordinate plane. They should mark in black if they missed and red if they hit their opponent’s boat. On the bottom half of the grid paper they are to color black for the ordered pairs their opponent calls out and color red for the ordered pairs that hit their ship.

The students will be able to demonstrate understanding of ordered pairs by playing this game. You can assess the students’ understanding through listening, watching, and checking the students’ work as they play with a partner.

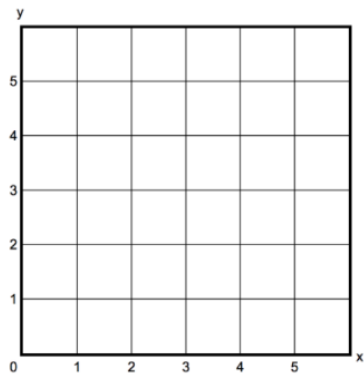
- d. Students should be exposed to the following problems:

Coordinates for points are shown in the table.

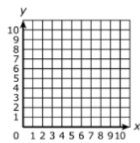
| Point | Coordinate |
|-------|------------|
| A | (2, 5) |
| B | (1, 4) |
| C | (0, 3) |
| D | (1, 0) |

Graph all the points from the table on the coordinate grid.

Select the places on the coordinate grid to plot the points.



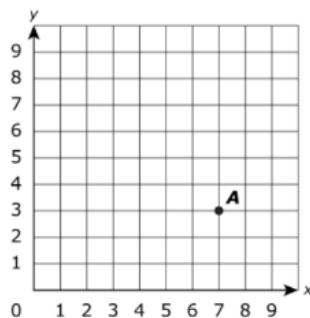
A coordinate plane is shown.



Which of these is a correct process for plotting the point (3, 6) on the coordinate plane?

- A. Start at the origin. Move 3 units up the y -axis, and then move 6 units to the right. Plot the point there.
- B. Start at the top of the y -axis. Move 3 units down the y -axis, and then move 6 units to the right. Plot the point there.
- C. Start at the origin. Move 3 units to the right on the x -axis, and then move 6 units up. Plot the point there.
- D. Start at the top of the y -axis. Move 3 units to the right, and then move 6 units down. Plot the point there.

What is the location of point A shown on the coordinate plane?



- A. (3, 7)
- B. (4, 8)
- C. (7, 3)
- D. (8, 4)

e. Lesson Vocabulary: coordinate plane, ordered pair, origin, x-axis, x-coordinate, y-axis, y-coordinate

9. Represent Problems in the Coordinate Plane- Instruct students to use the coordinate plane to solve both mathematical and real-world problems, including problems involving geometric shapes graphed in the coordinate plane and problems involving finding horizontal and vertical distances between points. Students should be taught how to interpret graphs that show relationships between two real-world quantities, and they plot and interpret points on these types of graphs.

a. Complete Lesson 32, Sessions 1-4 (4 days)

b. Students will explore how to represent and solve problems using graphs in the coordinate plane.

c. Possible strategies include but are not limited to:

i. Students can plot three vertices of a square or rectangle and then plot the fourth point on the x- and y-coordinate based on what they know about the quadrilaterals.

ii. Students can plot points to solve problems that require graphing points as well as using and finding distances in the coordinate plane.

iii. Students can plot points to represent real-world problems. For example:

1. Greetings from the Kalahari Desert in South Africa! In this activity, you will learn a lot about the Kalahari's most playful residents: meerkats.

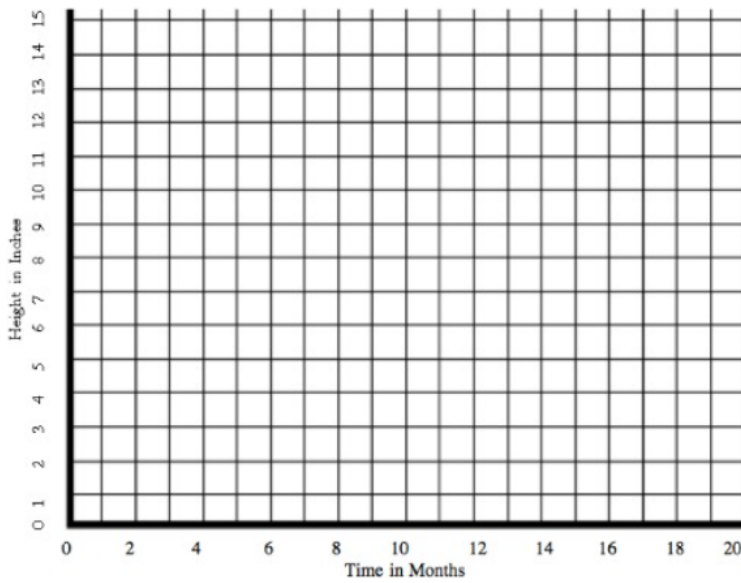
The following ordered pairs show the height of a typical meerkat at different times during the first 20 months of life. Graph the corresponding points and see what you can discover about meerkats. Once you have graphed them all, connect the points in the order they are given to form a line graph.



See if you can graph these ordered pairs:

(0 months, 3 inches)
(2 months, 5 inches)
(4 months, 6 inches)
(6 months, 7 inches)
(8 months, 8 inches)
(10 months, 9 inches)
(12 months, 10 inches)
(14 months, 12 inches)
(16 months, 12 inches)
(18 months, 12 inches)
(20 months, 12 inches)

Title: Meerkat Height in Inches Over First 20 Months

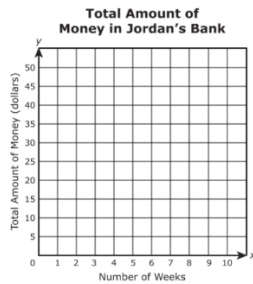


- What does the point (0 months, 3 inches) mean for a typical meerkat's height?
- How tall do you think a typical meerkat gets? Why?
- At what age do meerkats reach their full height? How do you know from this graph?
- If this graph were about a human instead of a meerkat, at what age do you think the height would stop getting larger?

iv. Lighthouse Task

d. Students should be exposed to the following problems:

Jordan has \$10 in the bank. Jordan earns \$5 each week for doing chores, and puts the money in the bank. After a certain number of weeks of doing chores, Jordan has \$35. A graph is set up so that Jordan can record the total amount of money in the bank each week after putting in \$5.



Part A

Which ordered pair represents the amount of money Jordan has in the bank before doing any chores?

- A. (0, 10)
- B. (0, 35)
- C. (10, 0)
- D. (35, 0)

Part B

Which ordered pair represents the amount of money Jordan has after 4 weeks of doing chores?

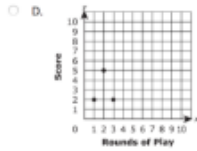
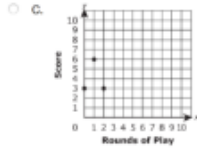
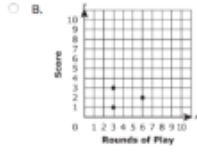
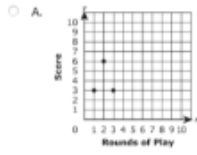
- A. (4, 20)
- B. (4, 30)
- C. (20, 4)
- D. (30, 4)

Mia is playing several rounds of a word game. Each coordinate pair shows the number of a round and Mia's score for that round. She is keeping track of these coordinate pairs on a coordinate plane.

- Round 1: (1, 3)
- Round 2: (2, 6)
- Round 3: (3, 3)

Part A

Which coordinate plane correctly shows Mia's scores for the first three rounds of play?



Part B

In round 4, Mia scores the same number of points as in rounds 2 and 3 combined.

What is the coordinate pair that represents Mia's score for round 4?

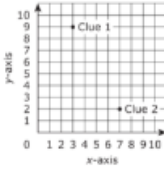
- A. (4, 5)
- B. (9, 4)
- C. (5, 4)
- D. (4, 9)

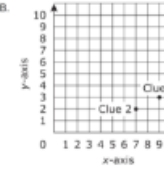
Bryan is planning a treasure hunt for his friends in his backyard. He hides four clues. The first two clues are at the coordinates shown.

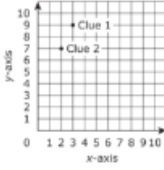
- Clue 1: (3, 9)
- Clue 2: (7, 2)

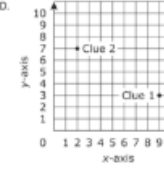
Part A

The coordinate planes represent Bryan's backyard. Which coordinate plane shows the correct locations of Clue 1 and Clue 2?

A. 

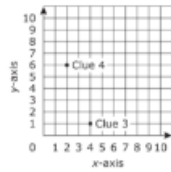
B. 

C. 

D. 

Part B

Bryan hides Clue 3 and Clue 4 at the coordinates shown on the coordinate plane. What are the coordinates of Clue 3 and Clue 4?



- A. Clue 3: (1, 4); Clue 4: (8, 2)
- B. Clue 3: (4, 1); Clue 4: (8, 2)
- C. Clue 3: (4, 1); Clue 4: (2, 8)
- D. Clue 3: (1, 4); Clue 4: (2, 8)

e. Lesson Vocabulary: There is no new vocabulary. Review the following key terms: coordinate plane, ordered pair, origin, x-axis, x-coordinate, y-axis, y-coordinate

10. Analyze Patterns and Relationships- Students should continue their work with number patterns as they begin to look at the relationships between patterns. Instruct students to analyze numerical patterns and describe the relationship between corresponding terms of two different numerical patterns. Instruct students to graph ordered pairs of corresponding terms in the first quadrant of the coordinate plane to help them see the relationship between corresponding terms.

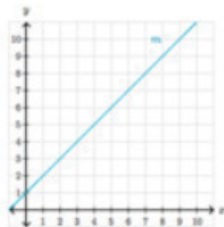
a. Complete Lesson 33, Sessions 1-4 (4 days)

b. Possible strategies include but are not limited to:

i. Students can look for patterns on the coordinates of a coordinate plane:

Directions: Fill in the missing numbers in the table.

| X | Y |
|---|---|
| 6 | 7 |
| 7 | |
| 8 | |



ii. Provide opportunities to identify relationships between two corresponding patterns.

| Hour | Number of Basketballs | Number of Footballs |
|------|-----------------------|---------------------|
| 3 | 9 | 6 |
| 4 | 12 | 8 |
| 5 | 15 | 10 |
| 6 | 18 | 12 |
| 7 | 21 | 14 |
| 8 | 24 | 16 |
| 9 | 27 | 18 |

Jed works in a factory that makes basketballs and footballs. In three hours, he can make 9 basketballs and 6 footballs.

Jed's boss wants to know how many basketballs and footballs Jed will have made in 20 hours.

iii. Provide opportunities for students to generate a numerical pattern given a rule:

Rule: $\times 3$

| input | output |
|-------|----------------------|
| 1 | <input type="text"/> |
| 2 | <input type="text"/> |
| 5 | 15 |
| 8 | <input type="text"/> |
| 12 | <input type="text"/> |

iv. [Sidewalk Patterns](#) Task

c. Students should be exposed to the following problem:

Rafael and Charla each create a pattern. Rafael's pattern starts at 2 and increases by 3 each time. Charla's pattern starts at 4 and increases by 6 each time.

Part A

Complete the table to show the first 4 numbers in Rafael's and Charla's patterns. Enter the answers in the boxes.

| | | | | |
|------------------|----------------------|----------------------|----------------------|----------------------|
| Rafael's Pattern | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Charla's Pattern | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

Part B

When the number in Rafael's pattern is 245, what is the corresponding term in Charla's pattern? Enter the answer in the box.

d. Lesson Vocabulary: corresponding terms, terms, pattern

GENERAL QUESTIONS FOR TEACHER USE

Adapted from Growing Success and materials from Math GAINS and TIPS4RM (Georgia Department of Education)

Reasoning and Proving

- How can we show that this is true for all cases?
- In what cases might our conclusion not hold true?
- How can we verify this answer?
- Explain the reasoning behind your prediction.
- Why does this work?
- What do you think will happen if this pattern continues?
- Show how you know that this statement is true.
- Give an example of when this statement is false.
- Explain why you do not accept the argument as proof.
- How could we check that solution?
- What other situations need to be considered?

Reflecting

- Have you thought about...?
- What do you notice about...?
- What patterns do you see?
- Does this problem/answer make sense to you?
- How does this compare to...?
- What could you start with to help you explore the possibilities?
- How can you verify this answer?
- What evidence of your thinking can you share?
- Is this a reasonable answer, given that...?

Selecting Tools and Computational Strategies

- How did the learning tool you chose contribute to your understanding/solving of the problem? Assist in your communication?
- In what ways would [name a tool] assist in your investigation/solving of this problem?
- What other tools did you consider using? Explain why you chose not to use them.
- Think of a different way to do the calculation that may be more efficient.
- What estimation strategy did you use?

Connections

- What other math have you studied that has some of the same principles, properties, or procedures as this?
- How do these different representations connect to one another?
- When could this mathematical concept or procedure be used in daily life?
- What connection do you see between a problem you did previously and today's problem?

Representing

- What would other representations of this problem demonstrate?
- Explain why you chose this representation.

- How could you represent this idea algebraically? graphically?
- Does this graphical representation of the data bias the viewer? Explain.
- What properties would you have to use to construct a dynamic representation of this situation?
- In what way would a scale model help you solve this problem?

Note: The instructor is encouraged to consult the supplemental resources located under materials to personalize and differentiate instruction for students, as well as address any learning gaps based on formative assessments.

Evidence/Performance Tasks

Formative Assessment:

- Fact Fluency Practice Assessments
- Administer Ready Math Lesson Quizzes at the end of each Lesson
- Administer Comprehension Check (digital)

Summative Assessments:

- Administer Ready Math Mid-Unit Assessments
- Administer Ready Math End of Unit Assessments

Benchmark Assessments:

- iReady Diagnostic
- Fact Fluency Assessment
- Acadience Assessment (As a reference, these assessments are not administered by the classroom teacher)

Alternative Assessments:

- Informal Observation
- Small Group Observation
- Exit Tickets
- Math Journal

- Oral and Written Explanations of Reasoning

Materials

The following are approved resources that teachers can include to further unit related objectives:

- Ready Math Teacher Toolbox Resources
 - Whole Class Instruction
 - Teach: Instruction & Practice, Interactive Tutorials,
 - Assess: Lesson Quizzes & Unit Assessments
 - Small Group Differentiation
 - Prepare: Prerequisite Lessons
 - Reteach: Tools for Instruction
 - Reinforce: Math Center Activities
 - Extend: Enrichment Activities
- Ready Math Workbook
- Ready Math Slides
- Digital Math Tools
- iReady My Path
- Learning Games
- The First 10 Weeks Number Talks
- The Second 10 Weeks Number Talks
- The Third 10 Weeks Number Talks
- The Fourth 10 Weeks Number Talks
- Manipulatives: counters, tens frames, connecting cubes, base 10 blocks, fraction strips,
- White boards
- Number paths

- Hundred charts
- Blank Bar Models
- Grid Paper
- Blank Number Bonds
- CPS District Mathematics Google Drive Folder
- Literature to assist in teaching:
 - *Sir Cumference and the Viking's Map* by Cindy Neuschwander (Coordinate Grids)
 - *A Fly on the Ceiling* by Julie Glass (Coordinate Grids)

Supplemental Resources:

- [Grade 5 NJSLA Math Questions- Organized by Topic](#)
- [Acing Math](#)- Card games that support a variety of math skills
- [Measurement Conversion Chart](#)
- [Real-World problem examples](#)
- [Tasks Aligned with Fifth Grade Standards](#)

Any additional resources that are not included in this list will be presented to and reviewed by the supervisor before being included in lesson plans. This ensures resources are reviewed and vetted for relevance and appropriateness prior to implementation.

Standards

New Jersey Diversity and Inclusion Law

In accordance with New Jersey's Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity through real world applications and analysis, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance.

| | |
|----------------|--|
| MATH.5.OA.A.1 | Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. |
| MATH.K-12.2 | Reason abstractly and quantitatively |
| MATH.5.OA.A.2 | Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. |
| MATH.K-12.3 | Construct viable arguments and critique the reasoning of others |
| MATH.5.OA.B.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. |
| MATH.K-12.4 | Model with mathematics |
| MATH.K-12.5 | Use appropriate tools strategically |
| MATH.K-12.6 | Attend to precision |
| MATH.5.NBT.A.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. |
| MATH.K-12.7 | Look for and make use of structure |
| MATH.K-12.8 | Look for and express regularity in repeated reasoning |
| MATH.5.NBT.B.5 | With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm. |
| ELA.L.KL.5.1 | Use knowledge of language and its conventions when writing, speaking, reading, or listening. |
| ELA.L.KL.5.1.A | Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases. |
| MATH.5.NF.A.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. |
| ELA.L.VL.5.2 | Determine or clarify the meaning of unknown and multiple-meaning academic and domain-specific words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies. |
| MATH.5.NF.A.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 reasonableness of answers. |
| MATH.5.NF.B.3 | Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). 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. |
| MATH.5.NF.B.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. |
| MATH.5.M.A.1 | Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. |
| MATH.5.DL.A.1 | Understand how different visualizations can highlight different aspects of data. Ask questions and interpret data visualizations to describe and analyze patterns. |
| MATH.5.DL.A.2 | Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g., chart, storyboard, video presentation). |

| | |
|-----------------|--|
| MATH.5.DL.A.3 | Collect and clean data to be analyzable (e.g., make sure each entry is formatted correctly, deal with missing or incomplete data). |
| MATH.5.DL.A.4 | Using appropriate visualizations (i.e., double line plot, double bar graph), analyze data across samples. |
| MATH.5.DL.B.5 | Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. |
| MATH.5.G.A.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). |
| MATH.5.G.A.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. |
| MATH.5.G.B.3 | Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. |
| MATH.5.G.B.4 | Classify two-dimensional figures in a hierarchy based on properties. |
| ELA.SL.PE.5.1 | Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. |
| ELA.SL.PE.5.1.B | Follow agreed-upon rules for discussions and carry out assigned roles. |
| ELA.SL.PE.5.1.C | Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. |
| WRK.K-12.P.1 | Act as a responsible and contributing community members and employee. |
| WRK.K-12.P.4 | Demonstrate creativity and innovation. |
| WRK.K-12.P.8 | Use technology to enhance productivity increase collaboration and communicate effectively. |
| TECH.9.4.5.CI | Creativity and Innovation |

Suggested Strategies for Modification

[Possible accommodations/modification for Fifth Grade](#)

Note: Teachers can find more specific modifications for English learners, learners with special needs, learners reading below grade level, and advanced learners on the Ready Math website.