Grade 3 Math Unit 2

Content Area: **Mathematics**
Course(s):
Time Period: **Trimester 2**
Length: **59 Days**
Status: **Published**

Brief Summary of Unit

In this unit, students are introduced to area and other applications of multiplication. Students will explore the idea of area as the amount of space covered by a shape and the act of measuring area is introduced by showing a rectangle covered with square units. In this unit, students will draw on the concept of area and the properties of rectangles and arrays to solve a problem. They will share strategies to explore how to find area when they cannot count all square units. In addition, students will share models to explore how to find the combined area of two rectangles. Next, students will draw on their knowledge of multiplication and division to solve word problems. Students will write word problems and equations involving multiplication and division. After, students will write and solve two equations to explore how two-step problems can be broken down into one-step problems.

Students will also read and interpret a picture graph where each symbol represents two units to explore how multiplication can help them figure out the data shown by the symbols on the graph.

Also, in this unit, students will explore how unit fractions can help you understand fractions with numerators greater than 1. Students will also use number lines to show equal parts of a whole and use number lines to count fractions including fractions equal to or greater than Students will use area models and number lines to determine which fractions are equivalent. In this unit, students will compare models (same areas model or number line) to explore how to rename a fraction using a different denominator.

Revision Date: August 2024

Essential Questions/Enduring Understandings

Essential Questions:

- How is area related to the operations of multiplication and division?
- How can the knowledge of area be used to solve real world problems?
- How can the same area measure produce rectangles with different dimensions? (Ex. 24 square units can produce a rectangle that is a 3 x 8, 4 x 6, 1 x 24, 2 x 12)
- How can you solve problems that involve more than one step?
- How do we represent and read information on a picture graph or bar graph?

- How can you divide a region into equal parts?
- How can different fractions name the same part of a whole?
- How do you locate and name fractions on a number line?
- What are the important features of a unit fraction?
- How are fractions used in problem-solving situations?

Enduring Understandings:

- Students will understand that area is the measure of the space inside a shape
- Students will understand that you can use that you know about multiplication to find the area of a rectangle and that you can add areas to find the area of complex shapes.
- Students will understand that you can use what you know about arrays to help you model and solve multiplication and division problems.
- Students will understand that the scale on a graph can be greater than 1 and knowing how to multiply will help you use scale to solve problems about data more efficiently.
- Students will understand that fractions are numbers that describe wholes divided into equal parts, knowing how many equal parts you have will help you name fractions.
- Students will understand that fractions name points on a number line and knowing about number lines can help you compare fractions with whole numbers and other fractions.
- Students will understand that you can use what you know about fraction models and number lines to find different names for the same fraction, or equivalent fractions.

Students Will Know/Students Will Be Skilled At

Students will know:

- Area and how to find the area by tiling and by multiplying.
- How to find the area of a combined rectangle or a non-rectangular shape by adding the areas of the rectangles that make up the shape.
- How to use multiplication or division to solve one-step word problems.
- How to use addition, subtraction, multiplication, or division to solve two-step word problems.
- How to draw picture graphs and bar graphs to show data.
- How to use a fraction to show equal parts of a whole, for example: when a whole has 4 equal parts,

each part is ¼ of the whole.

- How to use a number line to show fractions, and find a fraction on a number line.
- That equivalent fractions show the same amount and name the same point on a number line.
- How to find equivalent fractions.
- How to write whole numbers as fractions, for example; $5 = {}^{5}/_{1}$ or ${}^{10}/_{2}$.

Students will be skilled at:

- Understanding area and finding area by tiling and by multiplying.
- Finding the area of a combined rectangle or a non-rectangular shape by adding the areas of the rectangles that make up the shape.
- Using multiplication or division to solve one-step word problems.
- Using addition, subtraction, multiplication, or division to solve two-step word problems.
- Drawing picture graphs and bar graphs to show data.
- Using a fraction to show equal parts of a whole, for example: when a whole has 4 equal parts, each part is ¼ of the whole.
- Using a number line to show fractions, and find a fraction on a number line.
- Understanding that equivalent fractions show the same amount and name the same point on a number line.
- Finding equivalent fractions.
- Writing whole numbers as fractions, for example; $5 = {}^{5}/_{1}$ or ${}^{10}/_{2}$.

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

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 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.

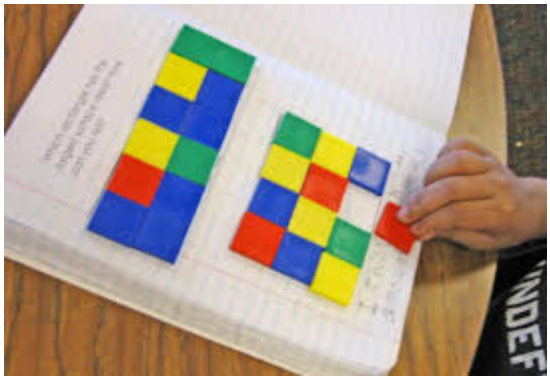
- Number Strings- This routine helps to build students' mental math capabilities. The teacher writes a problem horizontally on the board in a whole group or small setting. The students mentally solve the problem and share with the whole group how they solved it. They must justify and defend their reasoning. 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 ten 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. Third graders need to be fluent in adding and subtracting within 20 as well as multiplying to ten. 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. Understand Area- Instruct students to gain a conceptual understanding of area as the amount of space inside a closed plane shape, or the amount of space the shape covers. Instruct students to recognize that a rectangle has both length and width and that square units can be used to measure the amount of space covered by a rectangle. Instruct students to find the area of a rectangle and a non-rectangle shape by counting the number of square units that cover the rectangle or shape. Instruct students that a square with sides that are 1 inch long has an area of 1 square inch and a square with sides that are 1 centimeter long has an area of 1 square centimeter.

a. Complete Lesson 14, Sessions 1-3 (3 days)

b. Students can cover rectangular shapes with tiles and count the number of units (tiles) to begin developing the idea that area is a measure of covering. Instruct students that area describes the size of an object that is two-dimensional. T**he formulas should not be introduced before students discover the meaning of area.**

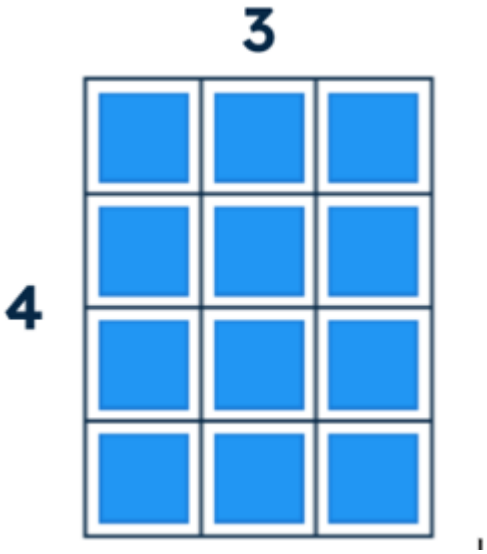


c. The area of a rectangle can be determined by having students lay out unit squares and count how many square units it takes to completely cover the rectangle completely without overlaps or gaps.

d. Students need to develop the meaning for computing the area of a rectangle. A connection needs to be made between the number of squares it takes to cover the rectangle and the dimensions of the rectangle. Ask questions such as:

i. What does the length of a rectangle describe about the squares covering it?

ii. What does the width of a rectangle describe about the squares covering it?



e. Lesson Vocabulary: area, square unit, measure

3. Multiply to Find Area- Instruct students to formally explore the multiplicative relationship between a rectangles length and width and its area. Instruct students to apply their understanding of decomposing a rectangle into rows and columns of the same-sized square units and, thus, the rectangle's area. Students should be taught that a rectangle's area can also be found by multiplying its length and its width. Instruct students to label the area in square units, such as square centimeters or square feet.

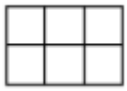
a. Complete Lesson 15, Sessions 1-4 (4 days)

b. The concept of multiplication can be related to the area of rectangles using arrays. Students need to discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column.

c. Ask questions about the dimensions if students do not make these discoveries. For example:

i. How do the squares covering a rectangle compare to an array?

ii. How is multiplication used to count the number of objects in an array?



d. Students should also make the connection of the area of a rectangle to the area model used to represent multiplication. This connection justifies the formula for the area of a rectangle.

e. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths and widths of the rectangle. Expect different lengths and widths such as 6 inches by 7 inches, or 3 inches by 14 inches.

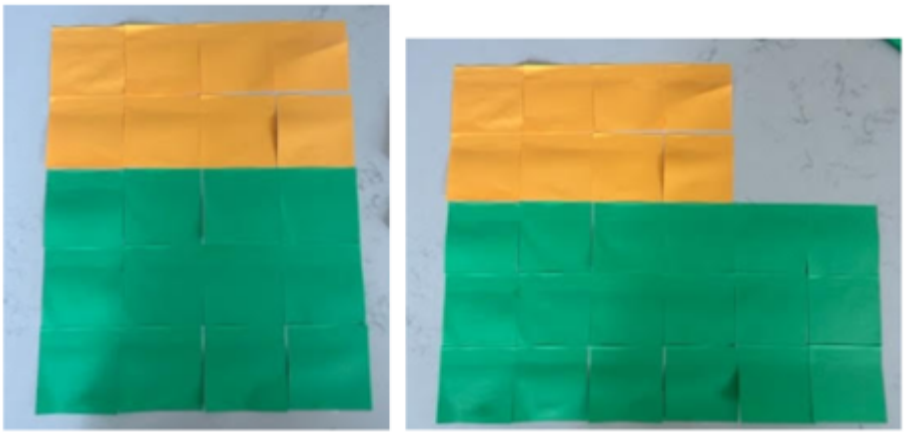
f. Video: Brainpop Jr. Area

g. Lesson Vocabulary: area, multiplication, square unit

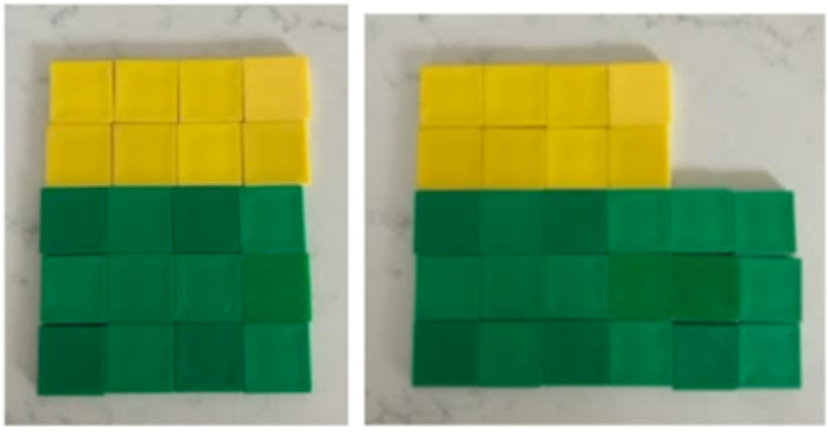
4. Add Areas- Instruct students to continue to explore area of rectangular shapes and deepen their understanding of spatial structuring. Students should be taught that area is additive. Instruct students to find areas of combined rectangles by using area models and the distributive property of multiplication. Students should be solving real-world problems.

a. Complete Lesson 16, Sessions 1-4 (4 days)

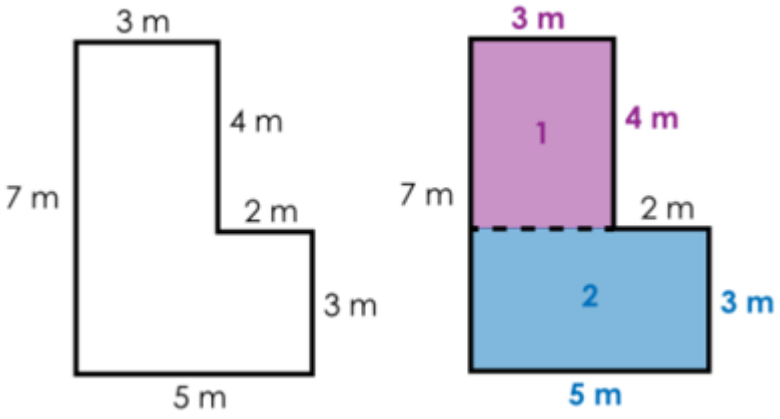
b. To find the area of an irregular shape, you can divide the shape into rectangles, find the area of each rectangle, and then add the areas. One way to do this could be to model with post-it notes on the board so students can physically see the two shapes and count the squares for each area before multiplying each shape. These are amazing for group discussions in particular because you can model and manipulate the area. You can easily add and remove square units as well.



c. These can be used to easily create visuals for anchor charts, bulletin boards, group work, You can also do this with square tiles. This might work better with a small group of students.



d. When the students are no longer using manipulatives, instruct them that they should first, draw lines to separate the shape into one rectangle and two squares to get the area of each rectangle and then add the two areas together.



e. Lesson Vocabulary: area, product, square unit

5. Solve One-Step Word Problems Using Multiplication and Division- Instruct students to apply their understandings of multiplication and division to solving one-step word problems that involve equal groups, arrays, and area. Students should be using drawings, words, and equations to represent situations in word problems, writing equations using a letter for the unknown number. Students should be taught to recognize that the same situation can be represented with both a multiplication equation and a division equation.

a. Complete Lesson 17, Sessions 1-5 (5 days)

b. One possible way to introduce the problems:

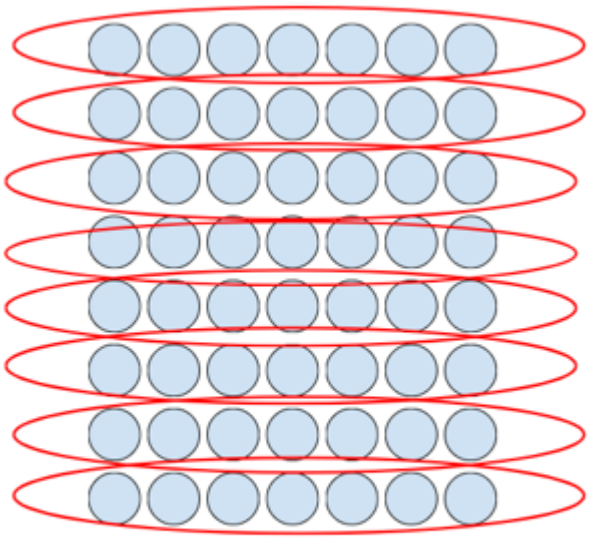
   i. Multiplication word problem in which the unknown is the product.

   ii. Multiplication word problem in which the unknown is the number of equal groups or the number in each group.

   iii. Division word problem in which the unknown is the number of equal groups of the number in each group.

c. Encourage students to model the problems with manipulatives or drawings.

d. Students should write the equation that models what the problem is asking. For example: A bin in the gymnasium holds 56 footballs. There are 8 bins in the gym. How many footballs are in each bin?



8 x ? = 56
8 x 7 = 56
7 footballs are in each bin.

e. Lesson Vocabulary: array, division, division equation, multiplication, multiplication equation

6. Solve Two-Step Word Problems Using Multiplication and Division- Instruct students to model and solve

two-step word problems involving all four operations and calculations with up to three-digit numbers. Students should be continuing to use drawings, words, tables, and equation with unknowns to represent situations in word problems. Students should be using estimation and mental strategies to check the reasonableness of their answers. Students should be taught to solve two-step word problems involving money using the four operations.

a. Complete Lesson 18, Sessions 1-5 (5 days)

b. Possible strategies include but are not limited to:

    i. Possible strategies include but are not limited to:

        1. Start out with sharing one step problem. You can use manipulatives so the students can see the picture, but you do not need to. For example:

            a. There are 5 cars

            b. Each car has 4 tires.

            c. How many tires do they have in all?

        2. Next, you can give each student some type of counting manipulative (If they do not have one already). Then have the students create on their desk arrays to compliment the story problems you call out. However, you will add another sentence which will involve another math operation. For example:

            a. There are 5 cars.

            b. Each car has 4 tires.

            c. 3 of the tires are flat.

            d. How many tires are not flat?

        3. Question: What type of math is being presented? How would that equation be written? **(5 x 4) - 3 = X**

        4. Have the students create arrays and subtract or add manipulatives to solve the equation. Along with that, the students would write the equation for the story problem on a dry erase board and hold the board in the air when you instruct them to do so. This will be done to check student understanding. Possible problems to use are in the chart below (These problems use multiplication and either addition/subtraction):

One Step Problems	**Two Step Problems**
There are four kids. Each kid has 9 marbles. How many marbles is that?	There were 5 parents at the park. Each parent had 3 kids. 6 of the kids were boys. How many were girls?
The gardener has 4 gardens. Each garden has 5 rose bushes. How many rose bushes are there?	The coach had 6 baskets. Each basket contained 7 balls. 12 of them were footballs. How many were not footballs?

Six police officers were patrolling the city. Each one captured 3 bad guys. How many bad guys did they capture?

Seven kids were buying ice cream. They each have four quarters. How many quarters do they have?

There were 5 doctors. Each doctor had 7 patients. How many patients is that?

The pet shop had eight dogs. Each dog has 2 puppies. How many puppies will they have to sell?

There were three teachers. Each teacher had 7 boys each in their class. How many boys were in all three classes?

Three buckets were under an apple tree. Each one could hold 8 apples. What is the largest number of apples that the buckets can hold?

Mary, Luke, Mark, and Isaiah went fishing. They each caught 8 fish. When they got home, their mom had purchased 10 from the local supermarket. How many fish do they have?

There are 7 fire stations in the city. Each fire station has 5 firemen. During the week, the city hired 8 more. How many firemen do they have in all?

There are nine students and they each have a pencil box. 7 pencils are inside each one. 28 of the pencils are sharpened. How many are not sharpened?

There were 3 boxes of donuts. Each box held 10 donuts. 12 donuts had sprinkles. How many donuts did not have sprinkles?

c. Lesson Vocabulary: operation, equation, estimate (noun), estimate (verb), round

7. Scaled Graphs- Students should be taught the concept of scale in graphs. Instruct students that a symbol on a picture graph can represent more than one item of data and that the key tells the number of items each symbol stands for. Students should be taught to multiply the number in the key by the number of symbols in a category to find how many items are represented. Instruct students to recognize that the scale on a bar graph can show intervals other than 1. Students should be taught to combine data from two or more categories to find how many more or fewer items are in those categories than in another. Instruct students to draw picture graphs and bar graphs from given data using scale other than 1. Students should be taught to think about whether a given scale is appropriate for certain data. Instruct students to title graphs, write a key and labels, draw symbols or bars to represent data. Students should be taught to develop data-based questions and decide what data will answer the questions. Instruct students to collect student-centered data

a. Complete Lesson 19, Sessions 1-5 (5 days)

b. Instruct students to draw picture graphs in which each picture represents more than one object, and

they draw bar graphs in which the height of a given bar in tick marks must be multiplied by the scale factor in order to yield the number of objects in the given category. Place an emphasis on multiplication when using the scale and reading/creating the graphs.

c. Possible strategies for bar/pictographs include but are not limited to:

    i. Students should create questions and then poll other classes for information to create graphs. If visiting classrooms is difficult, students can create a Google Form to share with their class or other classrooms to gather data. (Students creating questions and collecting data is part of the new standard.)

        1. Graphing topics include:

            a. What do you do first after school? Watch TV, Play games, Homework

            b. Which weekend day is your favorite? Friday, Saturday, or Sunday

            c. Out of these animals, which is your favorite? Sloth, panda, turtle, or tiger

            d. What is your favorite game to play with a ball? Basketball, Kickball, Golf, soft/baseball, Tennis

            e. What is your favorite flavor of ice cream? Chocolate, vanilla, mint, or strawberry

            f. What is your favorite type of shoe to wear? Sneakers, flip flops/slider, dressy shoe, sport shoe

            g. Or you can make stations, coin flip (heads or tails), spinner (tally the number of spins each number comes out and give the amount of spins such as 30, 40 or 50.

    ii. Another graphing suggestion is to prepare containers of objects for students to count such as color tiles, pom-poms, unifix cubes, legos, stickers, mini erasers, buttons, etc. Anything they can create categories for and scales that go beyond one. Borrowing counting objects from lower grade levels, such as bears, fruit, insects, will change it up for the students.

    iii. Instruct students to show how they can use multiplication to create and read a scale.

    iv. Students should be able to solve two step problems using graphs. The sample below shows a sample two-step problem using a bar graph.

Mr. Conley delivers packages. The bar graph shows the total number of packages he delivered on five days last week.



How many more packages did Mr. Conley deliver on Monday and Tuesday than he did on Thursday and Friday?

Enter your answer in the box.

d. Lesson Vocabulary: data, key, scale (on a graph), bar graph, picture graph

Third-grade students will have prior knowledge/experience related to the concepts and skills identified in this unit.

● In first grade, students are expected to partition circles and rectangles into two or four equal shares, and use the words, halves, half of, a fourth of, and quarter of.

● In second grade, students are expected to partition circles and rectangles into two, three, or four equal shares, and use the words, halves, thirds, half of, a third of, fourth of, quarter of.

● Students should also understand that decomposing into more equal shares equals smaller shares, and that equal shares of identical wholes need not have the same shape.

8. Understand What a Fraction is- Students should be taught to focus on the meaning of fractions and name fractions by the number of equal parts in the whole, such as sixths or eighths. Instruct students about the structure of fractions, identifying the denominator as the number of equal parts in the whole and numerator as the number of parts being considered. Instruct students to identify unit fractions such as ⅓, ¼, □, and ⅛, by using models with one part shaded out of a number of equal parts. Students should be taught to apply their understanding of unit fractions to understand greater fractions that are built from unit fractions, such as ⅔, ¾, 4/6, and ⅝. Students should be taught, for example, if they partition a whole (rectangle) into three equal parts, each part is 1/3. Tow of these parts would be 2/3/

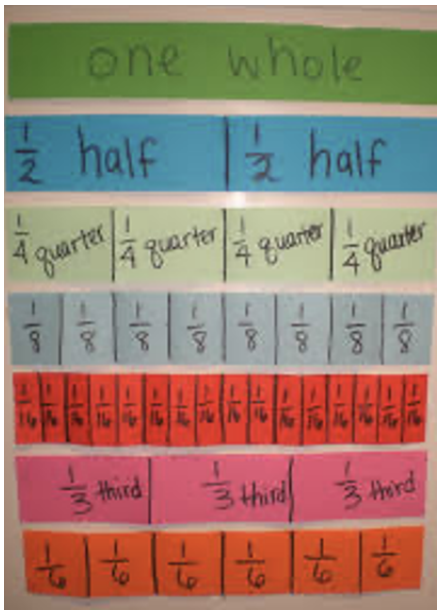
a. Complete Lesson 20, Sessions 1-3 (3 days)

b. Possible strategies include but are not limited to:

i. Fraction strips: Using construction paper, cut out 6 same length strips of different colors. Give each student one of each color strip. Have them write 1 in the middle of the strip. Next, take the second strip and fold in half, cut and have the students label each side ½. Do the same for fourths, eighths, and thirds and sixths. Students can use these strips to build fractions such as ⅔, ¾ etc. This will help them to understand that unit fractions are used to build larger fractions.

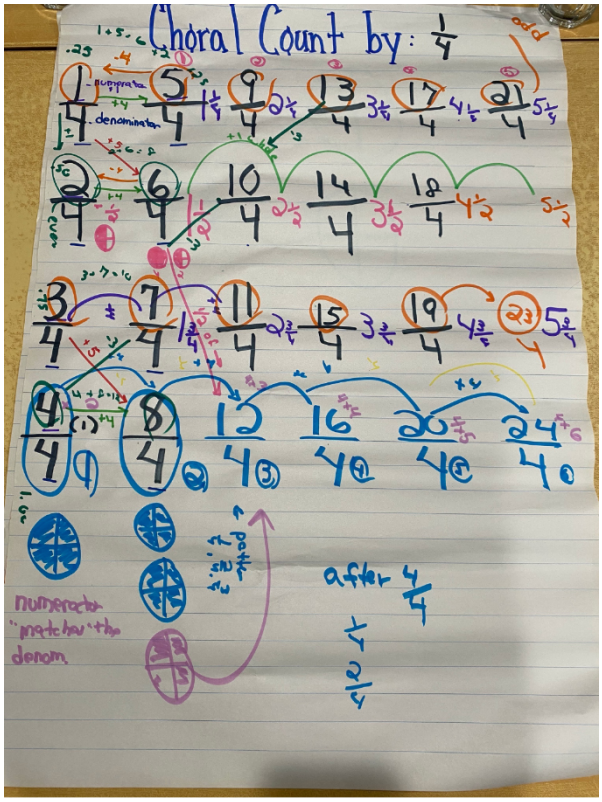
Students can use this set later on to make equivalent fractions and to compare fractions. The act of folding the fractions will allow students to see some relationships between fractions: fourths are half of half, eighths are half of fourths, etc.

ii. Students will also see how all of the fractions equal one whole because all of the strips are the same size. The example below shows strips made from sentence strips. (One other way to make them.)



iii. As students counted with whole numbers, they should also count with fractions. Counting equal sized parts helps students determine the number of parts it takes to make a whole and recognize fractions that are equivalent to whole numbers. Students need to know how big a particular fraction is and can easily recognize which of two fractions is larger. The fractions must refer to parts of the same whole. Benchmarks such as 1/2 and 1 are also useful in comparing fractions.

1. Try choral counting by halves, fourths, eights, thirds, and sixths starting at various points and include fractions greater than a whole to begin discussions about what that looks like.



c. Lesson Vocabulary: denominator, fraction, numerator, unit fraction

9. Understand Fractions on a Number Line- Instruct students to extend their understanding of fractions as equal parts of a whole to include the concept of fractions as number on a number line. Students should be taught to recognize that marking equal intervals on a number line can show whole numbers and that, similarly, marking equal intervals between whole numbers can represent fractions. Instruct students to recognize that a location on a number line can have more than one name, for example the same location can be named 1 whole or 4/4 (four fourths). Instruct students that each of the equal parts on a number line has a size.

a. Complete Lesson 21, Sessions 1-3 (3 days)

b. Possible strategies include but are not limited to:

i. Show students an open number line such as the one below. Ask them what they notice about it and what makes it different from number lines they've seen before.



Elicit that the number line is from 0-1 and the points will be less than 1. Next ask students where they think ½

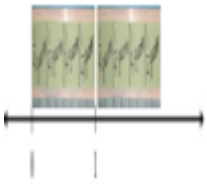
would be? If needed, have them use fraction strips they created or store bought to see where it be?



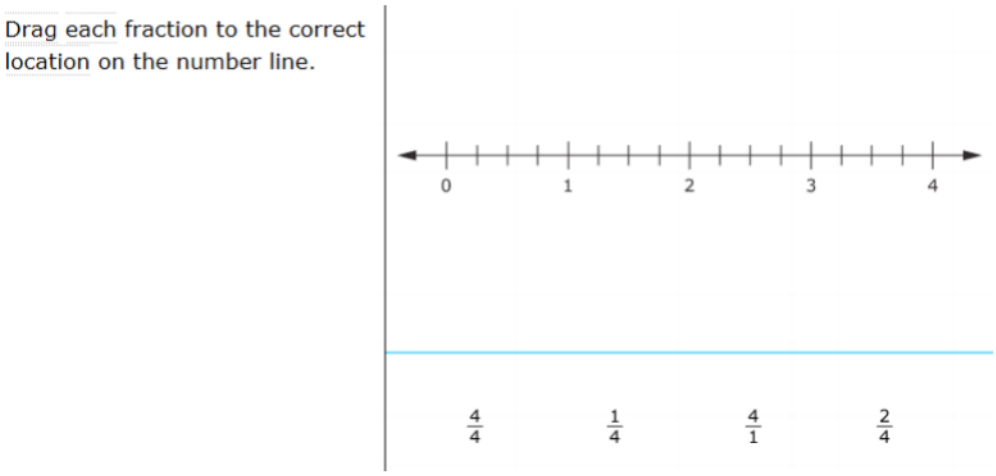
Talk about how it falls halfway in between zero and a half. Do the same for ¼ and ask the students what they notice? How many lines will there be? Why won't there be 4 lines etc.? (4/4 is one whole so you don't need a fourth line. Try it with eights, thirds and sixths.

1. Ask the students how the denominator helps place the numbers on the number line.
2. Ask how the fraction strips help with the location on the number line.

ii. Use the number lines to show fractions greater than 1. For example: Place two sets of fraction strips above a number line to show that what comes after 1 whole is a mixed number: 1 ¼



iii. Students should move from the strips to locating fractions on a number line without the models, solving problems locating specific fractions and determining how many sections a number line is divided into, etc. Such as:



iv. You can turn this activity to a center in which you have an open number line drawn on chart paper or bulletin board paper and have post-it notes with fractions on them for students to place on the number line like the one above.



c. Lesson Vocabulary: mixed number, denominator, fraction, numerator, unit fraction.

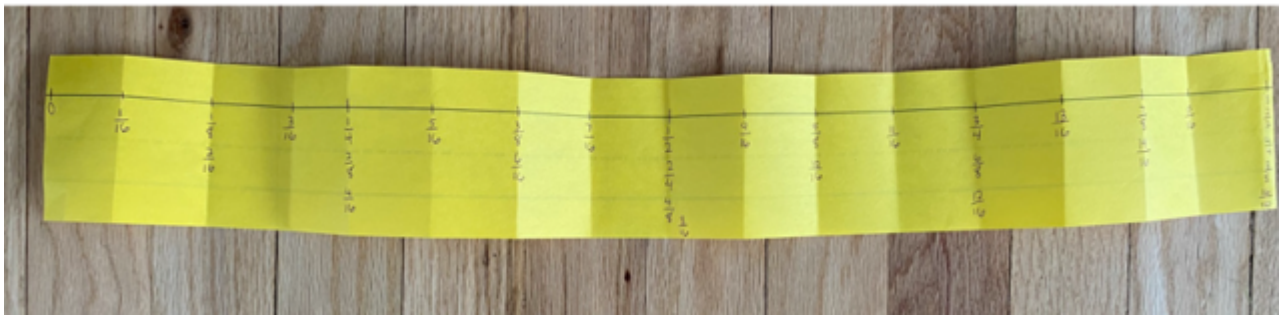
10. Understand Equivalent Fractions- Instruct students to use models and number lines to develop a conceptual understanding of equivalent fractions. Students should be taught that two fractions are equivalent when they name the same amount of the whole, students should be taught that the wholes must be the same size. Instruct students to explore finding equivalent fractions by dividing two same-sized rectangles into different numbers of equal parts. Students should be taught to use number lines and recognize that the same location can be named with two different fractions and the fractions are equivalent.

a. Complete Lesson 22, Sessions 1-3 (3 days)

b. Possible strategies include but are not limited to:

i. Equivalent fractions can be recognized and generated using fraction models. Students should use different models and decide when to use a particular model. Make transparencies to show how equivalent fractions measure up on the number line.

ii. Take a sentence strip and tell the student that the strip represents 1 whole. Fold the strip in half and label 0, ½ and 1 on the number line (sentence strip). Next fold the same strip into fourths, and label ¼ , 2/4 (under 1/2), and ¾ fold the same strip into eights and label the eighths under the halves and fourths.



Point out that the fractions that are equal to each other all line up for example: 1/2, 2/4, 4/8. They all take up the same amount of space on the paper. Explain that we found these by doubling the fold each time.

You can continue this process with different fractions if needed, try ⅓ and □ . You can show that again the fractions that line up take up the same space on the number line and are equal.

ii. Students can also use the fraction strips they creates with construction paper to determine which fractions are equal to each other.

c. Enforce that if using models to show equivalent fractions that the sizes of the 'whole' should be the same.

d. Students should be shown problems like the following:

What number goes in the box to make the equation true?

$$\frac{\square}{1} = 5$$

7.

A student divided a square into parts of equal size. The student modeled a fraction by shading some of the parts of the square, as shown.



The student drew some more squares that are the same size as the first square. Which squares are shaded to model a fraction that is equivalent to the fraction the student modeled?

Select the **three** correct answers.

☐ A.



☐ B.



☐ C.



☐ D.



☐ E.



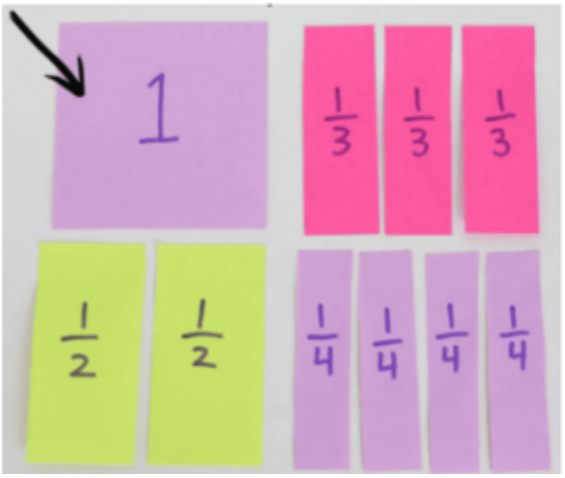
e. Lesson Vocabulary: equivalent fractions, denominator, fraction, numerator, unit fraction

11. Find Equivalent Fractions- Instruct students to extend their understanding of fractions to include identifying and generating equivalent fractions, reasoning about their size, including equivalent fractions for whole numbers that are equal to or greater than 1. Students should be taught to continue to use fraction models and number lines to reason about fraction equivalency and to find equivalent fractions. Instruct students to write a whole number as an equivalent number of fraction parts and as a fraction with a denominator of 1. Instruct students to express whole numbers as the number over one. For example 3 = 3/1; recognize that 6/1 = 6; and locate a whole number fraction and 1 are the same point on a number line. For example 4/4 is the same as 1.

a. Complete Lesson 23, Sessions 1-3 (3 days)

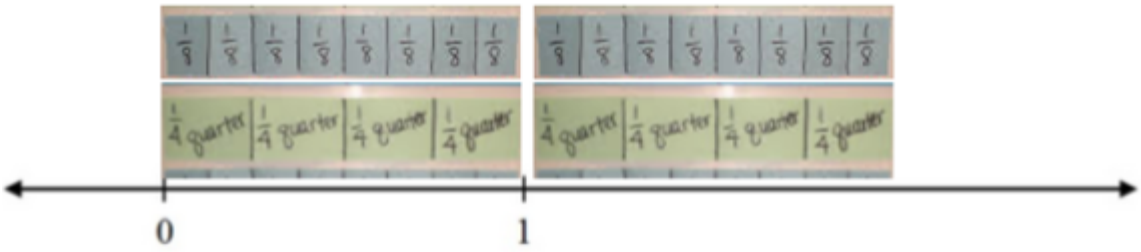
b. Possible strategies include but are not limited to:

i. Use sticky notes to make equivalent fractions greater than one. First, label one of your sticky notes as the whole, or 1. Then use scissors to cut your sticky notes into thirds, halves, quarters, etc. Folding the sticky note in half made it easy to see how to divide it evenly. Challenge students to make as many equivalent fractions as they can using the post-it notes. You can group students and tell them specific fractions to use, for example thirds/ sixths, fourth/eighths, etc. Students can also combine fraction strips to create equivalent fractions greater than one whole.



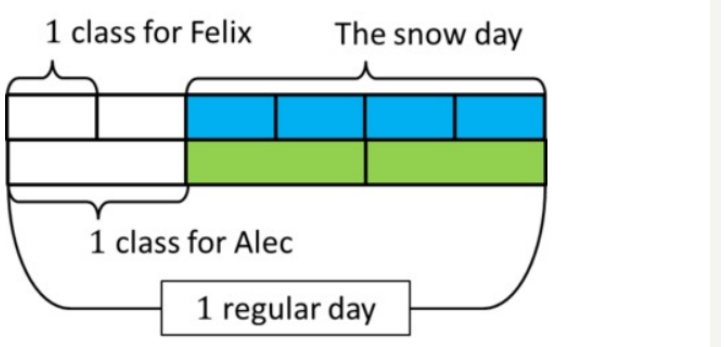


ii. Students can also use number lines to find fractions greater than one. Using two sets of fraction strips student can locate and show equivalent fractions greater than one on a number line and work their way from the models to just using the number line.



iii.Students should be shown problems like the following:

Alec and Felix are brothers who go to different schools. The school day is just as long at Felix' school as at Alec's school. At Felix' school, there are 6 class periods of the same length each day. Alec's day is broken into 3 class periods of equal length. One day, it snowed a lot so both of their schools started late. Felix only had four classes and Alec only had two. Alec claims his school day was shorter than Felix' was because he had only two classes on that day. Is he right?



But a full day is equal for the two brothers, so two of Felix' class periods are the same length as one of Alec's. The brothers actually went to school for the same amount of time on the snow day.

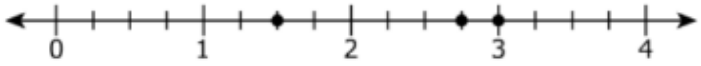
And questions like the following:

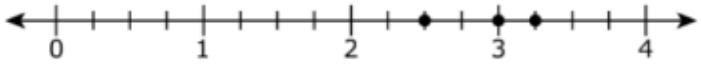
A white rabbit weighs 3 pounds. A brown rabbit weighs $2\frac{2}{4}$ pounds. A black rabbit weighs $3\frac{1}{4}$ pounds.

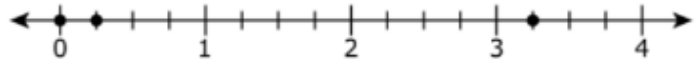
Part A

Which of these shows the weights of the rabbits plotted correctly?

A. 

B. 

C. 

D. 

Part B

Which of these is true?

A. The weight of the black rabbit is the same as the weight of the white rabbit.

B. The weight of the brown rabbit is the same as the weight of the white rabbit.

C. The weight of the black rabbit is closest to the weight of the white rabbit.

D. The weight of the brown rabbit is closest to the weight of the white rabbit.

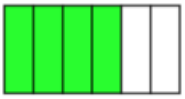
Which models have the same fractional part shaded as Figure Y? Each model is the same size and the same shape as Figure Y.

Figure Y



Select the **two** correct answers.

A. 

B. 

C. 

D. 

E. 

c. Lesson Vocabulary: denominator, equivalent fractions, fraction, numerator

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.

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:
    - *Bigger, Better, Best!* by Stuart J. Murphy (Area and perimeter)
    - *Sam's Sneaker Squares* by Nat Gabriel (Area)
    - *The Princess is Coming to Town* by Young-so Yu (Area)
    - *Give Me Half!* By Stuart J. Murphy (Fractions)
    - *The Ancient Formula* by Melinda Thielbar (Fractions)
    - *The Great Graph Contest* by Loreen Leedy (Graphing)

Supplemental Resources:

- Ready Math Student Workbook (listed above so I want to remove it from here.)
- Third Grade NJSLA Questions Organized By Topic
- Acing Math- Card games that support a variety of math skills
- Three Act Task: Measurement and Area (Paper Cut)
- Three Act Task: Measurement and Area (Piles of Tiles)
- Three Act Task: Measurement and Area (Cover the Floor)
- Three Act Task: Unit Fractions (Sliced Up)
- Graphs can be created using templates on this site
- Pictographs can be created using excel following the directions below:
- Bar graphs can be created using this website
- This website allows students to create bar graphs based on random sets of shapes.
- This website allows students to make a fraction from a direction on the page using a circle model.
- Visual Fractions Site Map The Complete Visual Fractions Website
- Fraction number line game like the game battleship
- Brainpop Jr. Fraction Videos - there are several videos here: Basic Parts of a Whole, Equivalent Fractions, Mixed Numbers, and More Fractions.

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

In accordance with New Jersey's Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including: inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance.

1	Make sense of problems and persevere in solving them
9.4.5.CI	Creativity and Innovation
P.1	Act as a responsible and contributing community members and employee.
3.OA.A	Represent and solve problems involving multiplication and division
3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.
2	Reason abstractly and quantitatively
P.4	Demonstrate creativity and innovation.
3	Construct viable arguments and critique the reasoning of others
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
4	Model with mathematics
3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
9.4.5.CT	Critical Thinking and Problem-solving
5	Use appropriate tools strategically
3.OA.B.5	Apply properties of operations as strategies to multiply and divide.
6	Attend to precision
7	Look for and make use of structure
3.OA.B.6	Understand division as an unknown-factor problem.
8	Look for and express regularity in repeated reasoning
3.OA.C.7	With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
3.OA.D.8	Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
3.NBT.A.1	Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.A.2	With accuracy and efficiency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.NF	Number and Operations — Fractions
3.NF.A	Develop understanding of fractions as numbers
3.NF.A.1	Understand a fraction 1/□ as the quantity formed by 1 part when a whole is partitioned into □ equal parts; understand a fraction □/□ as the quantity formed by □ parts of size 1/□.
3.NF.A.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3.NF.A.2.a	Represent a fraction 1/□ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into □ equal parts. Recognize that each part has size 1/□ and

	that the endpoint of the part based at 0 locates the number 1/□ on the number line.
3.NF.A.2.b	Represent a fraction □/□ on a number line diagram by marking off □ lengths 1/□ from 0. Recognize that the resulting interval has size □/□ and that its endpoint locates the number □/□ on the number line.
3.NF.A.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
3.NF.A.3.a	Understand two fractions as equivalent (equal) if they are the same size. Understand two fractions as equivalent if they are located at the same point on a number line.
3.NF.A.3.b	Recognize and generate simple equivalent fractions by reasoning about their size, (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent with the support of a visual fraction model.
3.NF.A.3.c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
3.M.B.3	Recognize area as an attribute of plane figures and understand concepts of area measurement.
3.M.B.3.a	A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
3.M.B.3.b	A plane figure which can be covered without gaps or overlaps by □ unit squares is said to have an area of □ square units.
3.M.B.4	Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).
3.M.B.5.a	Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.
3.M.B.5.b	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
3.M.B.5.c	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths □ and □ + □ is the sum of □ × □ and □ × □. Use area models to represent the distributive property in mathematical reasoning.
3.M.B.5.d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
3.DL.A	Understand data-based questions and data collection.
3.DL.A.1	Develop data-based questions and decide what data will answer the question. (e.g., “What size shoe does a 3rd grader wear?”, “How many books does a 3rd grader read?”)
3.DL.A.2	Collect student-centered data (e.g., collect data on students’ favorite ice cream flavor) or use existing data to answer data-based questions.
3.DL.B	Represent and interpret data
3.DL.B.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.
3.G.A.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.
SL.PE.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others’ ideas and expressing their own clearly.
SL.PE.3.1.B	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under

	discussion).
SL.PE.3.1.C	Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
SL.PE.3.1.D	Explain their own ideas and understanding in light of the discussion.
SL.ES.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
SL.PI.3.4	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
SL.AS.3.6	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Suggested Strategies for Modification

Possible accommodations/modification for Third 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.