CCGPS Frameworks Student Edition

Mathematics

Third Grade Unit Six
Representing and Comparing Fractions

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"Making Education Work for All Georgians"

Unit 6
Representing and Comparing Fractions

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UNIT OVERVIEW

In this unit, students will:

- Develop an understanding of fractions, beginning with unit fractions.
- View fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole.
- Understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one.
- Solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
- Recognize that the numerator is the top number (term) of a fraction and that it represents the number of equal-sized parts of a set or whole; recognize that the denominator is the bottom number (term) of a fraction and that it represents the total number of equal-sized parts or the total number of objects of the set
- Explain the concept that the larger the denominator, the smaller the size of the piece
- Compare common fractions with like denominators and tell why one fraction is greater than, less than, or equal to the other
- Represent halves, thirds, fourths, sixths, eighths, tenths , and twelfths using various fraction models

A common misconception, the idea that the smaller the denominator, the smaller the piece or part of the set, or the larger the denominator, the larger the piece or part of the set, is based on the comparison that in whole numbers, the smaller a number, the less it is, or the larger a number, the more it is. The use of different models, such as fraction bars and number lines, allows students to compare unit fractions to reason about their sizes.

Another misconception is that students think all shapes can be divided the same way. Present shapes other than circles, squares or rectangles to prevent students from over generalizing that all shapes can be divided the same way. For example, have students fold a triangle into eighths. Provide oral directions for folding the triangle:

1. Fold the triangle into half by folding the left vertex (at the base of the triangle) over to meet the right vertex.
2. Fold in this manner two more times.
3. Have students label each eighth using fractional notation. Then, have students count the fractional parts in the triangle (one-eighth, two-eighths, three-eighths, and so on).

For students to really understand fractions, they must experience fractions across many constructs, including part of a whole, ratios, and division. There are three categories of models that exist for working with fractions: area (e.g., 1/3 of a garden), length (e.g., ¾ of an inch), and set or quantity (e.g., ½ of the class). Partitioning and iterating are ways to for students to understand the meaning of fractions, especially numerator and denominator.

Understanding equivalent fractions is also critical. Two equivalent fractions are two ways of describing the same amount by using different-sized fractional parts. For example, in the fraction 6/8, if the eighths are taken in twos, then each pair of eights is a fourth. Six-eighths then can be seen as equivalent to three-fourths. (Elementary and Middle School Mathematics: Teaching Developmentally, John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 286.)

STANDARDS FOR MATHEMATICAL CONTENT

Develop understanding of fractions as numbers

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

- **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
- **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size or the same point on a number line.
b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

MCC3.MD.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. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

MCC3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

ENDURING UNDERSTANDINGS

In first grade and second grades, students discuss partitioning and equal shares. Students will have partitioned circles and rectangles into two, three, and four equal shares. This is the first time students are understanding/representing fractions through the use of a number line, and developing deep understanding of fractional parts, sizes, and relationships between fractions. This is a foundational building block of fractions, which will be extended in future grades. Students should have ample experiences using the words, *halves, thirds, fourths,* and *quarters*, and the phrases *half of, third of, fourth of,* and *quarter of*. Students should also work with the idea of the whole, which is composed of two halves, four fourths or four quarters, etc.

Example:
How can you and a friend share equally (partition) this piece of paper so that you both have the same amount of paper to paint a picture?

- Fractional parts are equal shares of a whole or a whole set.
- The more equal sized pieces that form a whole, the smaller the pieces of the whole become.
- When the numerator and denominator are the same number, the fraction equals one whole.
- When the wholes are the same size, the smaller the denominator, the larger the pieces.
- The fraction name (half, third, etc) indicates the number of equal parts in the whole.

ESSENTIAL QUESTIONS

- How are fractions used in problem-solving situations?
- How are tenths related to the whole?
- How can I collect and organize data?
- How can I compare fractions when they have the same denominators?
- How can I compare fractions when they have the same numerators?
- How can I compare fractions?
- How can I determine length to the nearest ¼?

- How can I display fractional parts of data in a graph?
- How can I organize data measured to the half inch?
- How can I organize data measured to the quarter inch?
- How can I represent fractions of different sizes?
- How can I show that one fraction is greater (or less) than another using my Fraction Strips?
- How can I use fractions to name parts of a whole?
- How can I use pattern blocks to name fractions?
- How can I use pattern blocks to represent fractions?
- How can I write a fraction to represent a part of a group?
- How do I label a number line (ruler) to the half inch?
- How do I label a number line (ruler) to the quarter inch?
- How do I measure objects to the half inch?
- How do I measure objects to the quarter inch?
- How is the appropriate unit for measurement determined?
- How is the reasonableness of a measurement determined?
- What are the important features of a unit fraction?
- What does the denominator of a fraction represent?
- What does the numerator of a fraction represent?
- What equivalent groups of fractions can I discover using Fraction Strips?
- What estimation strategies are used in measurement?
- What fractions are on the number line between 0 and 1?
- What is a fraction?
- What is a real-life example of using fractions?
- What relationships can I discover about fractions?
- What relationships can I discover among the pattern blocks?
- When we compare two fractions, how do we know which has a greater value?
- Why are units important in measurement?
- Why is the size of the whole important?

CONCEPTS/SKILLS TO MAINTAIN

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.

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

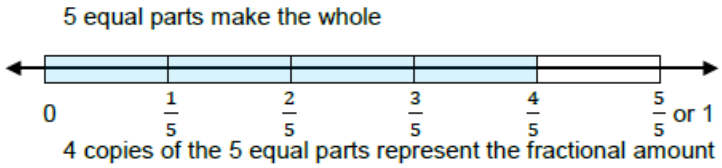
The terms below are **for teacher reference only** and are not to be memorized by the students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

- bar graph
- common fraction
- decimal fraction
- denominator
- equivalent fraction
- line plot graph
- numerator
- partition
- picture graph
- term
- unit fraction
- whole number

STRATEGIES FOR TEACHING AND LEARNING

Students need many opportunities to discuss fractional parts using concrete models to develop familiarity and understanding of fractions. Expectations in this domain are limited to fractions with denominators 2, 3, 4, 6 and 8.

Understanding that a fraction is a quantity formed by part of a whole is essential to number sense with fractions. Fractional parts are the building blocks for all fraction concepts. Students need to relate dividing a shape into equal parts and representing this relationship on a number line, where the equal parts are between two whole numbers. Help students plot fractions on a number line, by using the meaning of the fraction. For example, to plot 4/5 on a number line, there are 5 equal parts with 4 copies of one of the 5 equal parts.



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.

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.

Venn diagrams are useful in helping students organize and compare fractions to determine the relative size of the fractions, such as more than 1/2, exactly 1/2 or less than 1/2 . Fraction bars showing the same sized whole can also be used as models to compare fractions. Students are to write the results of the comparisons with the symbols >, =, or <, and justify the conclusions with a model.

EVIDENCE OF LEARNING

By the conclusion of this unit, students should be able to demonstrate the following competencies:

- Identify and give multiple representations for the fractional parts of a whole (area model) or of a set, using halves, thirds, fourths, sixths, and eighths.
- Recognize and represent that the denominator determines the number of equally sized pieces that make up a whole.
- Recognize and represent that the numerator determines how many pieces of the whole are being referred to in the fraction.
- Represent and compare fractions with denominators of 2, 3, 4, 6, and 8, using concrete and pictorial models.

TASKS

The following tasks represent the level of depth, rigor, and complexity expected of all kindergarten students. These tasks or a task of similar depth and rigor should be used to demonstrate evidence of learning. It is important that all standards of a task be addressed throughout the learning process so that students understand what is expected of them. While some tasks are identified as a performance task, they also may be used for teaching and learning (constructing task).

Scaffolding Task	Constructing Task	Practice Task	Performance Task
Tasks that build up to the constructing task.	Constructing understanding through deep/rich contextualized problem solving tasks	Games/activities	Summative assessment for the unit

Task Name	Task Type *Grouping Strategy*	Content Addressed
Exploring Fractions	Scaffolding Task *Individual/Small Group Task*	Naming fractional pieces, length model
Comparing Fractions	Scaffolding Task *Individual/Small Group Task*	Naming fractional pieces, exploring inequalities, length model
Strategies for Comparing Fractions	Scaffolding Task *Individual/Small Group Task*	Naming fractional pieces, exploring inequalities, length model
Using Fraction Strips to Explore the Number Line	Constructing Task *Individual/Small Group Task*	Create a number line, explore fractions between 0 – 1, length model
Pattern Block Fractions Revisited-Exploring Fractions Further with Pattern Blocks	Constructing Task *Partner/Small Group Task*	Apply skills in identifying fractional parts of a whole
Make a Hexagon Game	Practicing Task *Partner/Small Group Task*	Practice using fractional parts to make a whole
Pizzas Made to Order	Practicing Task *Individual Task*	Divide and label fractional parts
Graphing Fractions	Constructing Task *Individual/Small Group Task*	Representing data as fractions, graphing data
Trash Can Math	Practicing Task *Individual/Small Group Task*	Representing data as fractions
Inch by Inch	Constructing Task *Whole/Small Group Task*	Using nonstandard units of measurement to measure to the ¼ and ½ inch.
Measuring to the ½ and ¼ Inch	Constructing Task *Individual/Small Group Task*	Using a number line to measure and organize data
Culminating Activity The Fraction Story Game	**Performance Task *Individual/Small Group Task***	**Create a fraction game using story problems**

SCAFFOLDING TASK: EXPLORING FRACTIONS

Adapted from NCTM Illuminations
Suggested Time for Task: 2 class periods

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Before the activity, be sure the children understand the concept of equal parts. Use pieces of different shaped paper (piece of construction paper, coffee filter, 8 ½ inch square cut from a piece of copy paper, 1/2 sheet of copy paper cut vertically, etc.) to demonstrate folding into equal-sized pieces. For some of the students to understand "equal-sized" you may have to cut and match the pieces, demonstrating that they are the same size. The use of different models, such as fraction bars and number lines, allows students to compare unit fractions and to reason about their sizes.

ESSENTIAL QUESTIONS

- What is a fraction?
- How can I represent fractions of different sizes?
- What relationships can I discover about fractions?
- What does the numerator of a fraction represent?
- What does the denominator of a fraction represent?

MATERIALS

- Exploring Fractions task sheet
- 9" x 12" sheets of paper in six different colors (cut into 1" x 12" strips) Each child will need 6 strips, one of each color.
- Scissors
- File folder (1 for each child)
- Glue or tape

GROUPING

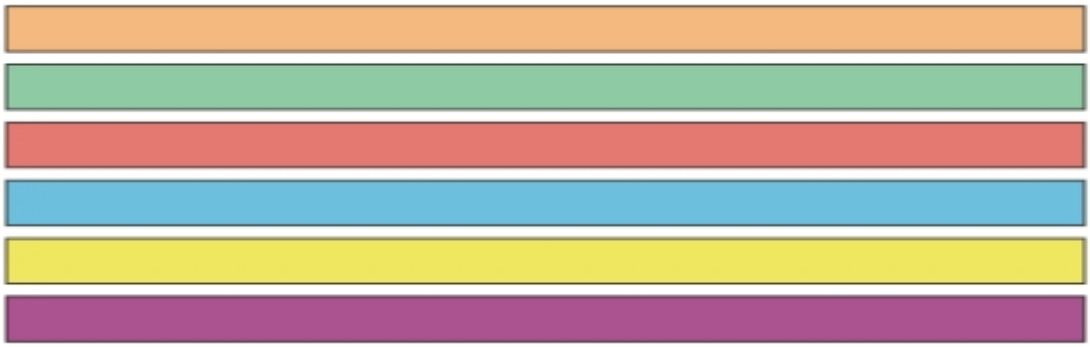
Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I
To assess prior knowledge, ask students to create a list of ways they use fractions in their daily lives. Discuss different ways students use fractions in their everyday activities. Some examples may include dividing a snack in half (1/2), eating 3/8 of a pizza, using measuring cups or spoons while baking, money (half a dollar), time (quarter of an hour).

Read aloud and discuss, Whole-y Cow! by Taryn Souders (or another book about the concept of fractions).

To begin the lesson, give students six strips of paper in six different colors. Specify one color and have students hold up one strip of this color. Tell students that this strip will represent the whole. Have students write "one whole" on the fraction strip. The term **whole** is included in the labeling instead of 1 because it helps eliminate confusion between the numeral 1 in fractions such as ½.



Next, ask students to pick a second strip and fold it into two equal pieces. Have students draw a line on the fold. Ask students what they think each of these strips should be called (one-half or ½). It is important, here, for students to understand how fractions are named. In this case we have divided the whole into two pieces, so we put write a two on the bottom of the fraction (denominator). Point to each individual piece and ask students how many of the two pieces is this? (1) This is how we write fractions. The denominator tells us how many pieces are in the whole or set. The numerator tells us how many of those pieces we are referencing. Have students label their strips accordingly using both the word and the fractional representation. Label both sides of the strip "1/2 one-half."

Have students take out another strip, fold it in half twice, and divide it into four congruent pieces. Ask them what they think each of these strips should be called (one-fourth or ¼). Have students draw lines on the folds and label the strips using both the word and the fraction. Label all four sections of the strip "1/4 one-fourth". Repeat the process of folding in half and naming eights.

Students will take out another strip, fold it in thirds and divide it into three congruent pieces. Ask them what they think each of these strips should be called (one-third or 1/3). Have students draw lines on the folds and label the strips using both the word and the fraction. Label all three sections of the strip "1/3 one-third". Repeat the process of folding in thirds and then in half to create sixths. Label each section "1/6 one-sixth."
After folding and labeling strips of paper for the whole, halves, thirds, fourths, sixths, and eighths, ask students to glue or tape the strips on their file folder in order (largest fractional pieces to smallest fractional pieces). Make sure the students line up the strips evenly so that they begin to see equivalences. Suggestion: Secure the ½ strip first with the half mark on the crease in the file folder. Place every other paper strip in line with one-half.

Part II
Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations about the fraction strips. Have each group share some of their comments. Lead the groups to consider questions such as:

- How many halves does it take to make a whole strip?
- How many thirds does it take to equal one whole?
- How many fourths, sixths, eighths?

Part III
Have students work in small groups to answer the questions below. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions. Have groups (at least 2-3) share their solution to question number seven. Try to pick groups who presented different ways of dividing the sandwich.

FORMATIVE ASSESSMENT QUESTIONS

- Is your strip folded into equal parts? How do you know?
- What relationships did you discover about fractions?
- What does the numerator represent?
- What does the denominator represent?

DIFFERENTIATION

Extension
- Have students create additional fraction strips and write about relationships.

Intervention
- Use ready-made Fraction Tiles or Virtual Manipulatives.

- Class Fractions
  Use a group of students as the whole – for example, six students if you want to work on 1/3s, 1/2s, and 1/6s. Ask students, "What fraction of our friends (are wearing tennis shoes, have brown hair, etc.)?" Change the number of people over time.

Adapted from Elementary and Middle School Mathematics: Teaching Developmentally By John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 290.

TECHNOLOGY RESOURCES

http://www.kidsnumbers.com/turkey-terminator-math-game.php

http://www.visualfractions.com/

http://nlvm.usu.edu/en/nav/frames_asid_103_g_1_t_1.html?from=topic_t_1.html

http://nlvm.usu.edu/en/nav/frames_asid_274_g_2_t_1.html?open=activities&from=topic_t_1.html

http://nlvm.usu.edu/en/nav/frames_asid_104_g_2_t_1.html?from=topic_t_1.html

Name: _____ Date: _____

EXPLORING FRACTIONS

(Adapted from a lesson by Angela Lacey Hester, Floyd County, GA)

1. Using complete sentences and math words, write 3 observations you and your group made about the Fraction Strips.

Use your Fraction Strips to answer the following questions.

2. How many thirds does it take to equal one whole?

3. How many sixths does it take to equal one whole?

4. What do you think three 1/8 strips might be called? How would you write that fraction?

5. If you made a 1/9 fraction strip, how many ninths would it take to make a whole?

Put on your thinking caps….

6. What would a 1/10 Fraction Strip look like? Sketch and label the Fraction Strip in the space below.

7. Pretend you are having a party for 6 people. For refreshments, you are serving a 12" sub sandwich. On the back of this paper, draw and label a 12" sub (just like your Fraction Strips). Show how you would equally divide the sandwich for 6 people. Use pictures, words, and numbers to explain your reasoning.

SCAFFOLDING TASK: COMPARING FRACTIONS

Adapted from NCTM Illuminations
Suggested Time for Task: 2 class periods

STANDARDS FOR MATHEMATICAL CONENT

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Understand two fractions as equivalent (equal).

b. Recognize and generate simple equivalent fractions, e.g., ½ = 2/4, 4/6 = 2/3. Explain why fractions are equivalent by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Counting fractional parts is the groundwork for comparing and understanding the two parts of fractions. When developing this thinking, it is useful to display fraction pie pieces and count them together as a class. For example, using the fractions 1/4, 2/4, 3/4, 4/4, and 5/4, the class can discuss the relationship the fractions have with one whole. (Van De Walle, p. 138)

ESSENTIAL QUESTIONS

- What relationships can I discover about fractions?
- How can I compare fractions?
- What equivalent groups of fractions can I discover using Fraction Strips?

MATERIALS

- Comparing Fractions task sheet
- 9” x 12” sheets of paper in six different colors (cut into 1” x 12” strips) Each child will need 6 strips, one of each color.
- Scissors

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

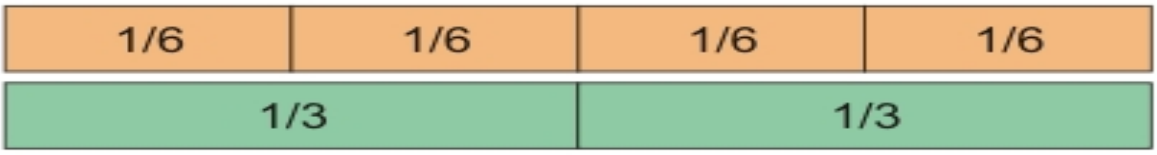
Part I

Give students six strips of paper in six different colors. Repeat the Fraction Strip folding and labeling activity from the Exploring Fractions Task. This time, ask students to separate the Fraction Strips by cutting on the folds giving them 2 - ½ strips, 3 – 1/3 strips, and so forth. Give each student a plastic sandwich bag or envelope to store the strips.

Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations about the separated Fraction Strips. Have each group share some of their comments. Lead the groups to consider questions such as:

- Do you see any special relationships among the different colored strips?
- Place a ½ strip on your desk. How many strips or combinations of strips are the same size as ½?
- When fractions are the same size, they are called *equivalent*. What other equivalent sets of fractions can you create?

Have students line up their fraction strips and find as many relationships as they can. For instance, they might notice that three of the 1/6 pieces are equal to four of the 1/8 pieces, or that two of the 1/3 pieces are equal to four of the 1/6 pieces. Have students record these relationships on paper. When they have finished, have them share the relationships they have discovered. Record the relationships on chart paper and discuss.



Students will notice that one whole is the same as 2/2, 4/4, 8/8, 3/3, or 6/6. Another example includes the relationship between ½, 2/4, 4/8, and 3/6. Tell students that when fraction strips are the same length, they represent equivalent fractions. Students may also notice that for each of these fractions, the numerator is ½ of the denominator.

Part II

Students will work in small groups to answer the questions in the activity sheet. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions.

Have groups (at least 2-3) share their solution to question numbers 6 and 7. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in a plastic sandwich bag.

Part III

Students can practice comparing fractions using the following activity adapted from Elementary and Middle School Mathematics: Teaching Developmentally by John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 290.

> The friends below are playing red light-green light. Who is winning? Use your fraction strips to determine how far each friend has moved.
>
Mary – ¾	Harry – ½	Larry – 5/6
Sam – 5/8	Michael – 5/9	Angie – 2/3

Adapted from Elementary and Middle School Mathematics: Teaching Developmentally By John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 290.

FORMATIVE ASSESSMENT QUESTIONS

- What relationships did you discover about fractions?
- How can you compare fractions?
- What equivalent groups of fractions did you discover?

DIFFERENTIATION

Extension

- Have students create additional fraction strips and write about relationships.
- Students can use coffee filters, paper plates, or other objects to create different models to illustrate inequalities.

Intervention

- Use ready-made Fraction Tiles or Virtual Manipulatives.

TECHNOLOGY RESOURCES

http://www.mathplayground.com/Scale_Fractions.html

http://nlvm.usu.edu/en/nav/frames_asid_105_g_2_t_1.html?from=topic_t_1.html

http://illuminations.nctm.org/ActivityDetail.aspx?ID=80

Name: _____ Date: _____

COMPARING FRACTIONS

(Adapted from a Learning Task by Angela Lacey Hester, Floyd County, GA)

1. Using complete sentences and math words, write 3 observations you and your group made about the Fraction Strips.

Use your Fraction Strips to answer the following questions.

2. What fraction is equivalent to 2 of your 1/4 strips?

3. What fraction is equivalent to 3/6?

4. What fraction is equivalent to 6/8?

5. If you had made a fraction strip for 1/10s, how many tenths would it take to make to equal 1/2?

Put on your thinking caps….

6. In the space below, draw a Fraction Strip divided into fourths. Draw 2 additional shapes divided into fourths. Make one of your drawings a real-life example of something you might partition (divide) into fourths.

7. Pretend it is 7:30 a.m. Math Class begins at 8:00 a.m. Ashley says class starts in 30 minutes. Harrison says class starts in half an hour. Which child is correct? On the back of this page, draw a picture and write 2-3 sentences to explain your answer.

SCAFFOLDING TASK: STRATEGIES FOR COMPARING FRACTIONS

Adapted from NCTM Illuminations
Suggested Time for Task: 2 class periods

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Understand two fractions as equivalent (equal).

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
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ESSENTIAL QUESTIONS

- How can I show that one fraction is greater (or less) than another using my Fraction Strips?
- How can I compare fractions when they have the same denominators?
- How can I compare fractions when they have the same numerators?

MATERIALS

- Strategies for Comparing Fractions task sheet
- Fraction strips from previous task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Students will need their six strips of paper in six different colors from the previous task. Briefly review concepts covered in previous lessons. Guide students to compare fraction strips, this time encourage students to compare individual strips and explore which ones are longer and shorter.

Part I

Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations from comparing the Fraction Strips. Have each group share some of their comments. Lead the groups to consider questions such as:

- What special relationships do you notice among the different colored strips?
- Place a ½ strip on your desk. How many strips are less than ½?
- Place a 1/8 strip on your desk. How many strips are less than 1/8?

Part II

Instruct students to compare two fraction strips: ½ and ¼. Discuss which one is longer and which one is shorter. Have students discuss how they might write the inequality statements: ½ > ¼ and ¼ < ½. Guide them to the use of the symbols if they don't do this independently. Repeat the activity with several additional fraction strips. Be sure to include equivalent fractions such as ½ = 2/4.

Part III

Same Denominators/Different Numerator:

Have students work in groups of 4. Ask them to arrange 3 groups of fractions in their work space. In row one, place 1 - 1/3 strip. In row two, place 2 – 1/3 strips. In row three, place 3 – 1/3 strips. On a sheet of paper, have the students write the names of the strips in order from shortest to longest (1/3, 2/3, 3/3). Encourage students to look for patterns. What do they observe about the denominators? (All are three.) What do they observe about the denominators? (They go in order getting larger each time.) How do the numerators relate to the size of the fraction strips? (The larger the numerator, the larger the strip of paper.) Why? (The larger the numerator, the more equal sized pieces you have.)

Ask students to repeat the above activity with their 1/4th strips. Discuss the students' observations.

Same Numerator/Different Denominator:

Have students place one of each color Fraction Strip in their work space. At this time, do not include one whole. Ask students to arrange the strips from shortest to longest. Have the students write the names of the strips in order from shortest to longest (1/8, 1/6, ¼, 1/3, 1/2). Encourage students to look for patterns. What do they observe about the numerators? (All are one.) What do they observe about the denominators? (They go in order getting smaller each time.) How do the denominators relate to the size of the fraction strips? (The smaller the denominator, the larger the strip of paper.) Why? (The larger the denominator, the more pieces it takes to make the whole.)

Repeat this activity using 2 of each strip. Ask students to once again arrange the pairs of strips in order from smallest to largest (2/8, 2/6, 2/4, 2/3, 2/2). Discuss the students' observations.

Part IV

Have students work in small groups to answer the questions in the task sheet. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions.

At least two or three groups should share their solution to question number 6. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in their sandwich bag.

FORMATIVE ASSESSMENT QUESTIONS

- What relationships did you discover about fractions?
- How can you compare fractions with the same denominators?
- How can you compare fractions with the same numerators?

DIFFERENTIATION

Extension

- Have students write a set of guidelines and illustrations for comparing fractions and share with a peer.

Intervention

- Use ready-made Fraction Tiles or Virtual Manipulatives.

- Ordering Unit Fractions
  List a set of unit fractions such as ½, 1/3, 1/8, 1/5. Ask children to put the fractions in order from least to greatest. Challenge students to defend the way they ordered fractions. Ask them to illustrate their idea using fraction strips or other models.
  Repeat the activity using fractions with the same denominators such as 3/5, 2/5, 5/5, 4/5, 1/5.

Adapted from Elementary and Middle School Mathematics: Teaching Developmentally By John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 300.

TECHNOLOGY RESOURCES

http://www.gamequarium.com/fractions.html

http://www.learningplanet.com/sam/ff/index.asp

Name: _____ Date: _____

STRATEGIES FOR COMPARING FRACTIONS

(Adapted from a Learning Task by Angela Lacey Hester, Floyd County, GA)

1. Using complete sentences and math words, write 3 observations you and your group made about fraction inequalities, comparing fractions with the same denominators, and comparing fractions with the same numerators.

Use your Fraction Strips to answer the following questions.

2. Write an inequality statement for the fractions $\frac{1}{2}$ and 3/8.

3. Write two inequality statements using 1/6, 1/8, 1/3, 1/2, 1/4.

Put on your thinking caps….

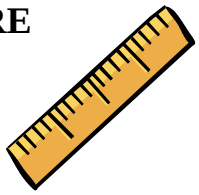
4. Pretend you had fraction strips for 1/5. Put the following fractions in order from smallest to largest: 1/5, 5/5, 3/5, 4/5, 2/5. Draw a picture below to help explain your answer.

5. Using what you have learned about comparing fractions, put the following fractions in order from least to greatest: $\frac{3}{4}$, 3/7/ 3/3, 3/8. Draw a picture below to help explain your answer. Stretch your brain- where would 3/2 go? What might 3/2 look like?

6. For the class party, Robin and Shawn each made a pan of brownies. Their pans were exactly the same size. Robin sliced her brownies into 9 pieces. Shawn sliced his into 12 pieces. Which student

had the largest brownie pieces? On the back of this paper, make a sketch of Robin and Shawn's brownies. Explain your reasoning using words, pictures, and numbers.

CONSTRUCTING TASK: USING FRACTION STRIPS TO EXPLORE THE NUMBER LINE



Adapted from a lesson by Michelle Clay, Floyd County, GA
Suggested Time for Task: 2 class periods

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

- **a.** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
- **b.** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Children need to understand the meaning of fractions based on repeated hands-on activities. They need a general rule for explaining the numerator and denominator of a fraction. They need to understand that fractions are numbers that can be represented on a number line. Students need to understand that fractions between 0 – 1 can have denominators and numerators greater than one.

ESSENTIAL QUESTIONS

- What fractions are on the number line between 0 and 1?
- What relationships can I discover about fractions?
- How are tenths related to the whole?

MATERIALS

- Using Fraction Strips to Explore the Number Line Activity task sheet
- 9" x 12" sheets of paper in six different colors (cut into 1" x 12" strips) Each child will need one strip of paper in each color.
- Scissors
- File folder (1 for each child)
- Glue or tape

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Students make and use a set of fraction strips to represent the interval between zero and one on the number line, discover fraction relationships, and work with equivalent fractions.

Part I

To begin the lesson, give students six strips of paper in six different colors. Specify one color and have students hold up one strip of this color. Tell students that this strip will represent the number line from zero to one. Have students glue or tape the strip to the back of their file folder. The students will label folder above the left-hand side of the strip "0" and above the right-hand edge of the strip "1."

Next, ask students to pick a second strip and fold it into two equal pieces. Have students label above this strip with the numerals 0, ½, 1.

Have students take out another strip, fold it twice, and divide it into four congruent pieces. Have students label the space above the strip using 0, ¼, 2/4, ¾, 1. Repeat this process of folding, cutting, and naming strips for thirds, and sixths. Have students use a ruler and label the last strip in 12ths by drawing a line at every inch. This particular number line will represent 1 foot. The inches are showing fractions of a foot. 1/12, 2/12, and so on.

Part II

Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations from comparing the Number Lines. Have each group share some of their comments. Lead the groups to consider questions such as:

- How are the Fraction Strips and Number Lines similar?
- How are they different?

Remind students that the fraction strip is equal to the length of a ruler which is one foot. Ask students to label ½ a foot with the letter A. Ask students to label 2/3 of a foot with B. Continue asking students to label fractional parts of a foot with letters.

Part III

Have students work in small groups to answer the questions below. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions on the Number Line.

Have groups (at least 2-3) share their solution to question numbers 6 and 7. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in their sandwich bag.

FORMATIVE ASSESSMENT QUESTIONS

- What fractions are on the number line between 0-1?
- How did you determine the various fractions between 0-1?

DIFFERENTIATION

Extension

- Have students create additional strips representing fractions between 0 - 5 and write about relationships.

Intervention

- Use ready-made Fraction Tiles or Virtual Manipulatives.

- Line 'Em Up
  Select four or five fractions for students to put in order from least to greatest. Have them indicate approximately where each fraction belongs on the number line labeled only with the points 0 and 1. Adding machine paper can be used as a number line. Students can compare their lines with others and explain how they decided where to place the fractions.

Adapted from Elementary and Middle School Mathematics: Teaching Developmentally By John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 301.

TECHNOLOGY RESOURCES

http://www.mathsisfun.com/numbers/fraction-number-line.html

Name: _____ Date: _____

USING FRACTION STRIPS TO EXPLORE THE NUMBER LINE

(Adapted from a Learning Task by Michelle Clay, Floyd County, GA)

1. Using complete sentences and math words, write 3 observations you and your group made about fractions between 0 and 1 on the Number Line.

Use your Number Lines to answer the following questions.

2. How many sixths are between 0 and 1?

3. How many 12ths are equivalent to 1 whole?

4. What fraction on the Number Line is equivalent to 2/6?

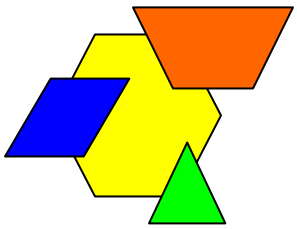
Put on your thinking caps….

5. If 3/3 is equivalent to the whole number 1, how many thirds are in the whole number 2?

6. What would the fraction 12/4 represent? Draw a picture in the space below to explain your answer.

7. During a lesson on Measurement, students were asked to measure their feet using a ruler. Lexi's foot measured 7 inches. Addie's foot was 5/6 of a foot. Robert's foot was equal to $\frac{3}{4}$ of a foot. Andrew's foot measured 2/3 of a foot. Use your number line to help you arrange the students' foot measurements in order from smallest to largest. On the back of this paper, sketch the Number Lines divided into thirds, fourths, sixths, and inches (1/12). Use pictures, numbers, and words to explain your solution.

CONSTRUCTING TASK: PATTERN BLOCK FRACTIONS Revisited: EXPLORING FRACTIONS FURTHER WITH PATTERN BLOCKS



Adapted from a Learning Task by Debra Childs, Floyd County, GA
Suggested Time for Task: 1 class period

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

A big idea for students to explore is that fractional parts are equal-sized parts of a whole unit. All the parts must be the same size. The unit can be a collection of things, and the unit is counted as one. The names for fractions tell how many parts of that size are needed to make the whole. In this activity, different wholes are designated in the same model. This discourages children from identifying a fractional part with a special shape or color, challenging them to see the relationship of each part to the designated whole. (Elementary and Middle School Mathematics: Teaching Developmentally, John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams.)

ESSENTIAL QUESTIONS

- How can I use pattern blocks to name fractions?
- How does the size of the whole affect the size of the fractions?
- Is ¼ always the same size? How do you know?

MATERIALS

- Pattern Blocks
- Exploring Fractions Further With Pattern Blocks Activity Sheet

GROUPING

Partner/Small Group Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Begin this task by presenting the students with 2 different sized pieces of construction paper. (If you wish, you can name it a pan of brownies or pizza.) Pose the question: Is ¼ always the same size? With the students fold the larger piece of paper into fourths, then do the same with the smaller piece. Verify with the students that each piece was evenly folded into fourths. Ask the question, "Which ¼ of a pizza/pan of brownies would you like to have?" This will lead to a discussion around the size of the whole.

Part II

Lead students in a discussion including questions such as:

- What if you use two yellow hexagon blocks to represent the whole?
- What fractional part of the whole will one yellow hexagon be?
- What block will represent ¼? What other relationships do you see?

Have students work together to complete the task sheet. Students should model each question with pattern blocks and make a sketch of the required blocks.

QUESTIONS FOR FORMATIVE ASSESSMENT

- How did you determine ¼?
- How did the size of ½ change from the whole on page 1 to the whole on page 2?
- How does the size of the whole affect the size of the fractional piece?
- Can you find any equivalent fractions? How do you know?

DIFFERENTIATION

Extension

- Challenge students to explore additional variations of the whole such as three hexagons, four trapezoids, or eight triangles.

Intervention

- Finding Fair Shares - Give students other objects or models and ask them to find halves or fourths. Use familiar objects such as groups of cookies or pieces of candy. Vary the number of pieces in the whole. (Teaching Student-Centered Mathematics, Grades 3-5, John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 136.

PATTERN BLOCK FRACTIONS Revisited:
EXPLORING FRACTIONS FURTHER WITH PATTERN BLOCKS

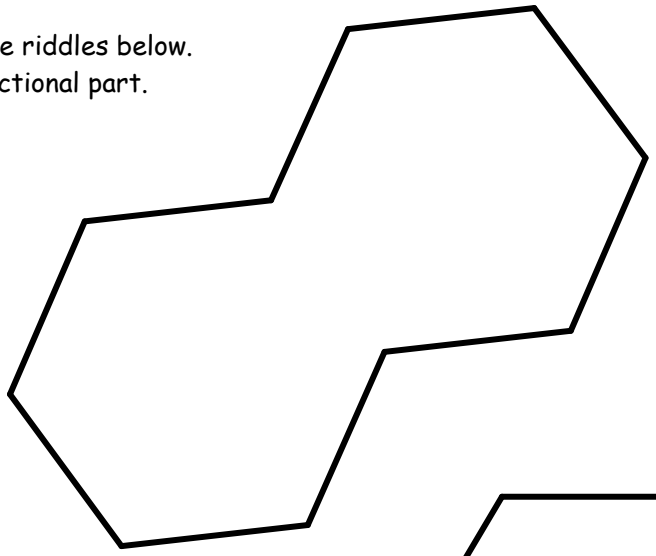
(Adapted from a Learning Task by Debra Childs, Floyd County, GA)

Name _____ Date _____

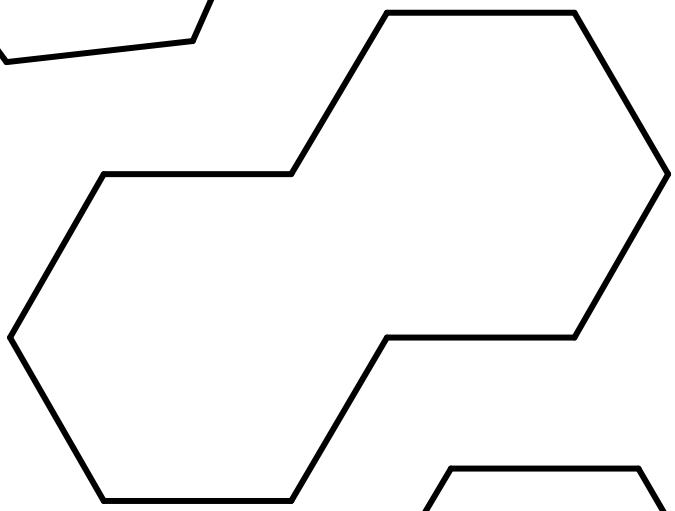
Task: Pattern Block Fractions

- Use the pattern blocks to solve the riddles below.
- Draw the shape and label each fractional part.

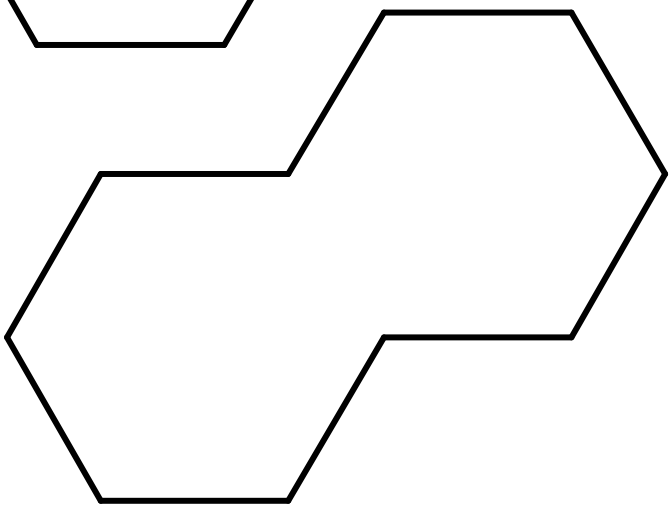
If this is one whole, what is ½?
(Draw and label)



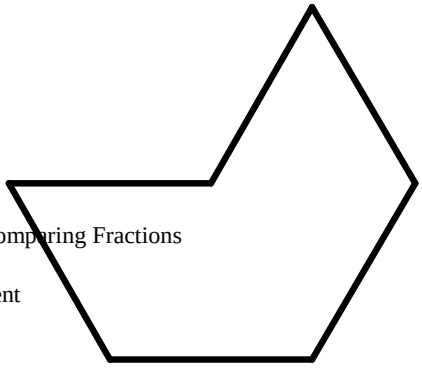
If this is one whole, what is ¼?
(Draw and label)



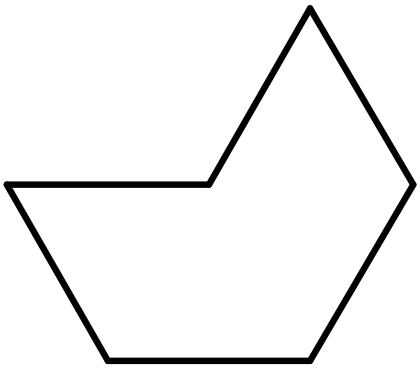
If this is one whole, what is 1/6?
(Draw and label)



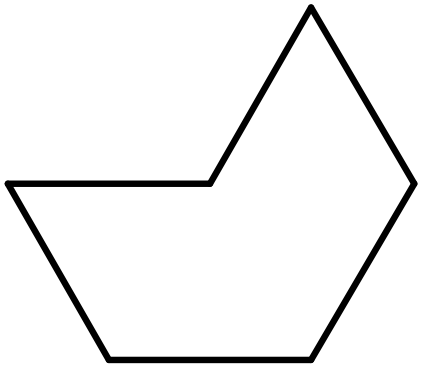
If this is one whole, what is ½?
(Draw and label)



If this is one whole, what is ¼?
(Draw and label)



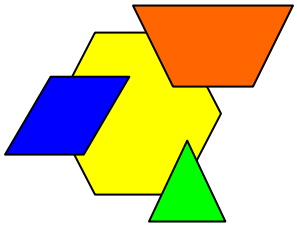
If this is one whole, show 1 ½. (Draw and label)



Use pictures, words, and numbers to summarize what you have learned from this task.

PRACTICING TASK: MAKE A HEXAGON GAME:

Adapted from a Learning Task from K-5 Math Teaching Resources
Suggested Time for Task: 1 class period



STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

The way we write fractions with a top and a bottom number with a bar between is simply an arbitrary agreement (convention) for how to represent fractions. It falls into the category of things you simply tell/show students. However, students do need to know the meaning of the numerator and denominator. The numerator tells how many shares or parts we have, how many have been counted, how many we are talking about. It counts the parts or shares. The denominator tells what is being counted. It tells what fractional part is being counted such as fourths or sixths.
(Elementary and Middle School Mathematics: Teaching Developmentally, John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams.)

ESSENTIAL QUESTIONS

- How can I use pattern blocks to name fractions?

MATERIALS

- Pattern Blocks: hexagon, triangles, trapezoid, blue rhombi
- Build a Hexagon Instructions and Game Board for each player
- Dice

GROUPING

Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Instruct students to work with a partner. For the game, students will take turns rolling two dice. The largest number rolled is the denominator and the smaller number is the numerator. Students build the fractional amount rolled on the game board using pattern blocks. Students

may use equivalent fractions. If students roll a fraction they cannot build, they lose a turn. Play continues until one player has covered all the hexagons on his game board.

FORMATIVE ASSESSMENT QUESTIONS

- What does the top number (numerator) tell us?
- What does the bottom number (denominator) tell us?
- What happened in the game if you rolled the same number on both dice?
- Did you have to trade triangles for other shape blocks? What equal trades did you make?

DIFFERENTIATION

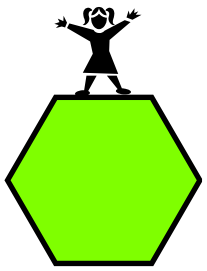
Extension

- Modify the game by changing the whole. Try using two hexagons for the whole or three trapezoids for the whole.

Intervention

- More, Less, or Equal to One Whole – Give students a collection of fractional parts (all the same type) and indicate the kind of fractional part they have. Parts can be drawn on a worksheet or physical models placed in plastic baggies with an identifying card. For example, if done with fraction strips, the collection might have seven strips with a card indicating "these are eighths." The task is to decide if the collection is less than one whole, equal to a whole, or more than a whole. Students must draw pictures and/or use numbers to explain their answer. They can also tell how close the set is to a complete whole. (Teaching Student-Centered Mathematics, Grades 3-5, John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p. 138.)

Build a Hexagon



Materials: game board for each player, dice, pattern blocks (hexagon, triangles, trapezoids, blue rhombi)

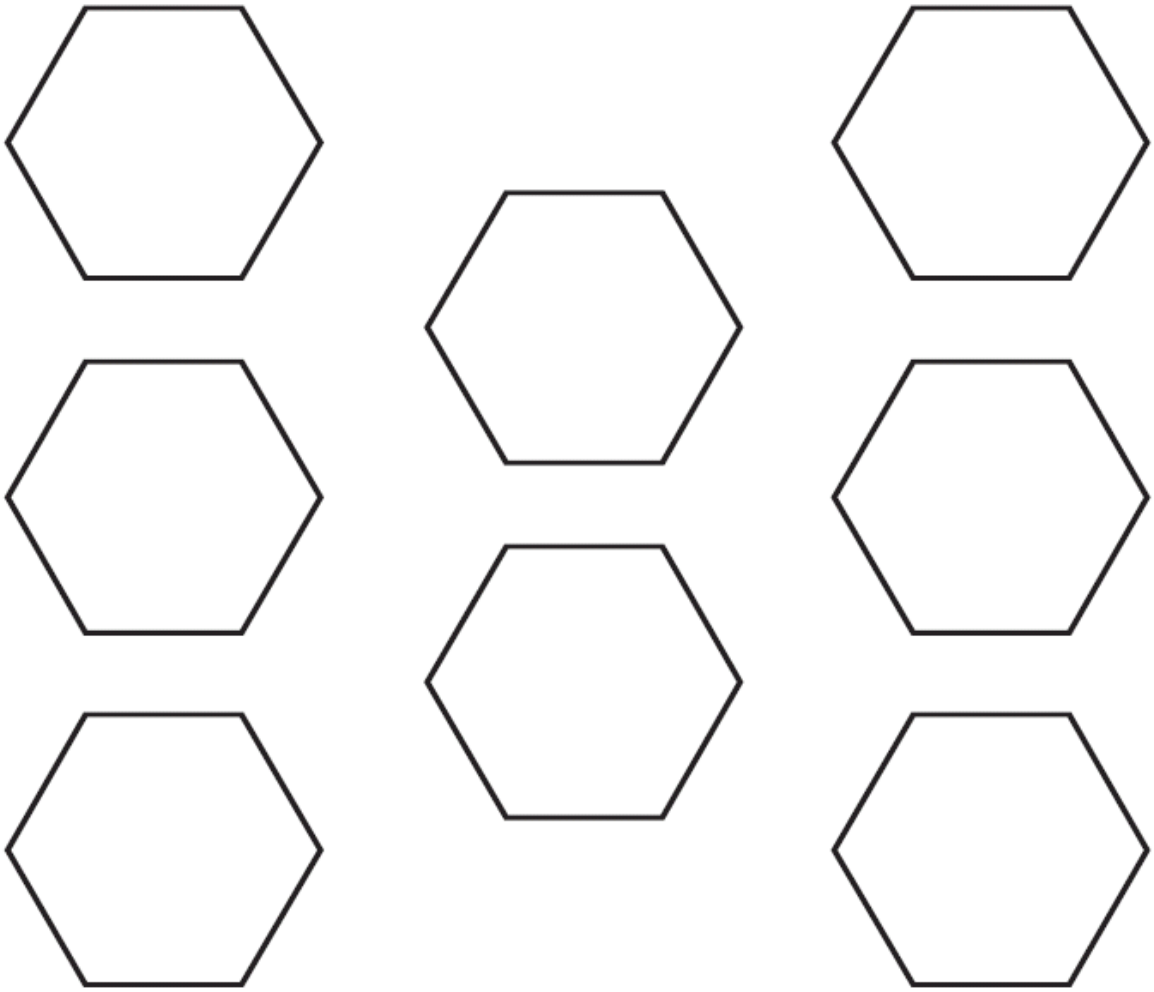
Work with a partner. Take turns to roll two dice. The largest number you roll is the denominator and the smaller number is the numerator.

1. Use pattern blocks to build the fractional amount you rolled on the game board. You may use equivalent fractions.

2. If you roll a denominator that you can't build, you lose a turn.

3. Keep going until one player has covered all the hexagons on his/her game board.

Build a Hexagon



CONSTRUCTING TASK: PIZZAS MADE TO ORDER

Adapted from a Learning Task by Cara Coker, Floyd County, GA
Suggested Time for Task: 1-2 class periods

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
Understand two fractions as equivalent (equal) if they are the

a. The same size or the same point on a number line.
b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Before the activity, be sure the children understand the concept of equal parts. Practice with the student's methods to divide various shapes into fractional pieces. Have students practice drawing lines to divide squares, rectangles, triangles, and circles into halves, fourths, eighths.

A common misconception is that 3/8 pepperoni means three pieces of pepperoni. Ensure that students understand 3/8 represents slices of pizza.

ESSENTIAL QUESTIONS

- What is a fraction?
- How can I represent fractions of different sizes?

- What relationships can I discover about fractions?
- What does the numerator of a fraction represent?
- What does the denominator of a fraction represent?
- What is a real-life example of using fractions?

MATERIALS

- Give Me Half! By Stuart J. Murphy (or another book about the concept of fractions).
- Scissors
- Glue or paste
- Crayons
- One large sheet of black paper
- One half sheet of brown paper
- Small pieces of various colored paper including red, white, green, yellow, black
- Pizza Order Directions – One per child

GROUPING

Individual Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

To assess prior knowledge, brainstorm with students about food that is divided into equal pieces. Possible suggestions may include a chocolate bar, apple pie, pizza, an orange.`

Read aloud and discuss, Give Me Half! By Stuart J. Murphy (or another book about the concept of fractions).

Part II

To begin the lesson, give students a half sheet of brown paper. Instruct them to draw and cut out a circle from the brown paper. Then give each child a Pizza Order. Instruct the students to use their pencil to divide their circles into the fractional part used in the Pizza Order (fourths or eights). Then have the students trace over their pencil lines with a dark crayon. Next, give students small sheets of the colored paper (red, white, green, yellow, black). Instruct students to cut pieces of the colored paper to represent the pizza toppings. The toppings should be glued onto the appropriate number of pizza slices.

After the toppings have been successfully glued to the brown circle, give each student a sheet of black construction paper. Have the students glue their pizzas and Pizza Order Directions to the paper.

FORMATIVE ASSESSMENT QUESTIONS

- What fraction of your pizza is covered with peppers?
- What topping covers most of your pizza?

- Are black olives covering more or less than half your pizza?
- Did you divide your pizza into equal parts?
- How many equal parts did you need? How did you know?
- If your whole pizza was divided into fourths, how many slices did you cover with toppings? How would you write this as equivalent fractions? (4/4 = 1)
- If your pizza is covered with 1/8 mushrooms and 3/8 green peppers, does it have more mushrooms or green peppers? How do you know? (Encourage students to explain in terms of the pizza size and by comparing numerators in the fraction.)
- Some of you covered 4/8 of your pizzas with pepperoni. Can you name equivalent fractions for 4/8?
- Were any pizzas covered with ½ cheese? Why did your Pizza Order ask for 2/4 cheese?
- Do you see any other examples of equivalent fractions on the pizzas?

DIFFERENTIATION

Extension

Have students create additional pizzas using more challenging fractional parts such as thirds, sixths, tenths. Increase the number of toppings. Have some sections contain more than one topping.

Intervention

Provide ready-cut circles and if necessary, draw dotted lines for students to trace as they divide their pizzas into fractional parts. Have students complete Pizza Orders using fractions containing only common denominators.

TECHNOLOGY RESOURCES

http://mrnussbaum.com/pizza_game/index.html

http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/fractions/index.htm

http://www.primarygames.com/fractions/2a.htm

PIZZAS MADE TO ORDER: PIZZA ORDER DIRECTIONS

Adapted from a lesson by Cara Coker, Floyd County, GA

I would like to order a pizza that is 1/8 green peppers, 8/8 pepperoni, and 3/8 mushrooms.

I would like to order a pizza that is
$\frac{1}{4}$ mushrooms, 2/4 cheese, and $\frac{1}{4}$ pepperoni.

I would like to order a pizza that is
1/8 black olives, 8/8 mushrooms, and
4/8 pepperoni.

I would like to order a pizza that is
$\frac{1}{4}$ mushrooms, $\frac{1}{4}$ black olives, and
$\frac{1}{2}$ pepperoni.

I would like to order a pizza that is
$\frac{1}{4}$ cheese, $\frac{1}{4}$ black olives, $\frac{1}{4}$ pepperoni, and
$\frac{1}{4}$ green peppers.

CONSTRUCTING TASK: GRAPHING FRACTIONS

From NCTM Illuminations
Suggested Time for Task: 2 class periods

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.MD.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. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Children need to understand the meaning of fractions based on repeated hands-on activities. They need a general rule for explaining the numerator and denominator of a fraction. Students should be familiar with various types of graphs including bar graphs, and line plots. Students may not realize that data can be described and displayed using fractions.

ESSENTIAL QUESTIONS

- How can I collect and organize data?
- How can I display fractional parts of data in a graph?

MATERIALS

Small individual bag of candy for each student

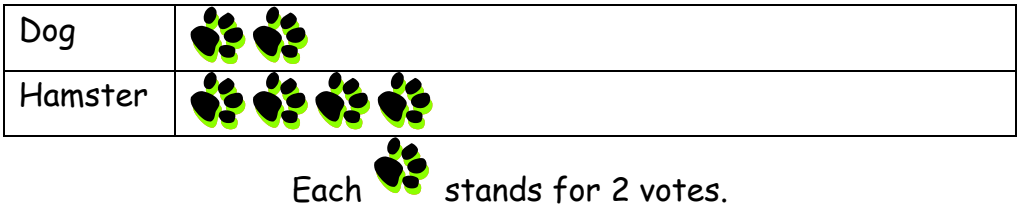
GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part I
As a class, or in small groups create a picture graph of favorite pets. An example is shown below,

FAVORITE PETS	
Cat	



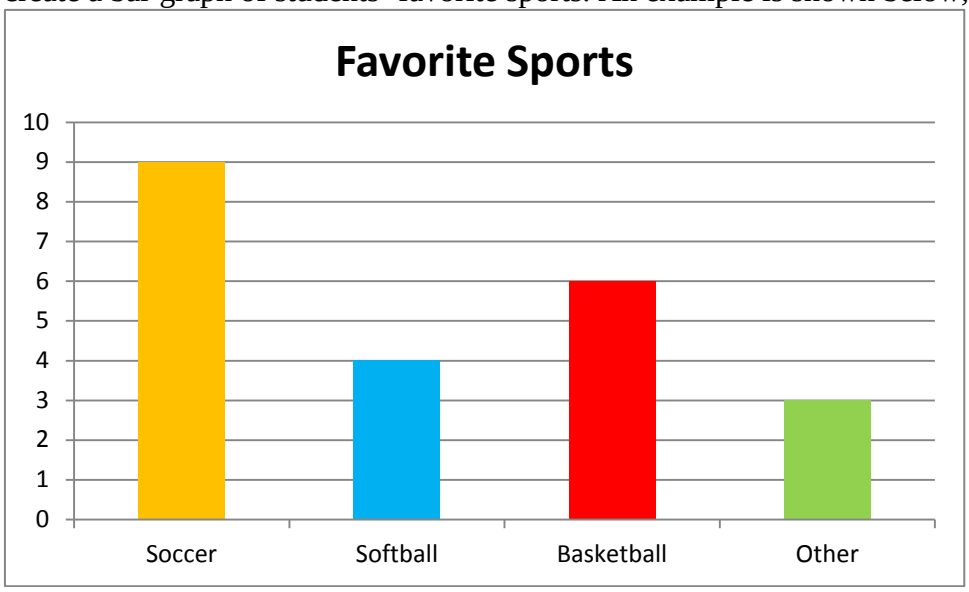
Have students determine the fractional representation for pet. For example, in the graph shown above there are:

- 10 children out of 20 prefer cats (10/20),
- 4 children out of 20 prefer dogs (4/20),
- 6 children out of 20 prefer hamsters (6/20)

Discuss the graph. As a class, create problems that could be answered using the data. You may want to display the graph for other classes to analyze.

Part II

As a class, create a bar graph of students' favorite sports. An example is shown below,



Once again, have students determine the fractional representation for favorite sports. For example, in the graph shown above there are:

- 9 children out of 22 prefer soccer (9/22)
- 4 children out of 22 prefer softball (4/22)
- 6 children out of 22 prefer basketball (6/22)
- 3 children out of 22 prefer other sports (3/22)

Discuss the graph, and create questions that can be answered using the data.

Part III

Working in small groups, students will examine the set model of fractions using colored candies. Give students an individual bag or pack of colored candies. Have students open their bag of candies and sort by color. Have students count the number of each color in their group and record the data in table on notebook paper. Have students record the fraction of each color represented in their group.

Have students log on to the Create a Graph Tool from the National Center for Education Statistics. Students should choose the type of graph they want to create by using the pull-down menu. Once students have created and printed their graph, they should label the data in fractional parts.

Have students work in groups to create story problems relating to their graphs. Examples of problems students might write:

- Which group had the most candies?
- How many candies did they have in their pack?
- What is the difference between the greatest and least number of candies in a pack?

FORMATIVE ASSESSMENT QUESTIONS

- Which type of graph did you create when you went to the Create a Graph Tool from the National Center for Educational Statistics?
- Why did you select this type of graph?

DIFFERENTIATION

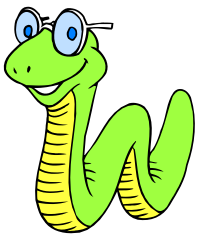
Extension

Have students create more than one graphical representational of the candy data. Discuss which display is most effective in presenting the data.

Intervention

Have students graph fewer pieces of candy using sticky notes to represent elements of data in a student-created graph.

Adapted from Elementary and Middle School Mathematics: Teaching l
By John A. Van de Walle, Karen S. Karp, and Jennifer M. Bay-Williams, p



CONSTRUCTING TASK: Inch By Inch

STANDARDS FOR MATHEMATICAL CONTENT

CCGPS.3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters.

(Refer to grade level overview for unpacked standards)

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

If students actually make simple measuring instruments using unit models with which they are familiar, it is more likely that they will understand how an instrument measures. A ruler is the most important measurement tool that primary students need to learn about. If students line up physical units, such as paper clips, along with a strip of tag board, and mark them off, they can see that it is the *spaces* on rulers, not the marks or numbers that are important. It is essential that the measurement with actual unit models be compared with measurement with using an instrument. The temptation is to carefully explain to students how to use these units to measure and then send them off to practice measuring. This approach will shift students' attention to the procedure (following your instruction) and away from developing an understanding of measurement using units. (Van de Walle p.72-72)

ESSENTIAL QUESTIONS

- What estimation strategies are used in measurement?
- How is the appropriate unit for measurement determined?
- How is the reasonableness of a measurement determined?
- Why are units important in measurement?
- How can I determine length to the nearest ¼ or ½?

MATERIALS

- tag board
- paper
- ruler

GROUPING

Whole group or small group

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Cut strips of paper length wise (1-inch thick) from regular paper. Ask students what is a half and how could they could find where a half is on the strip. Students will fold the strip in half. Have the students mark ½ on the folded line. Ask students: *if we needed to make this strip into 4 equal pieces/parts how could we do that?* Allow for exploration. Students will see that by folding a ½ in ½ it makes ¼.

Discussion: allow students to see that the strip is folded into 4 parts. Explain that the first fold is where 1 out of the four parts ends, have students label the next one 2/4 (two of 4 parts). Allow the conversation to take place that the second line is already labeled ½ and now it is going to be labeled 2 of 4 (2/4). What does that mean? Students will identify that they're the same. Label the last fold 3 of 4 or ¾.

Have students measure objects all around the room to the nearest ¼ **strip** and record their findings in there journal. **The strip is a non-standard unit of measurement and should be recognized as such**. Have students measure things that are longer than one strip to count a whole strip plus part. Example: the width of the desk is 2 strips and ¼ of a strip long.

Part II

Give the students a 1x1 inch square and repeat the entire process from day one. Allow students time to measure using a single inch square. Students will recognize how tedious it is to measure with a single inch square, and in many cases inaccurate. Give students (12) 1x1 squares and mark them into fourths with a pencil (not folded).

Place the folded inch square on top of the blank inch squares as a template for marking and place a dash to identify ¼ , 2/4, (1/2), and 3/4. *Keep asking students what ½ and 2/4 have in common.* Give students a tag board strip that is 1 inch wide. Have students create an inch ruler by gluing the MARKED 1x1 inch squares side by side.

After each student has created the ruler, have them measure things around the class using their newly created inch ruler. After 10-15 minutes of exploring engage students in a discussion in regards to the difficulties they encountered using their ruler (not labeled correctly, always had to count what square it was, etc)

Introduce a ruler with inches. Discuss and compare the similarities between the created ruler and the actual 12' ruler. Discuss how the actual ruler is more accurate and efficient.

Have the student circulate the class measuring objects to the nearest ¼ of an inch using the actual ruler.

Students create a line plot graph to collect and record the data of the objects they have measured throughout the class.

FORMATIVE ASSESSMENT QUESTIONS

- How did you determine ¼, ½, and ¾ on your strip of paper?
- Why is it important to have a standard unit of measurement?
- How does your "ruler" compare to the standard 12' ruler?

- Looking at your line plot graph, which measurement seems to be the most common among the classroom?

DIFFERENTIATION

Extension

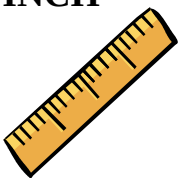
- Measure around the classroom to the nearest ¼, ½ and whole inch using a broken ruler.

Intervention

- Spend additional time with the original strip from part one.
- Have students create an additional strip that is a different size and determine the ¼, ½, and ¾ marks. Have students compare the two strips and lead a discussion of the importance of standard measuring tools.

CONSTRUCTING TASK: MEASURING TO THE HALF AND QUARTER INCH

Adapted from a Learning Task from K-5 Math Teaching Resources
Suggested Time – 4 Class Periods



STANDARDS FOR MATHEMATICAL CONTENT

MCC3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

c. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

Understand two fractions as equivalent (equal) if they are

a. The same size or the same point on a number line.

b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Fractions and measurement can be very difficult concepts for children to understand. In the previous unit, students learned to measure to the half and quarter inch. This task helps to combine fraction and measurement skills in a concrete and tangible activity geared toward learners of every type. By using fractions while measuring objects, children will be able to reason that fractions express a relationship between a part and a whole. Encourage students to consider the fact that a ruler is simply a number line used as a measuring tool. They will begin to see and apply fractions in their everyday lives as well as other areas of mathematics.

ESSENTIAL QUESTIONS

- How do I label a number line (ruler) to the half inch?
- How do I label a number line (ruler) to the quarter inch?
- How do I measure objects to the half inch?
- How do I measure objects to the quarter inch?
- How can I organize data measured to the half inch?

- How can I organize data measured to the quarter inch?

MATERIALS

- Half-Inch and Quarter-Inch Ruler Templates
- Unlined Paper

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Part 1

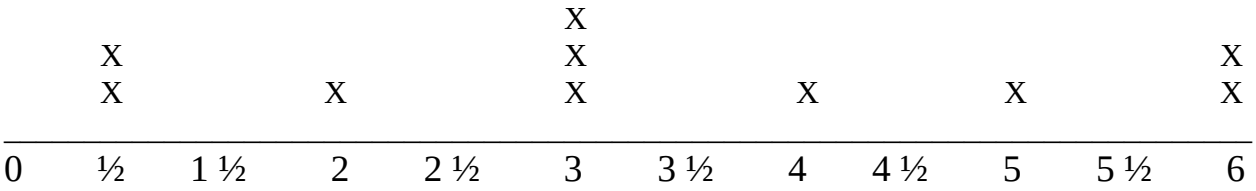
To begin the lesson, give each child a half-inch ruler template. Instruct students to label their rulers to show all half-inch measurements. Working individually or in small groups, have students use the rulers to measure ten objects in the classroom to the nearest half-inch.

On a sheet of paper, students should sketch and label each object they measured. Then ask students to number the objects in order from shortest to longest. Discuss how students decided which objects were smaller and which objects were larger. Encourage discussion about comparing the physical size of each object as well as comparing the fractional measurements of each object.

Part II

Students use their data to create a line plot where the horizontal scale is marked off whole numbers and halves. Completed line plots should be shared with small groups or entire class.

Classroom Objects Measured to Nearest Half-Inch



Part III

Repeat the activity using quarter-inch measurement. Give each child a quarter-inch ruler template. Instruct students to label their rulers to show all quarter-inch measurements. Ask students to write both measures (ex. 2/4 and ½) for equivalent fractions on the ruler. Include discussion about equivalent fractions in measurement. Working individually or in small groups, have students use the rulers to measure ten objects in the classroom to the nearest quarter-inch.

On a sheet of paper, students should sketch and label each object they measured. Then ask students to number the objects in order from shortest to longest. Discuss how students decided which

objects were smaller and which objects were larger. Encourage discussion about comparing the physical size of each object as well as comparing the fractional measurements of each object.

Students use their data to create a line plot where the horizontal scale is marked off with whole numbers, halves, and quarters. Completed line plots should be shared with small groups or entire class.

FORMATIVE ASSESSMENT QUESTIONS

- In what ways is your ruler similar to a number line?
- How did you label your number line to the half inch and quarter inch?
- Which measure is more exact?

DIFERENTIATION

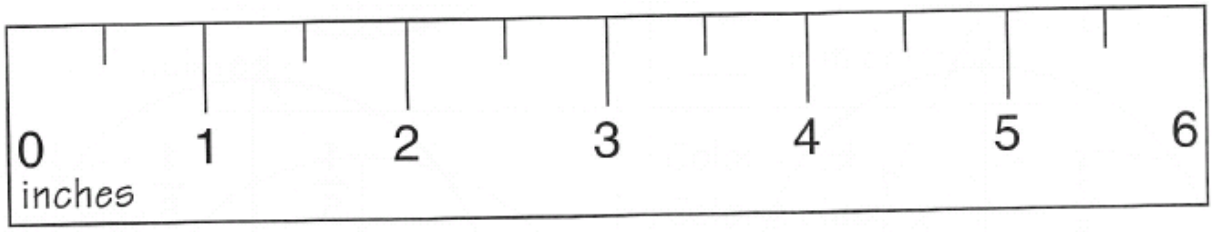
Extension

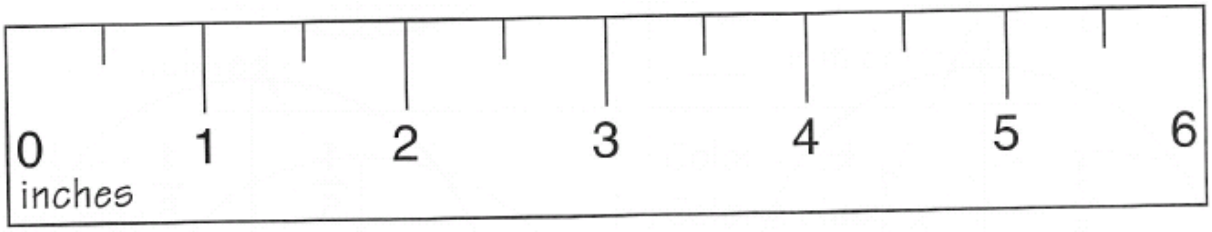
- Measure around the classroom to the nearest ¼, ½, and whole inch using a broken ruler.

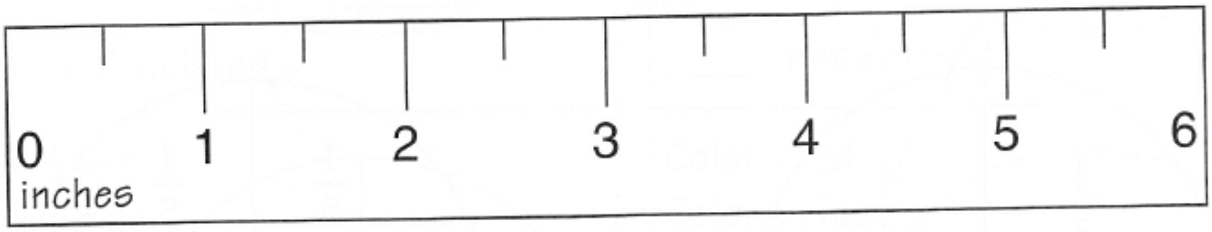
Intervention

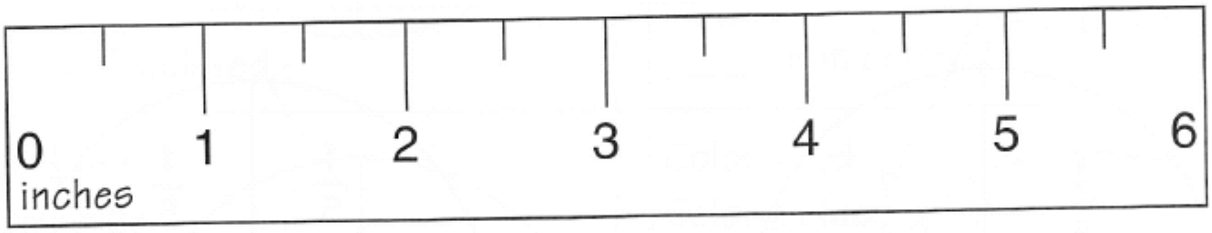
- Spend additional time with the original strip from part one.
- Have students create an additional strip that is a different size and determine the ¼, ½, and ¾ marks. Have students compare the two strips and lead a discussion of the importance of standard measuring tools.

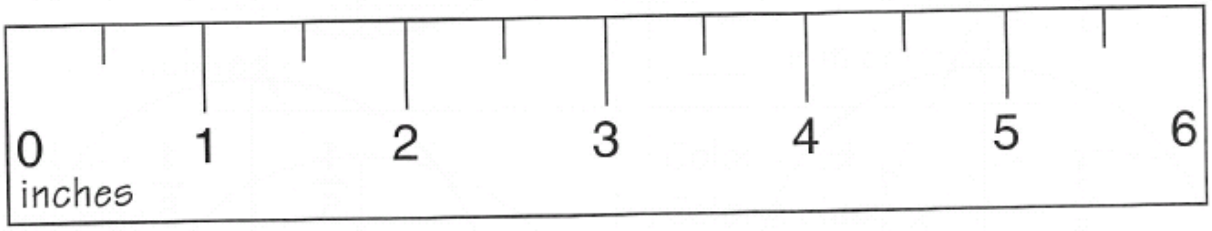
Half-Inch and Quarter-Inch Ruler Templates

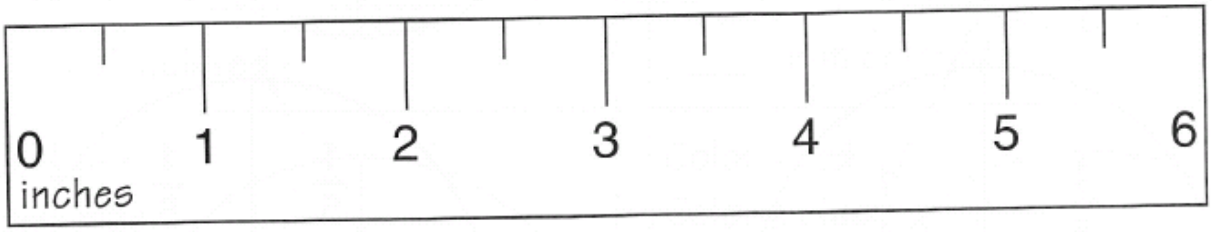


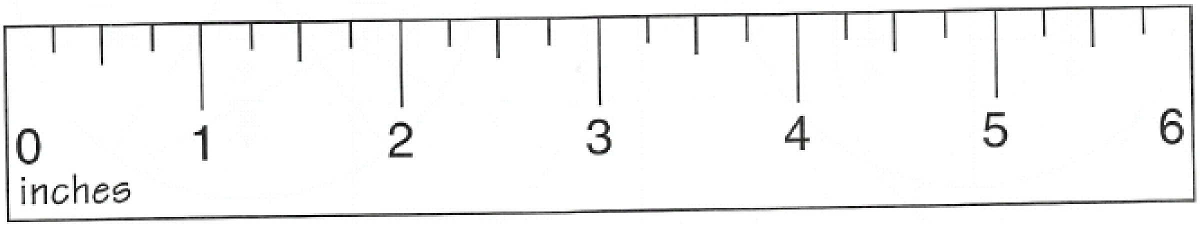


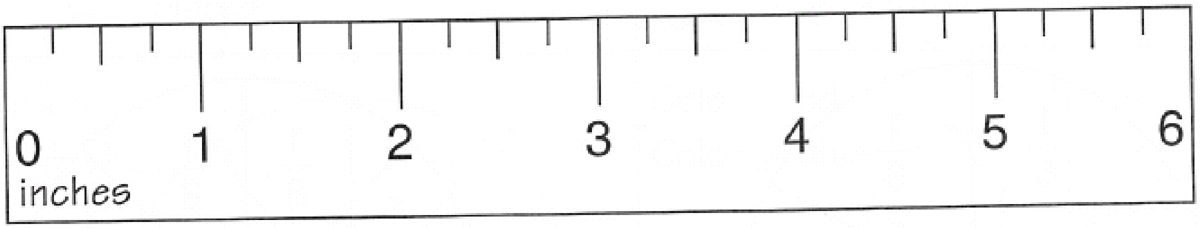


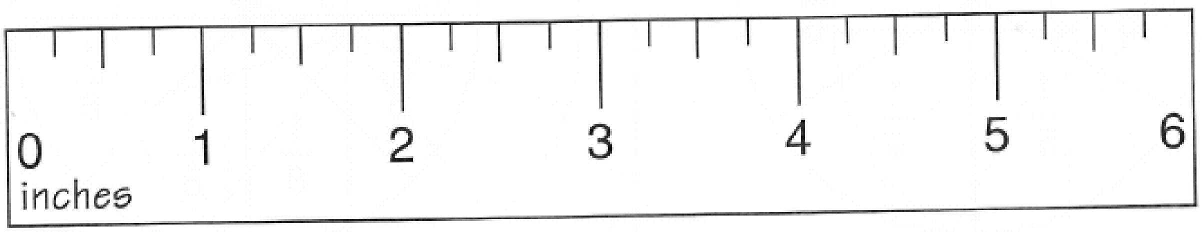


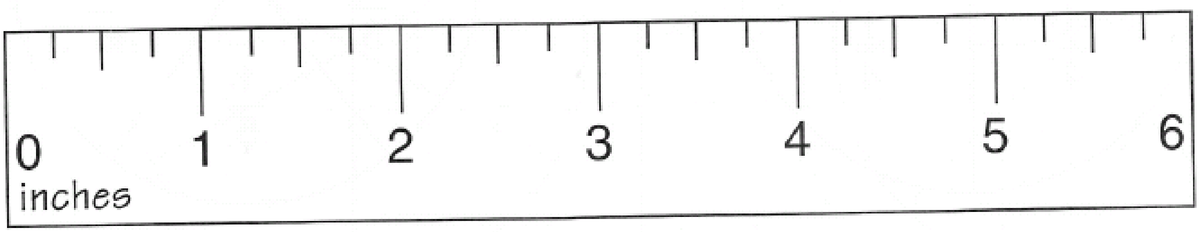


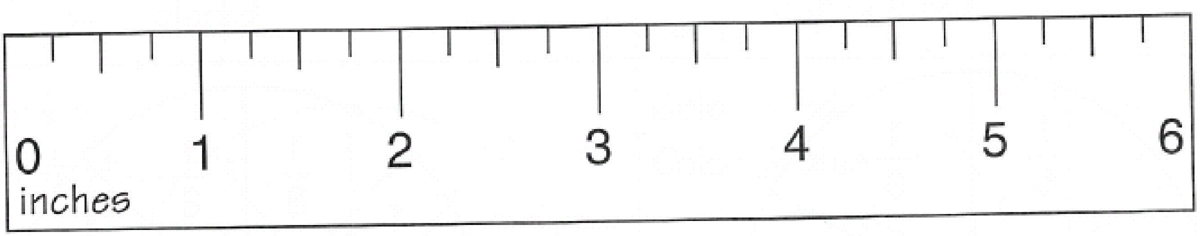


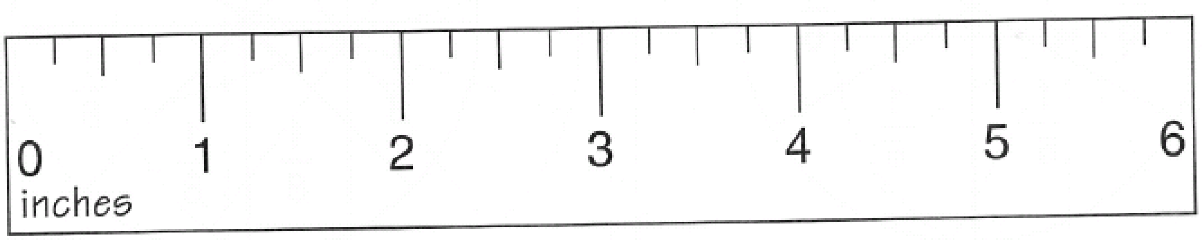












PRACTICE TASK: TRASH CAN BASKETBALL

Adapted from a 1st Grade GPS Frameworks Task
Suggested Time for Task: 1 class period

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Students have learned to write fractions as part of a whole and part of a group. They have also learned to compare fractions. This task allows students to practice their new knowledge in a game format.

ESSENTIAL QUESTIONS

- How can I write a fraction to represent a part of a group?
- When we compare two fractions, how do we know which has a greater value?

MATERIALS

- "Trash Can Basketball" student recording sheet
- Each group will need 10 pieces of "trash" (paper balls).
- Box, tub, or trash can for a container
- Crayons or markers and construction paper for making a poster

GROUPING

Partner/Small Group Activity

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students collect data from playing "Trash Can Basketball." They use the data to write and compare fractions.

1. Students use scrap paper to make 10 paper balls per group. (Wad the paper balls up tightly so they are easier to aim.)
2. Place a trash can (or other large container) 5 feet away.
3. Students predict how many paper balls they will be able to get into the basket. Predictions should be written in the chart on the student recording sheet.
4. Students take turns with their partner(s) throwing the ten paper balls into the trash can. The partner will collect data using tally marks on the chart to show how many of the 10 paper balls went into the trash can.

The copy room is a good source of trash paper. Be sure the paper balls are tight. Loosely packed ones make it really difficult to throw accurately. Before beginning the throwing contest, as a class, decide on any rules regarding practice throws.

FORMATIVE ASSESSMENT QUESTIONS

- How did you determine your score? How many times did you throw the paper ball? How many times did you "make a basket"?
- How did you compare your fraction to your opponent's?

DIFFERENTIATION

Extension

- Repeat the activity as time permits. (Try different types of paper balls, distances, types of shots, etc.)

Intervention

- Have the chart pre-made on the poster for student use and/or allow student to write his/her results on a computer, print, and attach to the poster.

TECHNOLOGY RESOURCES

http://www.mathsisfun.com/numbers/fractions-match-words-pizza.html

Name _____ Date _____

TRASH CAN BASKETBALL

This is your chance to demonstrate your basketball skills! You have been chosen to participate in a paper-ball throwing contest.

Directions:

1. Use the scrap paper to make 10 paper balls per group. (Wad the paper balls up tightly so they are easier to aim.)
2. Place a trash can (or other large container) 5 feet away.
3. Predict how many paper balls you will be able to get into the basket. Write your prediction in the chart below.
4. Take turns with your partner(s) throwing the ten paper balls into the trash can. Your partner will collect data using tally marks on the chart below to show how many of the 10 paper balls went into the trash can.

Player #1	Number of Tosses	Prediction for Number of "Baskets"	Number of "Baskets" (Use tallies)	Fraction of Baskets Made
_____	10			
Player #2	Number of Tosses	Prediction for Number of "Baskets"	Number of "Baskets" (Use tallies)	Fraction of Baskets Made
_____	10			

5. On a sheet of unlined paper, create a poster to display your group's results. Your poster should include the following. Write to explain the results of the contest. Be prepared to share your poster and results with the class. Represent the number of good throws for each partner as a fraction and express a comparison of fraction scores using a >, <, or = symbol. Make your poster colorful and informative!

Example:

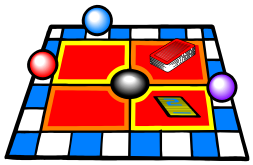
Player #1 $\frac{6}{10}$

Player # 2 $\frac{7}{10}$

$\frac{6}{10} < \frac{7}{10}$

PERFORMANCE TASK: THE FRACTION STORY GAME

Suggested Time for Task: 1-2 class periods



STANDARDS FOR MATHEMATICAL CONENT

MCC3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

MCC3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

MCC3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
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4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the unit so that students understand what is expected of them.

ESSENTIAL QUESTION

- How are fractions used in problem-solving situations?

MATERIALS

Materials Required Per Group

- "The Fraction Story Game, Directions" student sheet
- "The Fraction Story Game, Game board" student sheet
- Colored pencils or crayons
- Index cards (about 60)
- Common classroom materials -
  Recycled items for game pieces
  (about 6)

GROUPING

Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students create a game while reviewing all the different aspects of fractions they have studied.

Comments

Students may not understand what you mean by "common classroom materials." While many classrooms have standard dice that can be used, give alternative examples such as a penny can be flipped to determine how many spaces the players get to move (heads = 2 spaces, tails =1 space). For game pieces, extra marker caps, plastic soda lids, manipulatives, or coins can be used.

Part I

Begin by having students review lessons or activities that have been done during the fraction unit. Record their thoughts on chart paper or the board. You may want to post a list of the elements of the standards covered during the unit and reflect on tasks and activities which addressed each element.

Since a good game should have at least 20-30 questions, you may want the children to work with a partner or in small groups to create enough questions.

This culminating task represents the level of depth, rigor, and complexity expected of all third grade students to demonstrate evidence of learning.

Additional Comments:

- Students should have had multiple opportunities to write story problems by this time in the school year.
- Questions should match a standard.
- Creating questions to match the standard taught is a wonderful way to review. It is a strategy that can be used from elementary school through college and is very effective.
- Index cards may be used for the problem cards. Insist that the students write legibly. All problem cards should have the solutions on the back
- Solutions should be accompanied by an explanation/illustration.
- Game boards, playing pieces, and cards can be stored in large Ziploc bags or manila folders.

The cards students create for their games can be used in a variety of ways. The problem cards can be used to create a Jeopardy type game which can be played as a review of the unit. Also the problem cards can be reproduced and used as a set of review question before the unit assessment.

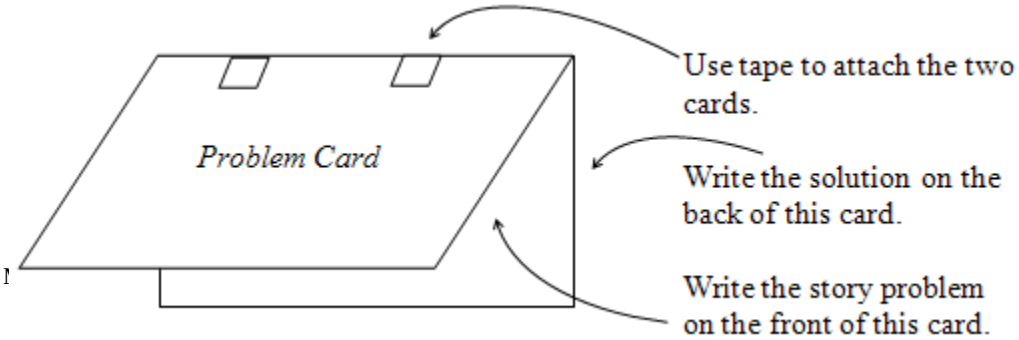
Part II

Students will follow the directions below from "The Fraction Story Game, Directions" student sheet.

Your task is to create a fraction story game using what you learned about fractions. Use the fraction game board on "The Fraction Story Game, Game Board" student sheet to create a game that other students will want to play.

Directions:

- Look at the list of the standard that you studied in class. The problem cards you create must match those standards.
- You will need to make approximately 30 problem cards for your game. Most of the cards should be written in story problem form.
- Be sure you have some problem cards for each of the standards addressed in this unit.
- Each problem card must have the correct answer on the back. Cover each problem card with a blank index card so players cannot see the problems before their turn. See sample below.
- Write the rules for your game.



Things to remember:

- You can only use common classroom materials.
- You may decorate your game board in a way that makes the game interesting and fun to play.
- Be sure to play your game with a partner to be sure it works.

FORMATIVE ASSESSMENT QUESTIONS

- What are the skills you learned during this unit?
- What kind of problem can you create for ____ (one of the elements of the standard)?
- How do you know this is the correct solution for your problem?

DIFFERENTIATION

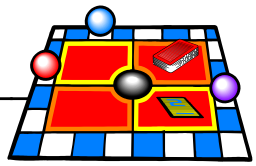
Extension

- Students can create their own game board format with penalties, rewards, and more complex rules.

Intervention

- Allow students to work in a small group so each student will need to make only one card per standard.
- For some of the parts of a standard, give the students the problem and require them to create the solution to the problem.
- Students with a significant problem with manual dexterity may need to type their problems, then cut and paste then onto the index cards.

Name _____ **Date** _____

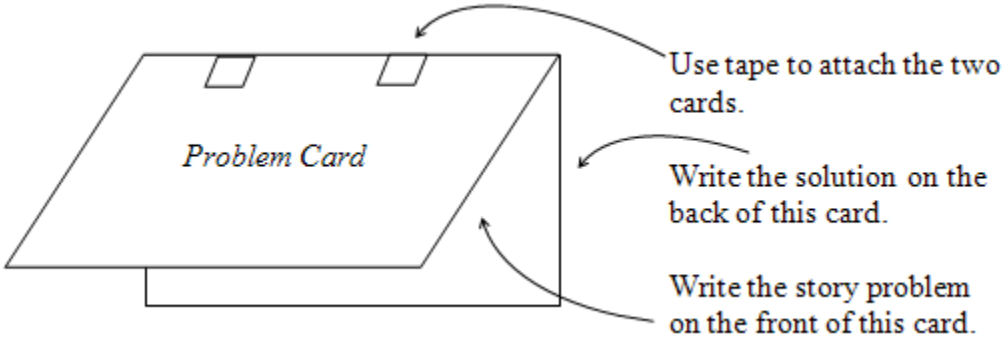


THE FRACTION STORY GAME

Your task is to create a fraction story game using what you learned about common fractions and decimal fractions. Use the fraction game board on "The Fraction Story Game, Game Board" student sheet to create a game that other students will want to play.

Directions:

- Look at the list of the standards that you studied in class. The problem cards you create must match the standard.
- You will need to make approximately 30 problem cards for your game. Most of the cards should be written in story problem form.
- Be sure you have some problem cards for each of the standards addressed in this unit. Make sure you use both fractions in your problem cards.
- Each problem card must have the correct answer on the back. Cover each problem card with a blank index card so players cannot see the problems before their turn. See sample below.

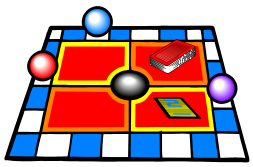


- Write the rules for your game.

Things to remember:

- You can only use common classroom materials.
- You may decorate your game board in a way that makes the game interesting and fun to play.
- Be sure to play your game with a partner to be sure it works.

Name _____ Date _____



The Fraction Story Game

Game Board

Finish

Start

Problem Cards