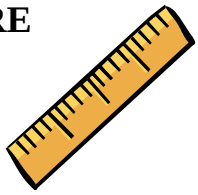
CONSTRUCTING TASK: USING FRACTION STRIPS TO EXPLORE THE NUMBER LINE



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.

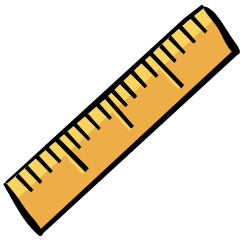
TECHNOLOGY RESOURCES

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.