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.
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.

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.

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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.

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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

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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.

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