Have Your Cake and Eat it too!

Summary

Core Academy Task Lesson from 2012
Students will compare 2 fractions with the same numerator or same denominator by reasoning about their size. They should recognize that comparisons are valid only when the 2 fractions refer to the same whole. They will record their results and use comparing symbols to justify their conclusions using a model.

Main Core Tie

Mathematics Grade 3
Strand: NUMBER AND OPERATIONS - FRACTIONS (3.NF) Standard 3.NF.3

Time Frame

1 class periods of 60 minutes each

Group Size

Pairs

Life Skills

Thinking & Reasoning

Materials

- paper, graph paper, chart paper
- pencil, colored pencils
- scissors - for students to create their own models
- manipulatives - such as fraction circles or bars

Background for Teachers

A solid foundation for the understanding and progressions of fractions should be known. It can be found in the progressions document for teaching fractions conceptually.

Student Prior Knowledge

Students should have a firm understanding on the parts of a fraction and how the whole is partitioned equally. They should also understand that the "wholes" being compared should be represented and compared side by side and be the same size.

Intended Learning Outcomes

Students will be able to compare denominators and determine which piece is larger or smaller, and they should be able to compare numerators and determine which piece is larger or smaller.
Mathematical Practice #1 - Make sense of problems and persevere in solving them.
Mathematical Practice #7 - Look for and make use of structure.

Instructional Procedures

Use the power point to represent the task.
Mom is mixing a cake to eat for dessert. As the cake is baking, she asks you if you would rather have 1/3 of the cake or 1/6 of the cake. Since this is your favorite cake, you want the most cake possible.

Which will you choose and explain why?
Explain that students will be expected to model and explain their thinking. They can draw pictures or use models.
The following questions could be asked while students are completing the task:

- Can you use a picture to help you?
- What tools could help you see it?
- How do you know that this one is bigger?
- Can you prove it to me?
- How is your picture the same or different from someone else?
- Explain how you know the pieces are larger or smaller.

Look for students to show answers using various methods - for instance, someone who used circles and someone who used rectangle bars, or paper and pencil models or construction paper cut ups, or graph paper. Show visual representations first and have students not just "show and tell" but explain how and why they did what they did. Have students ask questions if they have any. Connect to inequality expressions written last. (Start with the most concrete to most abstract ideas.) Then move on to look for patterns.
Questions to ask:

- What pattern do we see here?
- Will this strategy always work?
- Will this always be true?

Emphasize the idea that the larger the denominator, the smaller the piece.

- What kind of number sentence could go with your picture? Write an equality together.
- Why did you choose to do it that way?
- Who did this the same way?
- Who did it differently?
- How are these two ways similar or different?
- Does this really make sense? Do you have any quesitons?

Strategies for Diverse Learners

For the struggling learner:
Ask - what tools on the table could you use to help you solve the problem? Can you show me what 1/3 looks like? What does 1/6 look like? How are they similar? Different?
For the extensions: What if your mom said you could choose between 1/3 and 1/4 of a cake? Which would give you the most cake? How do you know?
Some of your brothers and sisters came home and the cake is cut into 8 pieces. Your mom says that you can have 2/8 and your brother can have 1/4. Is this fair? How do you know? Why or why not?
If 6/8 of the cake was already eaten when mom and dad took their piece, how big was the piece that each of them got? How much is left for sister?
IF the family had only eaten 1/2 of the cake, how many ways can you show how much is left?

Bibliography

Core Academy Tasks 2012
Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. "Thinking Through a Lesson Protocol: Successfully Implementing High-Level Tasks." Mathematics Teaching in the Middle School 14 (October 2008): 132-138.

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