
Rational Number Project

Level 1 / Lesson 21 / Overview

Students explore fraction subtraction within take away and difference contexts. Students estimate and solve story problems with fraction circles.

Materials

- Fraction Circles for students and teacher
- Student Pages A, B and C

Teaching Actions

1. Consider the development of fraction subtraction as a problem solving activity. Let students explore, in groups, using the circle pieces and creating their own solution strategies.
2. Introduce this take away problem. Ask students to act out the problem in their groups. Explain that you will be soliciting, at random, someone to explain their group's work to the whole class.

Alice noticed that there was $\frac{3}{4}$ of a pizza left after the party. She ate a slice of pizza that was the size of $\frac{1}{8}$ of a whole pizza. How much pizza was left after Alice ate a slice?
3. Before group work, ask for estimates. Will there be more or less than $\frac{1}{2}$ pizza left? Try picturing the $\frac{3}{4}$ pizza in your mind. Does this help in your estimate? Explain your thinking. (Record estimates on board).

Comments

1. Developing subtraction of fractions from contexts is more difficult than for fraction addition. There is more than one context for subtraction: take away, finding the difference, how many more.
2. You should expect students to solve each story problem type at the concrete level differently. Students will match their actions with the fraction circles with the action from the story problem.

At Level 1 you should be only interested in concrete solutions to subtraction problems and estimation of reasonable answers.

Teaching Actions

4. Have students try to act out the problem. As you monitor their work, consider these hints:
 - a) Can you show $\frac{3}{4}$ of pizza with the circles?
 - b) Is $\frac{1}{8} >$ or $<$ than $\frac{1}{4}$?
What is the action in the story?
 - c) Can you take away $\frac{1}{8}$ if the model is shown with 3 blues?
 - d) Can you use your ideas of equivalence to help you?
5. Randomly select a student to explain how his/her group attempted to act out the problem. Deemphasize an exact answer, but help students verbalize their group's reasoning and discussion.
6. Repeat the same story problem with these new numbers:

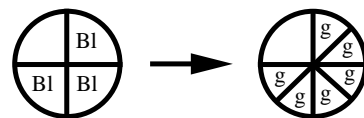
$\frac{1}{2}$, $\frac{1}{8}$
 1 , $\frac{3}{4}$
 $\frac{2}{3}$, $\frac{1}{6}$
7. End the lesson with a story problem that represents a difference model. Ask students to act out this story problem:

Joe & Renata each receive the same allowance. Joe spent $\frac{2}{3}$ of his allowance on records. Renata spent $\frac{1}{6}$ of her allowance repairing her bicycle. How much more did Joe spend than Renata?

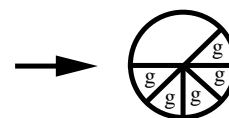
Ask: Is it easier to compare amounts when they are shown with the same colored pieces?

Comments

3. In the take away model, students may build the first fraction and take away the second.

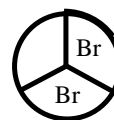


Take away

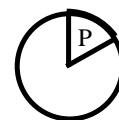


4. In the difference model, students may construct 2 separate models for the 2 fractions in the story and compare models.

For example:



Joe's amount

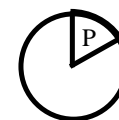


Renata's amount

Change to pink:



Joe spent $\frac{3}{6}$ more.



5. Some may still use the take away model.

Teaching Actions

8. Estimate answer. Will the difference be greater or less than $\frac{1}{2}$? Why?
9. As you monitor their group work consider these hints:
 - a) Is the action in this story different than in the pizza problem?
 - b) Can you show Joe's amount? Renata's amount?
 - c) Can you use your ideas of equivalence?
10. Have students share solution strategies. Talk about differences in actions in the two problem types.
11. Repeat the same story with these numbers:

$$\frac{1}{2} \quad \frac{1}{4}$$

$$\frac{2}{3} \quad \frac{2}{3}$$

$$\frac{6}{8} \quad \frac{1}{2}$$

12. Student Pages A and B provide practice with story problems. Spend time in class having students explain their strategies for solving these problems.

Student Page C provides some challenges.

Comments

6. Again, you will want to use this lesson plan over 2 -3 days. You may want to introduce the take-away model one day & the difference model the next day.
7. What you want is for students to be able to act out the problems with fraction circles, talking about what they are doing.

Name _____

Fraction Operations: Finding the Exact Answer

1. Joe lives $\frac{4}{10}$ a mile from school. Mary lives $\frac{1}{5}$ of a mile away. How much farther from school does Joe live than Mary? Draw pictures to show what you did with the circles.

Estimate: _____

2. Because of a rainstorm the water level in a swimming pool rose by $\frac{9}{12}$ ". The following day it dropped by $\frac{4}{6}$ ". What was the total change in the water level? Draw pictures to show what you did with the fraction circles.

Estimate _____

3. Velicia spent $\frac{1}{3}$ of her allowance on a CD and $\frac{4}{6}$ of her allowance on a movie. What fraction of her allowance did she have left? Draw pictures to show what you did.

Estimate: _____

Fraction Operations Continued

4. A clerk sold three pieces of ribbon. The red piece was $\frac{1}{3}$ of a yard long. The blue piece was $\frac{1}{6}$ of a yard long. The green piece was $\frac{10}{12}$ of a yard long.

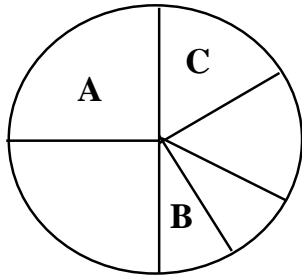
- a) How much longer was the green ribbon than the red ribbon?
- b) How much longer was the green ribbon than the blue ribbon?
- c) Is the red ribbon and blue ribbon together greater than, less than or equal in length of the green ribbon?
- d) If the red and blue together is greater than the green, how much greater? If shorter, how much shorter?

5. With your fraction circles, find the exact answers.

$$\frac{4}{5} - \frac{3}{10} \quad \frac{1}{4} + \frac{5}{8} \quad \frac{7}{8} - \frac{1}{3} \quad \frac{1}{2} + \frac{3}{8} \quad \frac{3}{5} - \frac{2}{5}$$

Challenges

1.



Shade Parts A, B and C

- How much larger is part A than part B?
- How much larger is part A than part C?
- How much larger is part C than part B?
- How much are parts A and C together?
- How much greater are parts A and C together than part B?
- Are parts C and B together greater than A? If so, how much greater? If not, how much smaller?

2. Describe how you solved the problems.

3. Circle the larger fraction in each pair. Then find out how much larger that fraction is.

$$\frac{1}{4} \quad \frac{1}{3}$$

$$\frac{1}{2} \quad \frac{2}{5}$$

$$\frac{2}{4} \quad \frac{5}{6}$$

$$\frac{1}{2} \quad \frac{5}{6}$$

Post Lesson Reflection

Lesson _____

1) Number of class periods allocated to this lesson: _____

2) Student pages used: _____

3) Adaptations made in lesson development part:
[For example: added extra problems, eliminated problems, changed fractions used]

4) Adaptations made on Student pages:

5) To improve lesson, next time I should: