

Cookie Fractions

- Strand:** Number and Number Sense
- Topic:** Identify, write, represent, and compare fractions
- Primary SOL:** 2.4 The student will
- name and write fractions represented by a set, region, or length model for halves, fourths, eighths, thirds, and sixths;
 - represent fractional parts with models and with symbols; and
 - compare the unit fractions for halves, fourths, eighths, thirds, and sixths, with models.

Materials

- The book *The Doorbell Rang* by Pat Hutchens
- Six copies of the large cookies (cut-out images) Attached
- Small cookies and fractions page (Student Page) Attached
- Paper
- Scissors
- Fraction pieces for projecting

Vocabulary

one-half, one-third, one-fourth, one-eighth, one-tenth, equal-sized parts, halves, thirds, fourths, sixths, and eighths

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Divide the class into groups of four. Give each student a copy of the student page, and have students cut out each box. Ask two volunteers to role-play the fraction story as you read it.
2. Tape the large cookies on the board. Read the first page and discuss how many cookies are in the whole set (12) and how the two students will share them equally (halves). Ask one student in each group to show this with his or her cookies. Then use the large cookies to model it on the board, and write the fractional notation below it. Have the student find that fraction and place it with his or her cookies.
3. Read the next two pages, then stop and have students predict how the characters will solve the dilemma. Ask, “What should they do if more people arrive to share?”
4. Read the next section to see if their predictions were correct. Have students use role-play to mimic what characters do in the story. Continue reading the story, adding more volunteers as needed. Have a different student in each group show the fraction with his or her cookies and then find the correct fraction card. Discuss what is happening to the whole set (i.e., first the cookies get divided into halves, then thirds, and so forth).

5. After finishing the story, discuss what happened to the set of cookies being shared in the story. (The set was divided again and again as more people came.) Discuss the fair shares (equal-sized portions) that each person received. Explain that fractions are shares of a whole or a set. Relate it to how the students would feel if their parents gave them a treat and they had to share it with a brother or sister. The parent would expect them to be fair and divide it equally (fair shares).
6. Ask the students, “What do you notice happening to the fair shares that each person receives as the number on the bottom of the fraction gets larger?” When the set of 12 cookies was divided in half, each child got $\frac{1}{2}$ of 12 cookies or a total of 6 cookies. When the set of 12 cookies was divided in sixths, each child got $\frac{1}{6}$ of the 12 cookies or a total of two cookies. Have students look for the pattern and ask them to think about the patterns they see, talk with their group, and then share as a whole class what they have discovered: the larger the denominator, the smaller the fair share. Compare this with what they know about the region/area model (fraction circles) of fractions. Ask, “Does the conclusion still fit?” Ask students to use the fraction pieces projected on the overhead to justify their conclusions and explain their rationale.
7. As a review and summary of the activity, have students complete a written and pictorial retelling of the fraction story that was shared at the beginning of class. Key components that should be included are the title, author, correct sequence of events, pictorial representations with the fractional notations of what happens each time new people join the original characters, and at least one sentence telling about each picture. Encourage students to use correct capitalization and punctuation.

Assessments

- **Questions**
 - How could you fairly share 10 cookies with 2 people?
 - Can you share 15 cookies fairly with 2 people? Explain your thinking.
- **Journal/writing prompts**
 - Explain what happens to the denominator each time the doorbell rang. What happened to the number of cookies each person got?
 - You want to share 12 cookies fairly with your friends. You want everyone to have 3 cookies. How many people need to share all 12 cookies so that each person has 3?
 - Write about having to share something fairly with someone. What did you share? How did you ensure you shared fairly? How much did each person get? What was the fractional part once you shared?

Extensions and Connections (for all students)

- Students can create their own variations of the fraction story as a dramatic presentation activity. The plays can then be presented to the class, with the fractional parts and fractional notation being drawn on the board, or by having group members present them on posters as props during the presentations.
- Model and create fractions using different set models (e.g., counters, cubes, fruit, six-packs of juice boxes, snack-sized packages of raisins). Set up learning centers so students can rotate and model the fractions, then trace or draw the representations (e.g., if 10 chips is the whole, show $\frac{1}{2}$ by dividing the chips into two equal piles encircling each group with yarn). A pictorial representation of the set model can be made by drawing or by stamping with Bingo markers and then circling the fractional part.
- Transfer understanding of set models of fractions to the area model. Ask students to explain similarities and differences they notice.

Strategies for Differentiation

- Develop understanding in a small group setting. Share cookies with the students in the group. Continue to work concretely before moving on to a representational phase.
- Give students a set of 12 concrete items (bottle caps, erasers, crayons...). Tell them they must fairly share the items between a certain number of people. Have them record on a table (see example). Discuss patterns they may notice.

Number of people sharing	Fraction each person gets
2	
3	
4	
6	

Hutchins, P. (1986). *The doorbell rang*. New York: Greenwillow Books.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

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Large Cookies



			
			
			
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{12}$