

FRACTION FRACAS

NUMBER



- Fractions
- Fractional equivalence
- Game strategies

Getting Ready

What You'll Need

Cuisenaire Rods, 1 set per group

Fraction Fracas spinner, 1 per group, page 96

Overhead Cuisenaire Rods and/or 1-centimeter grid paper transparency (optional)

Overview

In this game for two to four players, children take turns finding pairs of Cuisenaire Rods that represent a particular fraction in an effort to collect the most rods. In this activity, children have the opportunity to:

- find the fractional names of rod pairs
- learn about equivalent fractions
- develop strategic thinking skills



The Activity

Introducing

Ask children to find a rod that is one third as long as the dark green rod.

After children have shared their choices, invite them to look for other combinations of two rods that could be used to represent one third.

Call on volunteers to explain why the three Cuisenaire Rod combinations—red and dark green, white and light green, light green and blue—are the only ones that can be used to show one third.

Now tell children they are going to play a game called *Fraction Fracas*.

Go over the game rules given in *On Their Own*. Demonstrate by playing a partial game.

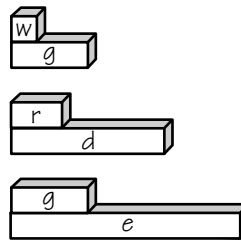
On Their Own

Play Fraction Fracas!

Here are the rules.

1. This is a game for 2 to 4 players. The object is to collect the most rods.
2. Players put all the rods in the center of the playing area.
3. Each player, in turn, spins the spinner and takes 2 rods that represent the fraction shown. Here is an example:

When the spinner shows $\frac{1}{3}$, a player may choose 1 of these possibilities.



4. Players lose a turn if they cannot find rods to match the fraction spun.
 5. The game is over when no one can make a fraction.
- Play 3 games of Fraction Fracas.
 - Be ready to talk about good rod choices and bad rod choices.

The Bigger Picture

Thinking and Sharing

Invite children to talk about their games and describe some of the thinking they did.

Use prompts such as these to promote class discussion:

- ◆ What did you think about when you made your choices?
- ◆ Were some fractions easier to make than others? Explain.
- ◆ Did you find any rods that could not be used no matter what was spun? If so, which ones and why?
- ◆ Did you roll one fraction more than any other fractions?
- ◆ What strategies, if any, did you develop for collecting the most rods?

Writing

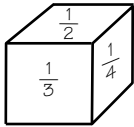
Have children select one fraction from the spinner and explain its meaning. Then have them list all the rod pairs that represent that fraction and describe how they found them.

Extending the Activity

Have children play the game again, but change the rules. Allow children to use more than two rods and permit the numerator or the denominator to be

Teacher Talk

You may want to make up a fraction cube that children can toss instead of spinning the spinner.



Where's the Mathematics?

To play *Fraction Fracas*, children only need to be aware of the definition of a unit fraction as “one out of a number of equal parts.” As they play the game, children learn that the value given to a rod depends on the size of the “whole.” A red rod, for example, can be used in the representation of a number of different fractions: $\frac{1}{2}$ when compared to the purple rod, $\frac{1}{3}$ when compared to the dark green rod, and $\frac{1}{4}$ when compared to the brown rod.

Most children soon realize that some fractions are easier to make than others. This is because more rod combinations exist for certain fractions than for others. Here are all the rod pairs that can be matched to the fractions on the spinner.

Fraction	Number of Pairs	Rod Combination
$\frac{1}{2}$	5	w/r, r/p, g/d, p/n, y/o
$\frac{1}{3}$	3	w/g, r/d, g/e
$\frac{1}{4}$	2	w/p, r/n
$\frac{1}{5}$	2	w/y, r/o
$\frac{2}{3}$	3	r/g, p/d, d/e
$\frac{3}{4}$	2	g/p, d/n

All of the rods, except for the black one, appear in some pair. When the black is the whole, the denominator of every fraction is 7 (7 white rods make 1 black rod). No sevenths, however, appear on the spinner.

To find the rods they need, children use a variety of methods. Some children start with a single rod and build one-color trains to match. For example, if they choose a brown rod, children find that two purples are the only pair the same length as the brown. Testing three same-color rods does not

represented by a combination of rods of the same color. For example, some of the choices for $\frac{1}{2}$ could be two whites and one purple, two whites and two reds, or one red and one purple.

produce a match, nor does five, six, or seven same-color rods. In fact, only four reds and eight whites match a brown. Thus, children can see that red is one fourth and white is one eighth of brown, respectively.

Other children reverse the process. They put two same-color rods together, then three, then four, and so on, each time looking for one rod of that length. These children find, for example, that two whites are the length of a red, three whites the length of a light green, and four whites the length of one purple, and so the fractions formed are $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, respectively.

Finding non-unit fractions, such as $\frac{2}{3}$ or $\frac{3}{4}$, can require more reasoning. To build $\frac{3}{4}$, children might reason that if white/purple represents $\frac{1}{4}$, they need to find a rod that is the length of three white rods. Or, children might create two trains in the same color, such as one with three red rods and one with four red rods, then search for a single rod to match each train. All of the searching and matching that children do in this activity lays the foundation for understanding equivalent fractions, multiples, and common denominators.

Children can develop strategies for playing this game. Some may make a visual choice and then check by building a train of the smaller rod to match the larger one. Others may find all the possible rod combinations (see chart) to use as a reference during the game. They may make a list, draw pictures, or use an extra set of rods to show all the ways to make each fraction on the spinner. Some children realize that there are lots of white rods and red rods but not as many of the longer rods. Hence, they may try to use the largest rods at the beginning of the game when they are readily available, rather than risk not being able to build some of the fractions later on. This strategy also makes those rods unavailable to opponents, putting them more at risk of losing a turn and therefore collecting fewer rods.

Instead of the fractions suggested, use fractions that are more suitable to your children's experience. For example, you may want to provide them with a spinner labeled $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{3}$, $\frac{1}{4}$.