CHALLENGE MATCH

NUMBER • LOGIC

- Equivalence
- Addition
- Game strategies

Getting Ready

What You'll Need

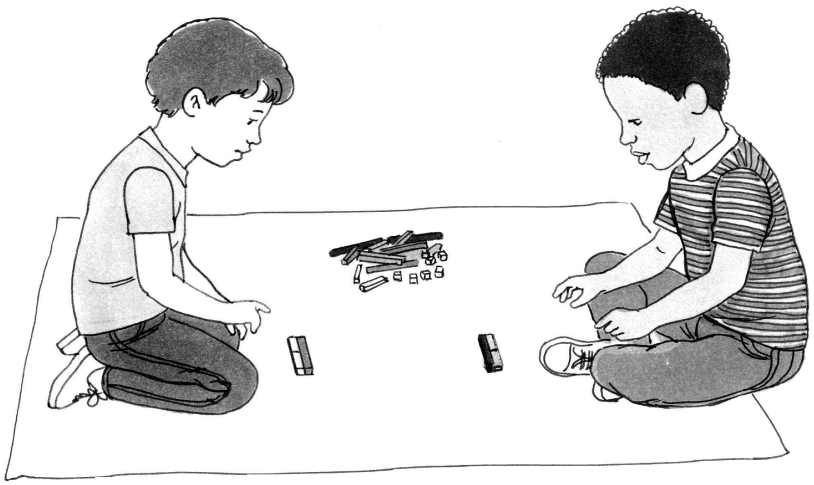
Cuisenaire Rods, 1 set per pair

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

Overview

In this game for two players, children take turns matching two-car Cuisenaire Rod trains to a single rod in an effort to be the last to make a two-car train. In this activity, children have the opportunity to:

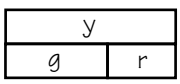
- find equivalent lengths
- see that different pairs of addends can have the same sum
- intuitively use the commutative property of addition
- develop strategic thinking skills

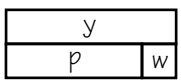


The Activity

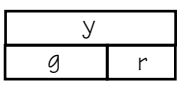
Introducing

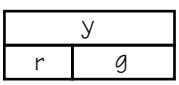
- Show children a yellow rod. Ask them to find two rods that, when put end to end to form a train, are as long as the yellow.
- Establish that there are two different ways to do this.





- Explain that the order of the rods does not make a difference. Show, for example, that a green-red train is the same train as a red-green.





- Tell children that they will be playing a game using two-car trains. Go over the rules for *Challenge Match* given in *On Their Own.*

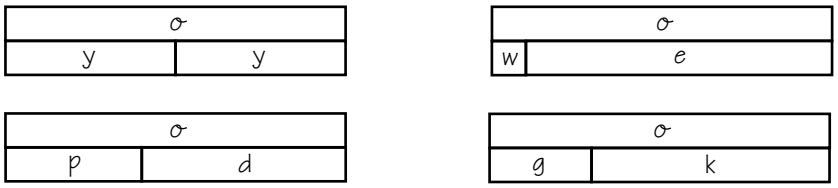
On Their Own

Play *Challenge Match!*

Here are the rules.

1. This is a game for 2 players. The object is to pick the Cuisenaire Rod from the pile that cannot be matched by a 2-car train.
2. The first player chooses any rod except for white and challenges the second player to make a matching 2-car train.

   Here are some ways to match an orange challenge rod:



3. When a match is made, the second player takes the challenge rod and the train and picks the next challenge rod.
4. Players take turns picking. Whoever picks the challenge rod that cannot be matched by a 2-car train wins.

- Play 3 games of *Challenge Match*.
- Be ready to talk about good moves and bad moves.

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:

- How did you decide which rod to give your partner as a challenge?
- Were some rods easier to match than others? Explain.
- Why was the white rod never used as a challenge rod?

Extending the Activity

1. Have children play the game again, this time using two challenge rods of different colors. The challenge in this game is to find a rod that, when added to the shorter of the two challenge rods equals the length of the longer challenge rod.
2. Have children repeat the game, this time finding three-car trains equal in length to the challenge rod.

Teacher Talk

Where's the Mathematics?

Challenge Match is a strategy game that has embedded practice in finding sums of 10 or less. When children select the two-car trains to match a challenge rod, they are practicing addition. The child choosing the challenge rod needs to survey the rods remaining in the pile and select a rod that cannot be matched with any two of the others. Both of these tasks require children to think "What plus what will equal this rod?" which provides readiness for subtraction.

At first, children approach the task of picking a challenge rod randomly, choosing any rod from the pile. Some may pick their favorite color or select a rod because there are fewer of that color in the pile. However, as children gain experience playing this game, they begin to see that some choices are better than others, and they will examine the rods left in the pile before deciding which challenge rod to select. The key to winning this game is selecting the one rod for which there are no addends left in the pile. For example, if all of the red rods have been eliminated, matching the light green rod with a two-car train becomes impossible.

A chart of all the possible two-car trains that can match a challenge rod can provide a concrete representation of what many children learn intuitively while playing this game. Helping to develop such a chart will help children see why eliminating all the red or white rods is a good strategy.

Color of Rod	w	r	g	p	y	d	k	n	e	o
Possible 2-car trains	none	w + w	w + r	w + g r + r	w + p r + g	w + y r + p g + g	w + d r + y g + p	w + k r + d g + y p + p	w + n r + k g + d p + y	w + e r + n g + k p + d y + y

A good way to implement the strategy of eliminating red and white rods is to choose short challenge rods. Short challenge rods have few two-car possibilities and require even shorter rods (such as reds and whites) for the matching trains. Conversely, the longer rods have more pairs of addends so the chances of winning when using a long rod as the challenge rod is not as great. As you discuss the possible two-car trains for each challenge rod, you may also find the opportunity to introduce the terms “greater chance” and “less chance” which will become part of the children’s vocabulary when they study probability.

The order in which the rods are placed in a train is irrelevant in this activity. As a result, children informally learn the commutative property for addition (white, then purple is the same as purple, then white) as they form their trains.

Playing this game can give children needed practice with their addition facts. Children with weak skills will rely on the trial-and-error method of picking rods whose sum is equivalent to the challenge rod. As children continue to search for matches, however, actually measuring with rods will be necessary less often, and children will begin to develop a knowledge of basic addition facts. Even those children with more developed skills can benefit from the reinforcement of making correct choices and having the rods to manipulate to verify the sum.