LAST SURVIVOR

- Counting
- Mental math
- Game strategies

Getting Ready

What You'll Need

Color Tiles, 13 per pair

Overhead Color Tiles and/or Color Tile grid paper transparency (optional)

Overview

In this game for two players, children take turns removing one or two Color Tiles from a group of thirteen tiles in an effort to be the player who takes the last tile. In this activity, children have the opportunity to:

- ◆ develop strategic thinking skills
- ◆ count and develop one-to-one correspondence
- ◆ use mental mathematics to add and subtract

The Activity

If necessary, reduce the number of Color Tiles to fit the needs and abilities of your children.

Introducing

- ◆ Tell children that they will be playing a game called *Last Survivor*.
- ◆ Distribute Color Tiles to each pair of children and explain the game rules given in *On Their Own*.
- ◆ Demonstrate by playing a partial game of *Last Survivor*, either by yourself or with a volunteer.

On Their Own

Play *Last Survivor!*

Here are the rules.

1. This game is for 2 players. The object is to be the player who takes the last tile.

2. Players lay out 13 Color Tiles.

3. Players take turns removing 1 or 2 tiles at a time. No player may skip a turn.

4. The player who takes the last tile is the *Last Survivor* and wins the game.

- Play several games of *Last Survivor*.

- 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 what moves to make?
- Did you find any strategies that worked? Explain.
- Does it matter who goes first? Explain.
- Is there a way to win every time?
- What would happen if you changed the number of tiles you started with?

Drawing and Writing

Have children use pictures and words to show a strategy for winning *Last Survivor*.

Extending the Activity

1. Repeat the activity but change the number of tiles children start with.

2. Repeat the activity but change the number of tiles children may take in a turn.

3. Have children play the game again, only this time the person left with the last tile loses the game.

Where's the Mathematics?

This game helps children develop, analyze, and compare strategies designed to produce a given outcome in a game situation. Most children at first play the game without any strategy in mind. Some will continue this way for a very long time. Other children may, after a while, begin to test a variety of strategies. A child may attempt a relatively random strategy, explaining, for example, that to win, "You should play any number until there are less than five left and then play very carefully."

Children sometimes test strategies that sound systematic but that are not based on an analysis of the situation. Copying what the other player does or thinking that the first person to play will always be the winner or the loser are examples of this. Children may develop a strategy, apply it successfully once, and be convinced that it will always work. With enough experience of playing this and other strategy games, children come to see that one success is not always enough to judge the validity of a strategy.

The key to winning in the game *Last Survivor* is for a player to control the number of tiles left on the table. The player with the advantage is the one who removes tiles so that a multiple of three (three, six, nine, or twelve) tiles is left on the table. Here is a scenario of how Player A, the player who goes first, can take control of the game and win by keeping track of sums of 3.

Player A takes one tile, leaving 12 (a multiple of 3) on the table. Then:

If player B takes	Player A takes	Sum of moves	Tiles left
1	2	1 + 2 = 3	9
2	1	2 + 1 = 3	6
2	1	2 + 1 = 3	3
1	2	1 + 2 = 3	0

If Player A goes second, he or she has to look for the earliest opportunity to leave either nine, six, or three tiles on the table. If Player B begins by taking two tiles, leaving eleven, Player A removes two and is in control again because nine tiles remain. If Player B begins the game by removing one, leaving twelve, there is no way Player A can get to nine tiles, so he or she has to wait. Taking just one tile leaves an opportunity for Player B to take just one also. If this happens, then Player A can regain control by taking one tile, leaving nine on the table. If this does not happen, Player A has to be patient and hope to regain control by the time he or she reaches six tiles. If both players know the strategy, the first player always wins.

As children describe their strategies, they should also try to explain how they arrived at them. Some children may have difficulty articulating what they are thinking. What is most important is to slowly develop the ability to reason out a situation and think ahead to predict the consequences of a particular action. If some children cannot come up with a winning strategy, it can be useful for them to listen to what others say and then try to implement the strategy they heard.