

ESTIMATION JARS

NUMBER • MEASUREMENT

- Counting
- Estimation

Getting Ready

What You'll Need

Color Tiles, about 30 per pair

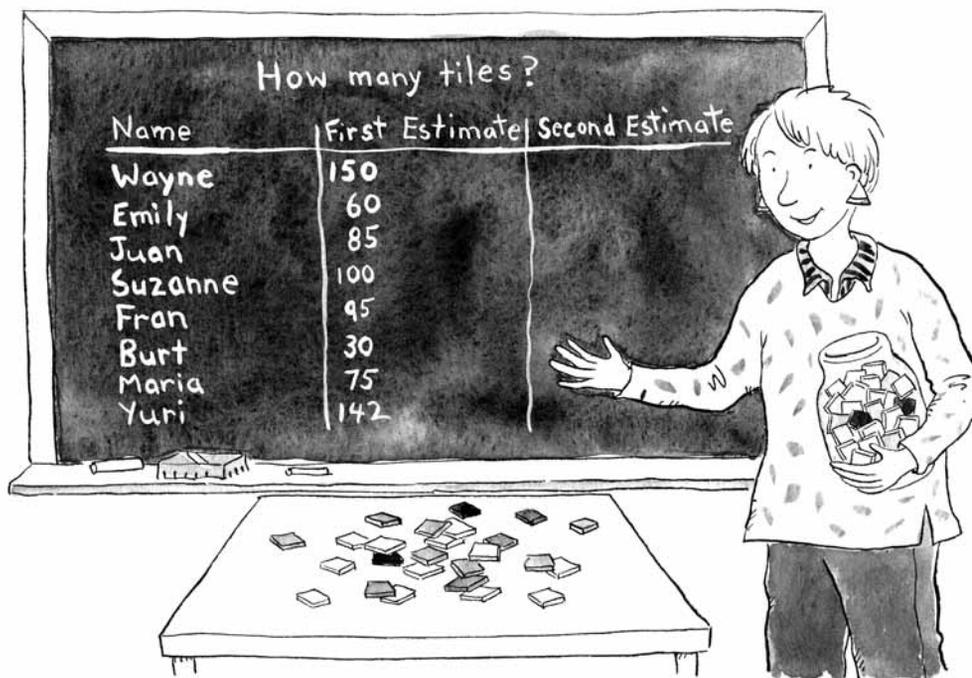
Plastic containers of different sizes,
3 per pair

Rubber bands, 3 per pair

Overview

Children estimate, then count, the numbers of Color Tiles that will fill a variety of containers. In this activity, children have the opportunity to:

- ◆ make and revise estimates
- ◆ use the concepts of grouping and place value



The Activity

In On Their Own, offer the choice of counting beyond ones only to children who are ready for this.

Introducing

- ◆ Hold up a container filled to the top with Color Tiles. Ask children how many tiles they think are in the container. List children's names and guesses, each time asking children to explain why their guesses, or estimates, make sense.
- ◆ Begin counting the contents of the container aloud. Halfway through, ask children whether they would like to change their estimates and, if so, why. Record children's new estimates next to their original ones.
- ◆ Finish counting the tiles and invite children to compare their estimates with the actual number of tiles.

On Their Own

Can you estimate how many Color Tiles are in a container?

- Work with a partner. Take a plastic container. Put a rubber band around the halfway point.
- Fill the container to the top with Color Tiles.
- Each of you makes your best guess, or estimate, of how many tiles the container holds. Record your estimates.
- Now check your estimates by counting the tiles.
 - ◆ First, spill out about *half* the tiles.
 - ◆ Then decide how you will count them—by 1s, 2s, 5s, or 10s. Stack the tiles in groups of that number. (If you will count by 1s, each pile should have 1 tile.)
- When you have counted about half the tiles, look at your estimate. If you want to change it, record your *second estimate* next to your first.
- Now count all the tiles. Record the number next to your estimates and draw a box around it.
- Repeat the activity with 2 different containers.
- Be ready to talk about how you made your estimates.

The Bigger Picture

Thinking and Sharing

Have children talk about what happened as they worked through the activity.

Use prompts such as these to promote class discussion:

- ◆ How did you make your first estimate?
- ◆ Did you change your estimate after you counted half the tiles? Why or why not?
- ◆ How did you count? What do you think was the most helpful way to count? Why do you think so?
- ◆ Was it easier to estimate when you worked with the second or third container? Explain.

Extending the Activity

Have children repeat the activity using Snap™ Cubes instead of Color Tiles.

Teacher Talk

Where's the Mathematics?

Activities involving estimation help young children to develop good number sense and prepare them to think about whether their answers are reasonable or not. Children must learn that an estimate is not just a wild guess. Having children count to check their guesses for about half the Color Tiles and allowing them to revise their estimates if they want to will help children learn that estimates are related to prior knowledge and to benchmarks. Having children share the strategies that they used for making their estimates also helps educate other children to the nature of estimates.

When asked for their initial estimate, some young children may look at the container and think, "It looks pretty big so I'll name a big number like 1,000." Then, as they count about half the tiles and find there are 46, which is no where near 1,000 they should realize that their first guess was not a good one. Children may now reason, "I have about as much room left to go as I have already filled. That means that I can probably put another 46 tiles in the container." At this point, children may simply conclude that the container holds about $46 + 46$, or 92, tiles. Those who feel comfortable with the idea of estimating may use rounding in an informal way to arrive at an estimate more quickly. Some children may reason, "Since 46 is almost 50, about $50 + 50$, or 100, should fill the container." Eventually, children may generalize that they can double the number they get after counting halfway.

Children may use what they already know about the number of tiles they counted in one container to estimate the number in another. Their success in doing so will indicate how well they can judge the relative sizes of the container. For example, if children have determined that the first container below holds 100 tiles, they may estimate that the second container holds



more—perhaps twice as many—simply because it is about twice as tall as the first. Children who also take into consideration that the second container is about half as wide as the first may decide that these two changes in dimensions cancel each other out and estimate that the second container holds about the same amount as the first. (In fact, if both shapes are cylinders and the second is twice as tall but half as wide as the first, the second should hold about half as many tiles as the first.) In using what they know about the tile capacity of one container to estimate the tile capacity of another, children use spatial reasoning as they are informally exposed to the idea of volume.

At first, some children may not understand that an estimate is an inexact answer. They may think that if they estimate 44 and the actual count is 41, then their estimate is wrong. Teaching children to phrase their estimates as “about 40” and later, when they have become more proficient at making estimates, as “between 40 and 45,” is likely to encourage them to be risk-takers, willing to make an educated guess.

Children can also come to appreciate the inexactness of an estimate when they compare the number of tiles different pairs of children were able to pack into the same container. Some children may pack the Color Tiles as neatly and closely as possible; others may just spill a handful of Color Tiles into the container. Even if two pairs of children use the same method for putting their tiles into the container, their final answers are apt to come out close together without being exactly the same.