

What Is One Half?

At the beginning of this unit on fractions, the teacher asks students what they know about one half. Students have many ideas, given their experiences with time, length, shapes, and other fractions that appear in their daily lives. They refer to representations they have used throughout the year, such as the number line and the 100 chart, as well as concepts they have worked on, such as symmetry.

Teacher: Today we are starting a study of fractions. What can you tell me about one half?

Anita: If you cut something down the middle, then it is a half of something.

Tia: Each side of it is a half.

Teacher: Anita, help me think about an example. What could you cut in half?

Anita: A square.

Alberto: And then you'd have 2 rectangles.

Leo: Or 2 triangles.

Teacher: Do you have any other ideas about one half?

Esteban: One day we were playing a game of guess how many fingers I have behind my back and I thought of just putting half my finger behind my back so I didn't have one or zero; I had half. I put half my finger up so only half of it was showing.

Melissa: If you have two of the same thing and you put them together, then you won't have any more halves.

Teacher: Give me an example, Melissa.

Melissa: If you have 2 pieces of a circle and you put them together, you won't have any halves, just a whole circle.

Teacher: Any other ideas about half?

Juan: It's sort of like a clock. It's like 30 minutes.

Teacher: Can you give me the whole idea there? Tell me more about 30 minutes.

Juan: Half an hour and half an hour make an hour.

Teacher: So if you look at the big hand on the clock, start at the 12, and then move halfway around the clock to the 6, that's equal to half an hour. It's also half of the clock, or half of the circle.

Esteban: So that's why they call it half an hour!

Chen: A connection to Juan's idea is that you can also do that on the number line. If you go to 30 on a number line and add another 30 it would be like Juan's.

Teacher: What would 30 on the number line be half of?

Chen: 60.

Henry: If something's whole, like a butterfly, and you cut it right in the middle, it has equal things on both sides. It's symmetrical. And if you put it back together it will make the butterfly.

Gregory: If you cut the 100 chart between the 50 and the 60 you would get 50 and 50 and that would be half of the 100 chart.

Teacher: Does anyone know how we would write *one half* in words or in symbols?

Melissa: You would write a 1 and then a line below and then a 2 at the bottom.

Simon: No, you would do a slash and then a 2.

Chen: Yeah, that's what it looks like on a measuring cup or when you're making a cake.

Jeffrey: You can write it as either.

Teacher: Jeffrey's right; you can write it either way [writes both ways on the chart paper and then writes *one half* in words]. Is *one half* the same as *one and a half*?

Paige: No, because an hour and a half is a whole hour and a half.

Teacher: We've been talking about cutting things. If I do this (rip a piece of paper into 2 pieces approximately $\frac{1}{4}$ and $\frac{3}{4}$ of the original piece of paper), does it make two halves?

Luis: No.

Teacher: Why not, Luis?

Luis: Because one of them is a strip and one of them is a square. They need to be the same size, so they have to be equal.

Teacher: Right, so 2 halves have to be 2 equal parts.

Simon: Like half a mile.

Teacher: Right. It's 1 mile split into 2 equal pieces, and that's why 30 minutes is half an hour. It's 60 minutes split into 2 equal pieces. Do you have to rip things into pieces to get half? Is there another way to get half?

Leigh: There has to be an answer because you're asking us!

Teacher: Imagine that this (a pad of self-stick notes) is a deck of cards. If there are 10 cards here, how would I make half? Would I rip all of the cards?

Melissa: No, you have to have the same amount. So you'd each get 5 cards.

As students in this class offered their ideas about one half, the teacher frequently asked them to elaborate, requesting more detail or a specific example. When Juan introduced 30 minutes as an example of one half, the teacher connected his comments with the ideas the class had been working on in "What Time Is It?". As the discussion continued, the teacher posed questions to find out what students already knew about writing fractions and to introduce the idea of half of a set of discrete objects (half of a deck of cards).