Understanding Fractions
A Closer Look at the Video

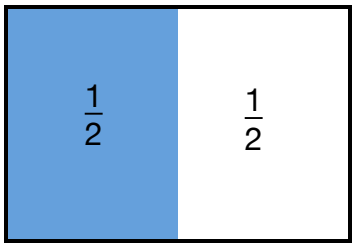
After watching the *Understanding Fractions* video, make sense of the mathematics by taking a closer look at the problem situations and solutions. The video illustrates four key points using two different types of representations. The key points are represented by using a wall, an area model, and by using cans of paint, a set model. Use the comments and questions in bold to help you investigate the four key points and develop a deep understanding of fractions.

The following four key points are important to understanding fractions.

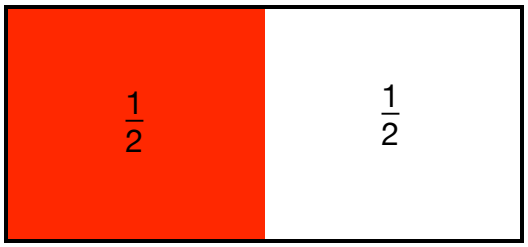
Key Point 1: You must know the size of the unit or the size of the whole.
Key Point 2: You must have equal-sized parts.
Key Point 3: You must know the number of equal-sized parts in the unit.
Key Point 4: You must know the number of equal-sized parts being considered.

<u>Key Point 1</u>: You must know the size of the unit or the size of the whole.

If Ed paints one half of a small wall and Michelle paints one half of a large wall, have they painted the same amount? Explain your answer. No, the sizes of the walls are different so these are different-sized wholes. One half of Ed's wall does not equal one half of Michelle's wall because the units are different sizes.



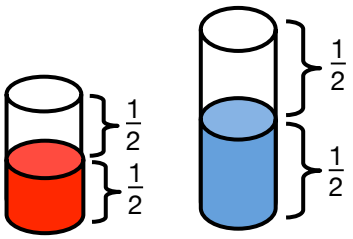
Ed's Wall



Michelle's Wall

If Paco used one-half can of red paint and one-half can of blue paint, does it mean he used the same amount of each color? What else do you need to know to answer this question? It is important to know the size of the cans. If the cans of paint were the same size, Paco used the same amount of each color. If the cans of paint were different sizes, Paco did not use the same amount of each color. This is why it is important to know the size of the unit or the size of the whole when working with fractions.

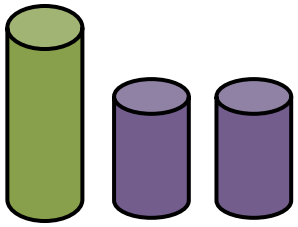
One half of a small can does not equal one half of a large can, because the units are different sizes.



***Key Point 2:* You must have equal-sized parts.**
The following wall does not show halves because the two parts are not equal.

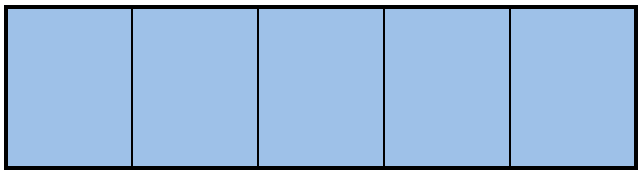
If Paco emptied one large can of green paint and then emptied two small cans of purple paint, is two thirds of the paint he used purple? Explain your answer. No, the three cans of paint were not the same size, so Paco did not have three equal-sized parts. The cans of purple paint were the same size, but the can of green paint was larger. Therefore the three parts used in this problem were not equal-sized and cannot be expressed as a single fraction.

Two thirds of the paint is not purple, because the paint is not divided into three equal-sized parts.

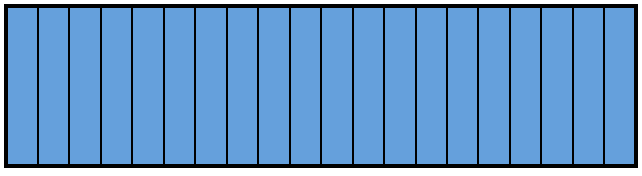


***Key Point 3:* You must know the number of equal-sized parts in the unit.**
The denominator tells you the number of equal-sized parts in the unit, or in one whole. We could divide a wall into two equal parts to show halves, five equal parts to show fifths, or even 20 equal parts to show twentieths.

$\frac{\text{numerator}}{2}$



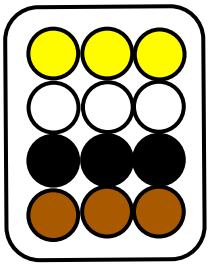
$\frac{\text{numerator}}{5}$



$\frac{\text{numerator}}{20}$

What happens to the size of each part as you divide a wall into more equal-sized parts? As you divide the same size whole (the wall) into more equal-sized parts, the parts become smaller. The larger the denominator the smaller each part. One half is greater than one fifth or one twentieth.

Paco bought a case of spray paint containing 12 cans.



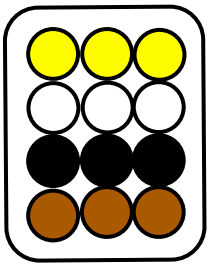
How many cans are in one twelfth of the case?
One can, each can is one twelfth of the case.
How many cans are in one fourth of the case?
Three cans, each row is one fourth of the case.
How many cans are in one third of the case?
Four cans, each column is one third of the case.
How many cans are in one sixth of the case?
Two cans, each half-column represents one sixth of the case.

What happens to the size of each part as you divide the case into more equal-sized parts? When the case is divided into more equal-sized parts, the number of cans in each part decreases. For example, when the case is divided into two equal-sized parts, there are six cans in each part. But when the case is divided into more equal-sized parts, four, for instance, then there are only three cans in each part. The larger the denominator the smaller each part.

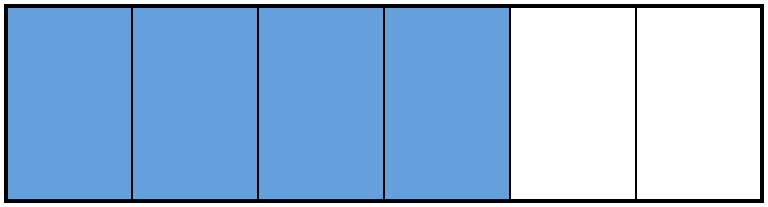
What part of the fraction tells you the number of equal-sized parts in the unit or in one whole? The denominator tells you the number of equal-sized parts in the unit or the whole.

<u>Key Point 4:</u> You must know the number of equal-sized parts being considered.
The numerator tells you the number of equal-sized parts being considered.
If three of the 12 cans of paint in the case are yellow, what fraction of the case is yellow?

Three twelfths of the paint in the case is yellow. Three is the number of cans of yellow paint being considered and 12 is the number of cans of paint in the whole case.



If we divide a wall into six equal sections and then paint four of the six sections, what fraction represents how much we painted? Explain your answer.



$\frac{4}{6}$ $\frac{\text{numerator}}{\text{denominator}}$

Four sixths of the wall would be painted. The number of sections being painted is four (the numerator of the fraction) and the total number of sections the wall is divided into is six (the denominator of the fraction).

What part of a fraction tells you the number of equal-sized parts being considered?
The numerator tells you the number of equal-sized parts being considered.

It is important to understand each of the key points and a variety of ways to represent fractions. We used a wall as an area model and cans of paint as a set model. You could also use rulers to show a linear model and measuring cups to show a volume model.