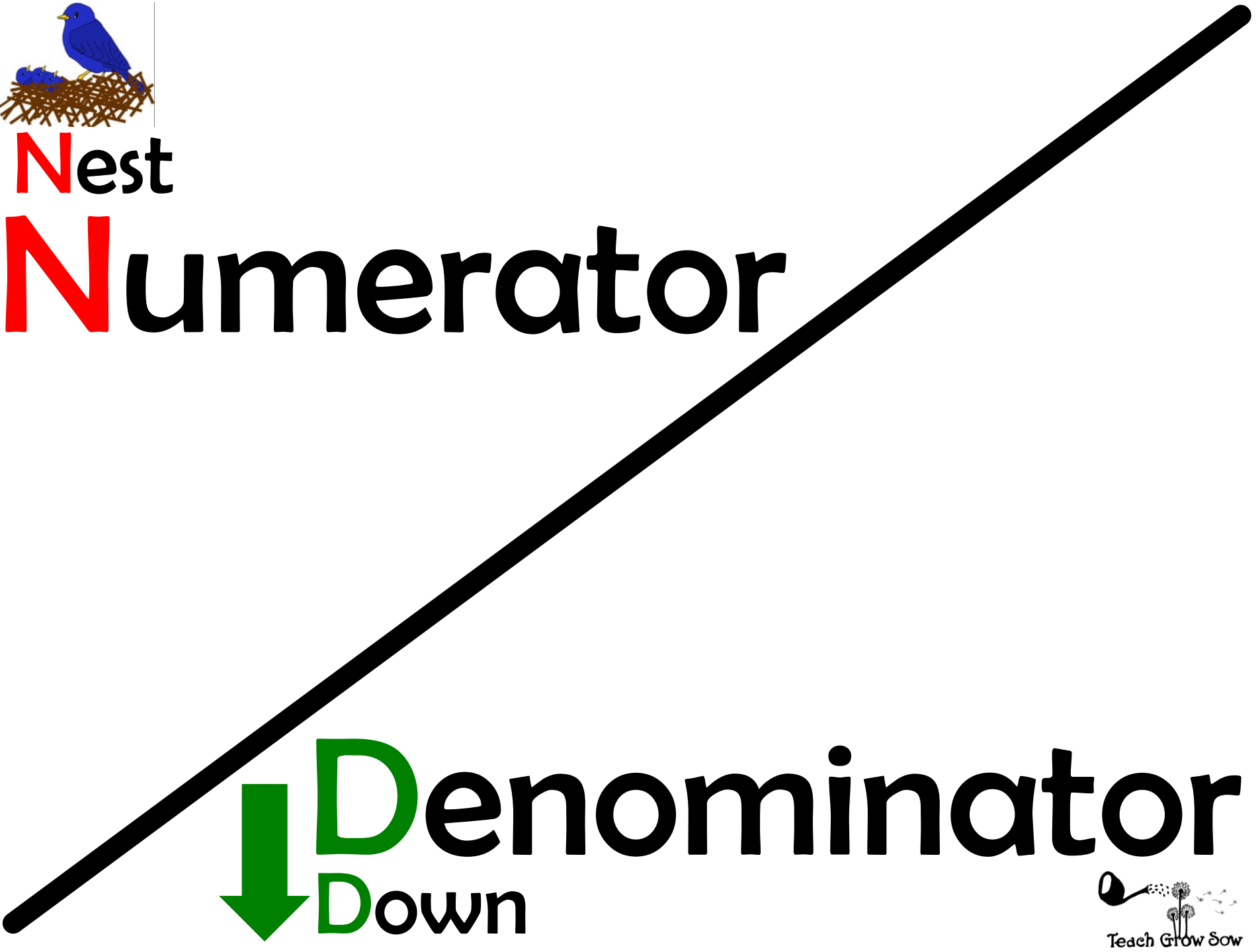




Nest

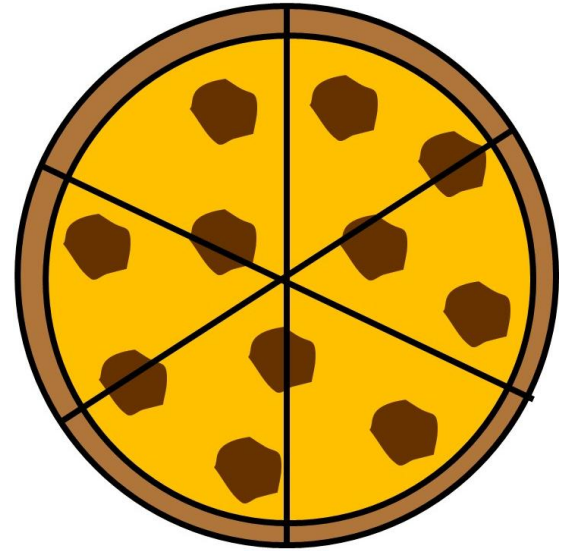
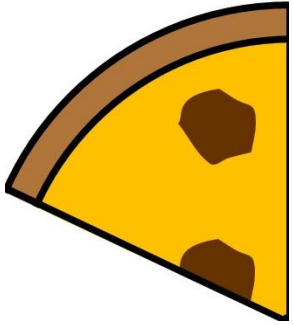
Numerator



 **D**enominator
Down

Nom, Nom, Nom!

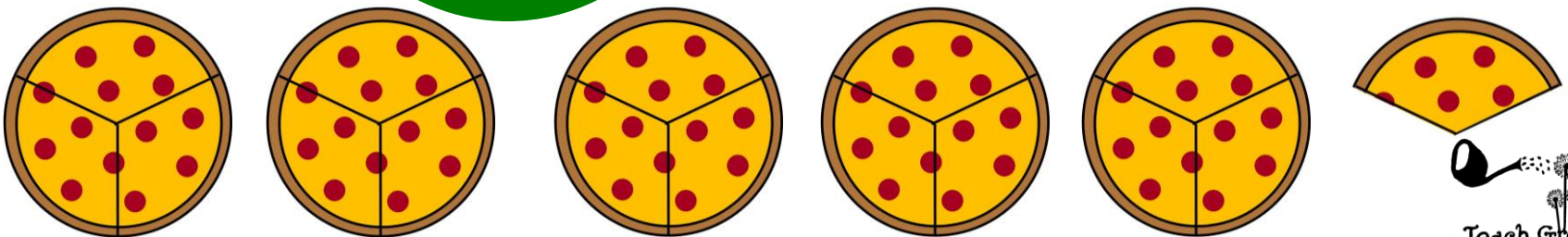
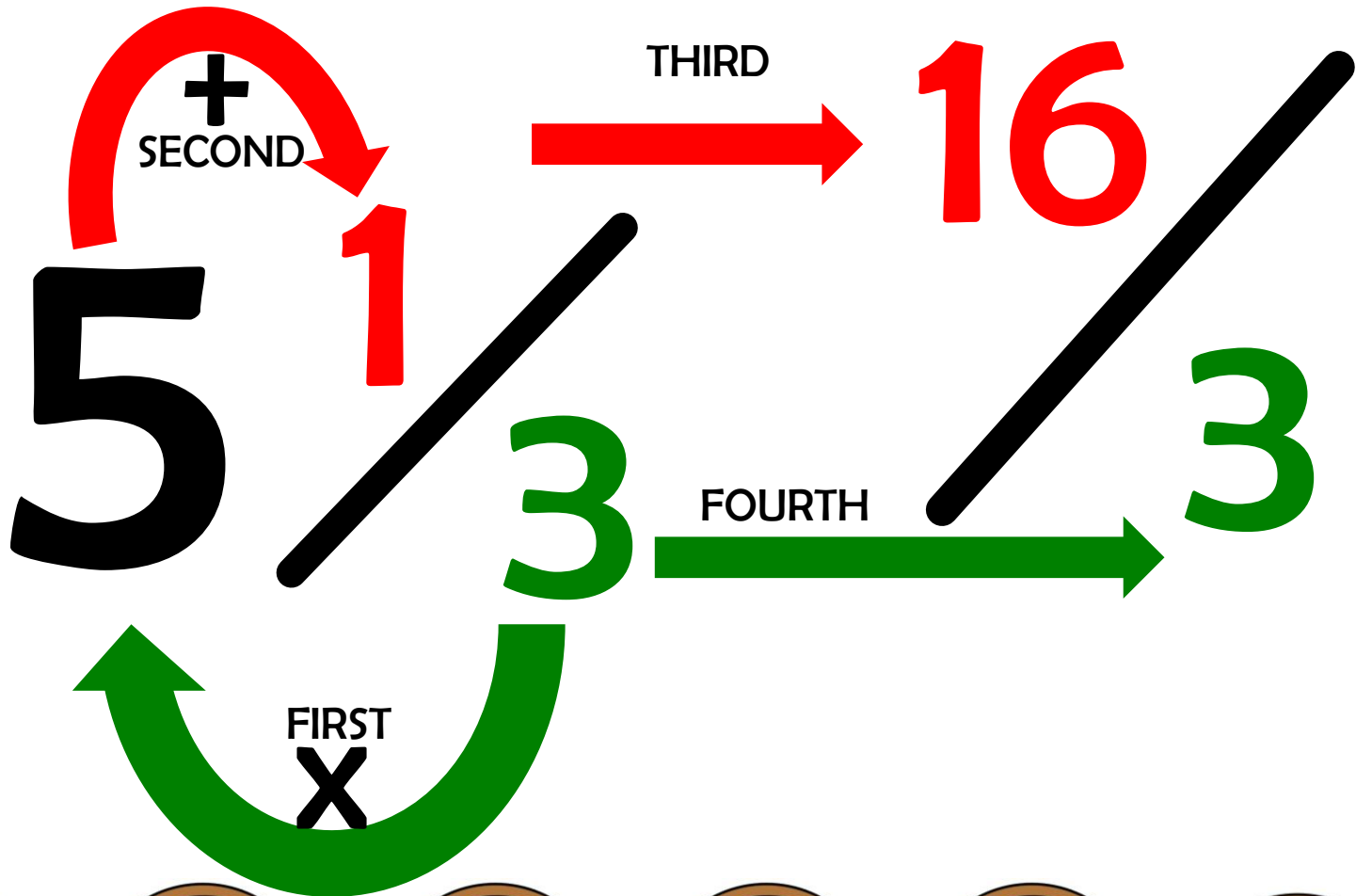
Numerator



Denominator
↓
Deep **D**ish

To teach the terms Numerator and Denominator, have students make a whole pizza (see Pizza Fractions pages) and say, “I have # slices of Deep-Dish Pizza. I’m going to eat # slice(s). Nom, nom, nom!” as they pretend to eat it. Remind them that Numerator starts with an N because it’s the part you Nom, Nom, Nom. Denominator starts with a D because it’s the Deep-Dish Pan you’re taking slices out of.

Mixed Number \rightarrow Improper Fraction



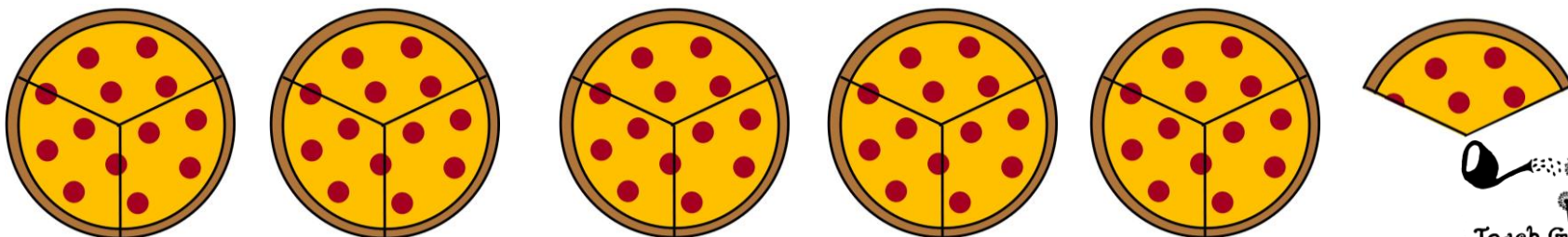
Improper Fraction \rightarrow Mixed Number

$$\frac{16}{3}$$



$$\begin{array}{r} 5 \\ 3 \overline{) 16} \\ \underline{-15} \\ 1 \end{array}$$

The diagram shows the conversion of the improper fraction $\frac{16}{3}$ to the mixed number $5\frac{1}{3}$. A long division process is shown where 3 divides into 16 to get 5 with a remainder of 1. A green bracket above the division indicates that the quotient 5 is written above the line, and the remainder 1 is written to the left of the decimal point. A red arrow points from the remainder 1 to the numerator of the fractional part, and a green arrow points from the divisor 3 to the denominator of the fractional part, resulting in the mixed number $5\frac{1}{3}$.



Simplest Form = Smallest Fraction #s

Find the biggest number that both the numerator and denominator can be divided by:

10 & 12 can both be divided by 2.



$$\frac{10}{12} \div 2 = \frac{5}{6}$$

4 & 8 can both be divided by 4.

$$\frac{4}{8} \div 4 = \frac{1}{2}$$

To find the Simplest Form, find each number's Greatest Common Factor

(The biggest number that can evenly divide into both of them.)

18 /	1, 2, 3, 6, 9, 18
24 /	1, 2, 3, 4, 6, 8, 12, 24

6 is the greatest number that can evenly divide both 18 & 24

$$\begin{array}{r} 18 \\ \hline 24 \end{array} \div 6 = \begin{array}{r} 3 \\ \hline 4 \end{array}$$

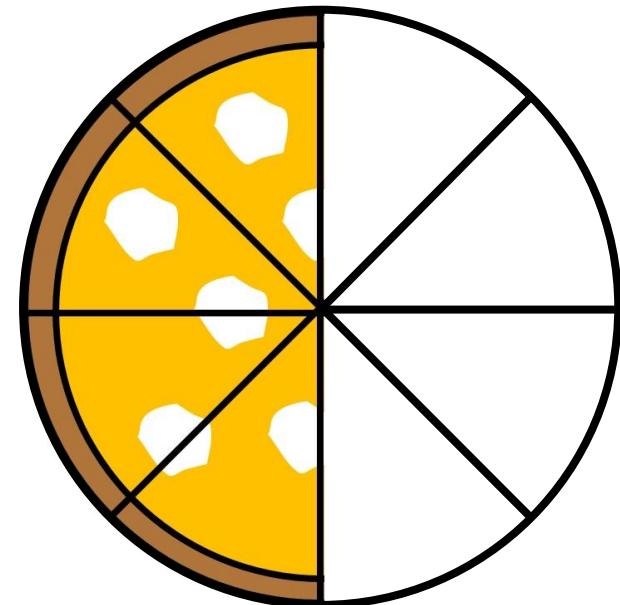
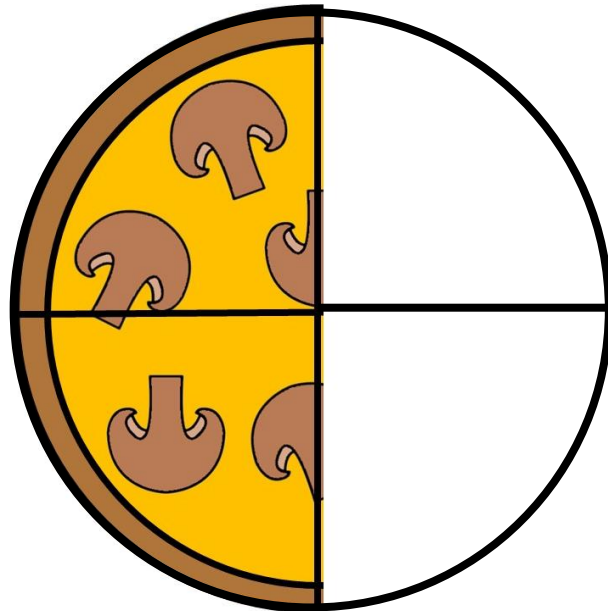
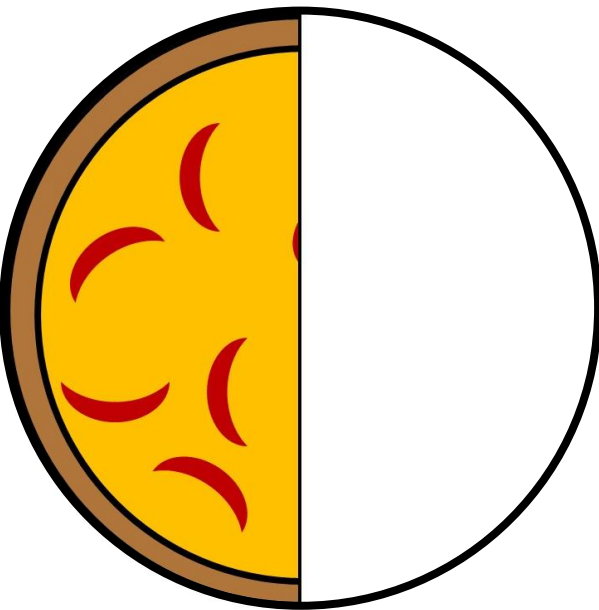
Equivalent Fractions

Equal the same amount of pizza!

$$\frac{1}{2}$$

$$\frac{2}{4}$$

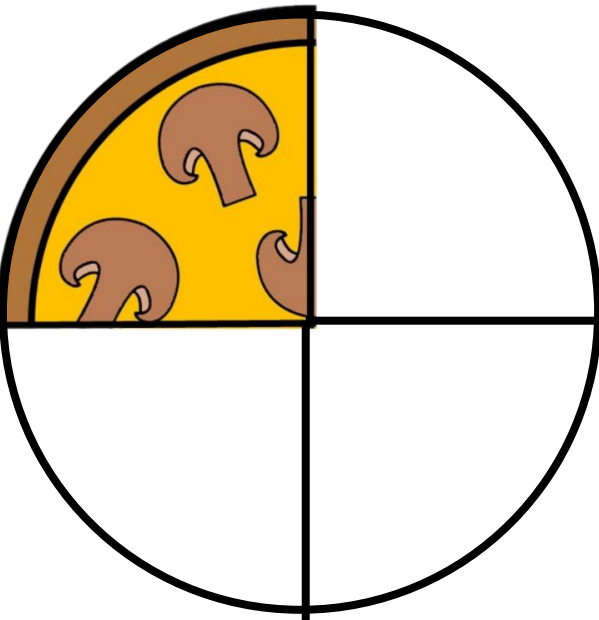
$$\frac{4}{8}$$



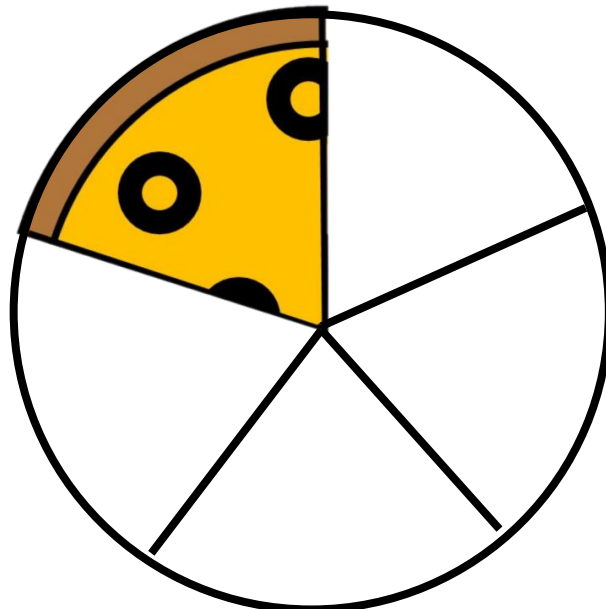
Unit Fractions

Are just one slice of pizza!

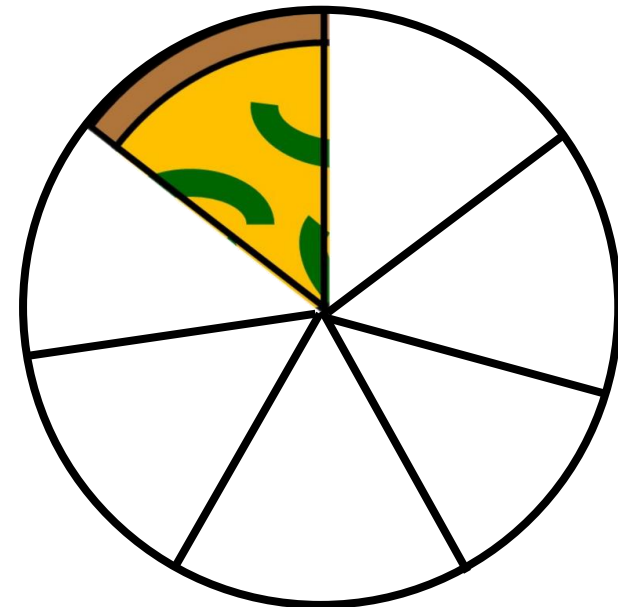
$$\frac{1}{4}$$



$$\frac{1}{5}$$



$$\frac{1}{7}$$



Like Fractions

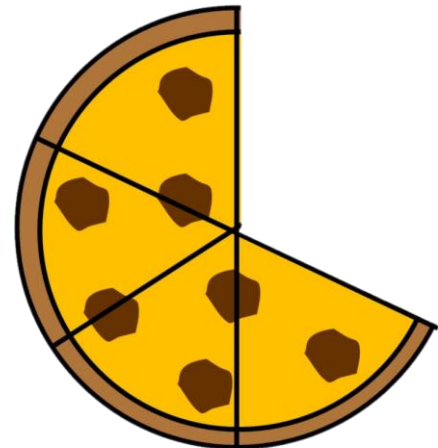
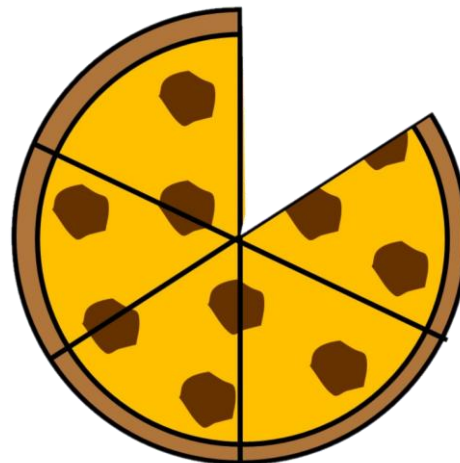
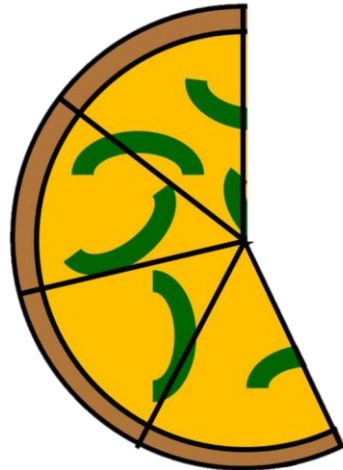
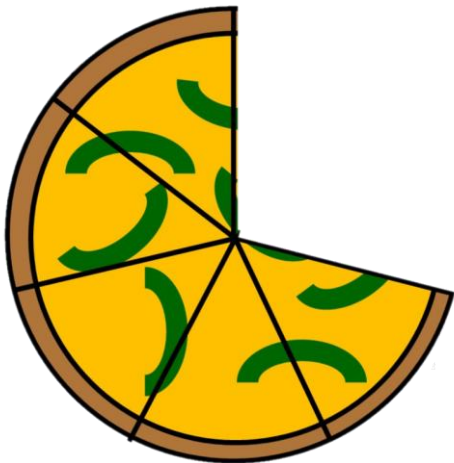
Come from the same pizza!

$$\frac{5}{7}$$

$$\frac{4}{7}$$

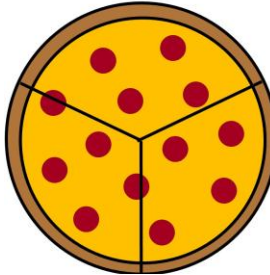
$$\frac{5}{6}$$

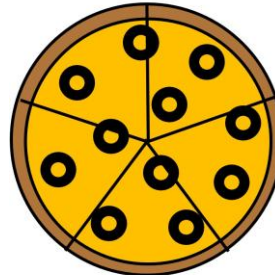
$$\frac{4}{6}$$

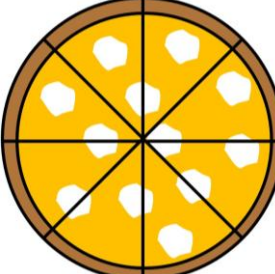


Any Fraction With the Same Numerator and Denominator Equals 1



$$\frac{3}{3} = 1$$
A circular pizza divided into three equal slices. Each slice is yellow with three red pepperoni toppings. The entire pizza is shown, representing the whole.

$$\frac{5}{5} = 1$$
A circular pizza divided into five equal slices. Each slice is yellow with one black pepperoni topping. The entire pizza is shown, representing the whole.

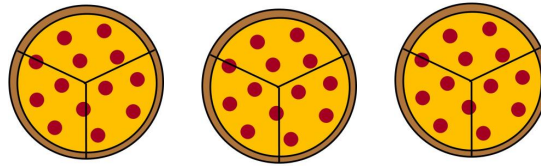
$$\frac{8}{8} = 1$$
A circular pizza divided into eight equal slices. Each slice is yellow with one white pepperoni topping. The entire pizza is shown, representing the whole.

Any Whole Number Can Be a Fraction

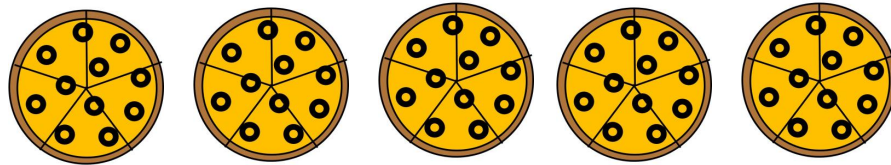


Just place it in the numerator with a one in the denominator!

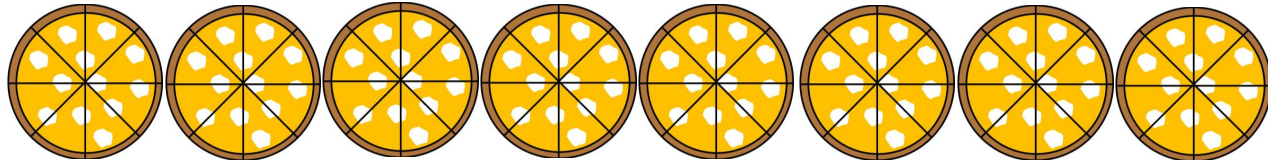
3 → $\frac{3}{1}$



5 → $\frac{5}{1}$



8 → $\frac{8}{1}$



Reciprocals

Are just the fraction flipped upside down!

$$\frac{5}{7} \rightarrow \frac{7}{5}$$

$$\frac{2}{3} \rightarrow \frac{3}{2}$$

$$8 \rightarrow \frac{8}{1} \rightarrow \frac{1}{8}$$

To Make Like Fractions

Find the smallest multiple shared by all denominators. 3, 4 and 2 can all go into 12. Whatever you have to multiply the denominator by to make that number, multiply the numerator by it also.

$$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$$

$$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$$

$$\frac{1}{2} \times \frac{6}{6} = \frac{6}{12}$$

Adding & Subtracting

Only add & subtract like fractions.

The denominator stays the same!

$$\frac{5}{7} + \frac{4}{7} = \frac{9}{7} \text{ or } 1\frac{2}{7}$$

$$\frac{5}{7} - \frac{4}{7} = \frac{1}{7}$$

Subtracting Mixed Numbers

First, multiply to make the fractions alike. Then, borrow from the whole number to make a fraction that can subtract.



Diagram illustrating the steps to subtract $1\frac{6}{7}$ from 3 .

Step 1: Convert the whole number 3 into a mixed number: $3 = 2\frac{7}{7} + 1\frac{7}{7}$. (Note: The original image incorrectly shows $2\frac{7}{7}$ as $2\frac{7}{7}$ with a red 7, which is a typo for $2\frac{7}{7}$.)

Step 2: Borrow from the whole number 2 to make a fraction with denominator 7: $2 = 1\frac{7}{7} + 1$. (Note: The original image incorrectly shows $1\frac{7}{7}$ as $1\frac{7}{7}$ with a red 7, which is a typo for $1\frac{7}{7}$.)

Step 3: Borrow from the whole number 1 to make a fraction with denominator 7: $1 = \frac{7}{7} + 0$. (Note: The original image incorrectly shows $\frac{7}{7}$ as $\frac{7}{7}$ with a red 7, which is a typo for $\frac{7}{7}$.)

Step 4: Add the fractions: $2\frac{7}{7} + 1\frac{7}{7} + \frac{7}{7} = 2\frac{11}{7} + 1$. (Note: The original image incorrectly shows $2\frac{11}{7}$ as $2\frac{11}{7}$ with a red 11, which is a typo for $2\frac{11}{7}$.)

Step 5: Subtract the mixed numbers: $2\frac{11}{7} + 1 - 1\frac{6}{7} = 1\frac{5}{7}$.

Multiplying Fractions

Multiply the numerators by the numerators & the denominators by the denominators.

$$\frac{3}{4} \times \frac{4}{5} = \frac{12}{20}$$

$$\frac{5}{7} \times \frac{3}{8} = \frac{15}{56}$$

Dividing Fractions

Flip the divisor upside down & multiply!

$$\frac{4}{5} \div \frac{3}{8}$$

↓

$$\frac{4}{5} \times \frac{8}{3} = \frac{32}{15} \text{ or } 2\frac{2}{15}$$

Multiplying and Dividing Fractions by a Whole Number

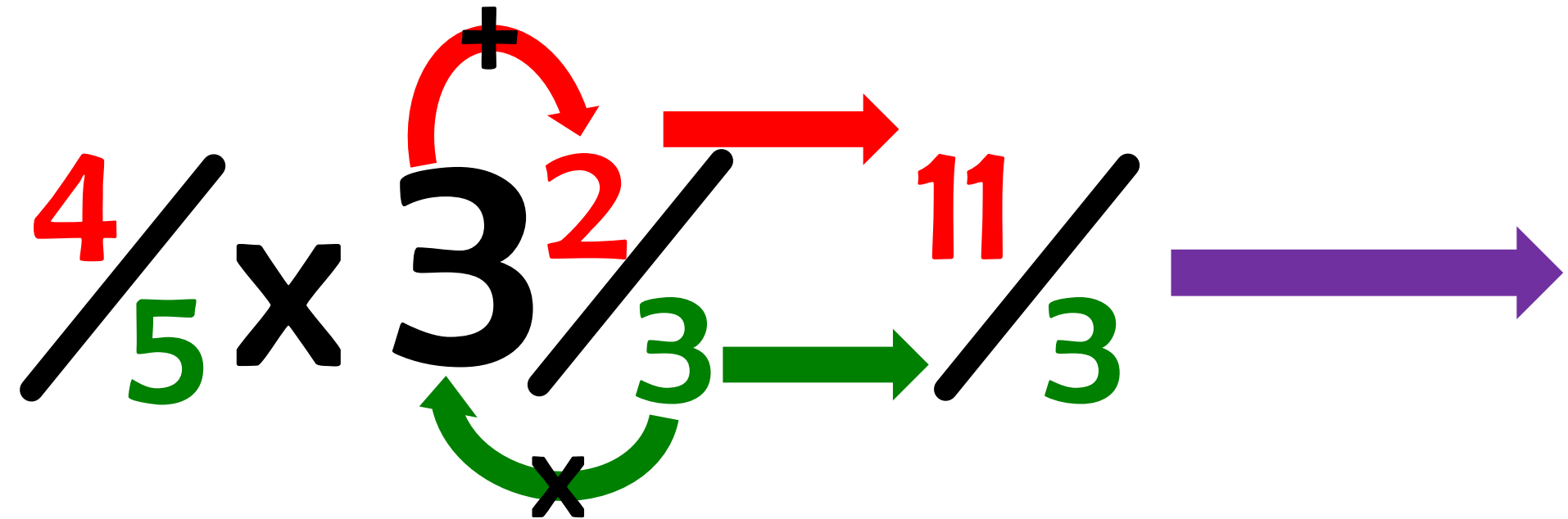
Turn the whole number into a fraction by placing a one in the denominator.

$$\frac{4}{5} \div 3 \rightarrow \frac{4}{5} \div \frac{3}{1} \rightarrow$$

$$\frac{4}{5} \times \frac{1}{3} = \frac{4}{15}$$

Multiplying Fractions by a Mixed Number

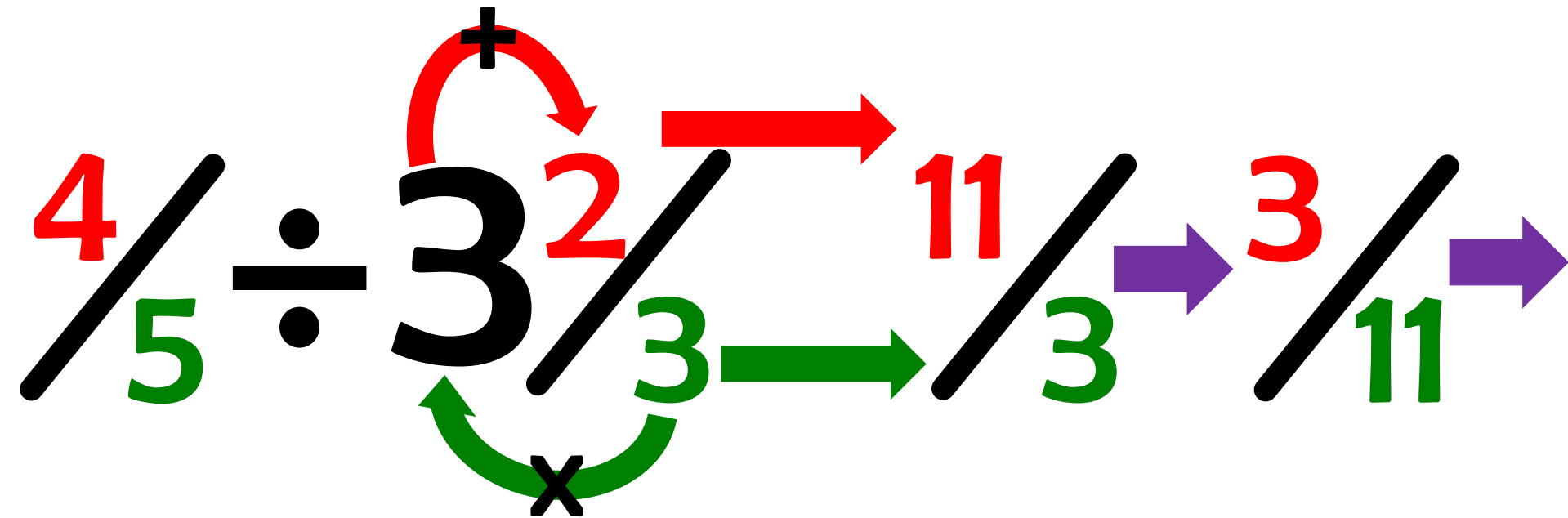
Turn the mixed number into an improper fraction.


$$\frac{4}{5} \times 3\frac{2}{3} \rightarrow \frac{11}{3}$$

$$\frac{4}{5} \times \frac{11}{3} = \frac{44}{15} \text{ or } 2\frac{14}{15}$$

Dividing Fractions by a Mixed Number

Turn the mixed number into an improper fraction, then flip it.



The diagram illustrates the conversion of a mixed number to an improper fraction and its reciprocal. It starts with the division $\frac{4}{5} \div 3\frac{2}{3}$. A red arrow with a '+' sign shows the whole number 3 being added to the numerator 2, resulting in 11. A red arrow then points to the improper fraction $\frac{11}{3}$. A green arrow with an 'x' sign shows the denominator 3 being multiplied by the numerator 11, resulting in 33. A green arrow then points to the reciprocal $\frac{3}{11}$. Purple arrows indicate the final step of the division process.

$$\frac{4}{5} \times \frac{3}{11} = \frac{12}{55}$$

Dividend
Divisor

Divisor) Dividend

Dividend ÷ Divisor

If multiplying a # by a fraction, the quotient will be less than the #.

$$\frac{5}{7} \times \frac{2}{3} < \frac{5}{7}$$
$$7 \times \frac{2}{3} < 7$$

If multiplying a # by an improper fraction, the quotient will be greater than the #.

$$\frac{5}{7} \times \frac{4}{3} > \frac{5}{7}$$
$$7 \times \frac{4}{3} > 7$$

If multiplying a # by a fraction with the same numerator and denominator, the quotient will be the same as the #.

$$\frac{5}{7} \times \frac{4}{4} = \frac{5}{7}$$
$$7 \times \frac{3}{3} = 7$$