

LO: Students will be able to understand and interpret stoichiometric ratios.

DOL: Students will correctly use stoichiometric ratios at least 4/5 times.

**Stoichiometry:** the relationship between the relative quantities of substances taking part in a reaction or forming a compound, typically a ratio of whole integers.

Essentially, it is a way of using MOLAR RATIOS to determine how much of each reactant and product is involved with a chemical reaction.

Using Ratios to determine quantities:

Let's define a "person" as 2 legs, 2 arms, 1 nose, and 10 fingers.

These ratios can be described as

leg : arm : nose : finger

2 : 2 : 1 : 10

This person could also be written as an equation:

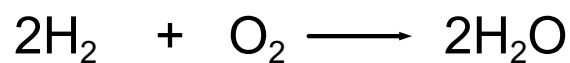
$2 \text{ arm} + 2 \text{ leg} + 1 \text{ nose} + 10 \text{ finger} = 1 \text{ person}$

Given 240 fingers, how many

arms \_\_\_\_\_ legs \_\_\_\_\_ nose \_\_\_\_\_

would you need?

Let's apply this same ratio concept to a balanced chemical equation:



How many mols of oxygen do you need in order to form 25 mols of water?

We are going to solve this using the 3-fraction method:

Let's take it a step further. Using the same equation from the last slide:

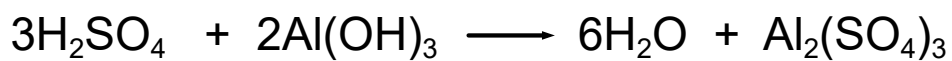
How many grams of water can be formed from 45.31 grams of oxygen?

Another way to do the same calculation:

**Factor Label method**

(leave a few lines of space when you are pre-writing your notes)

Given the following balanced chemical equation, how many mols of  $\text{H}_2\text{SO}_4$  and how many mols of  $\text{Al}(\text{OH})_3$  are needed to create 3.45 mol of  $\text{Al}_2(\text{SO}_4)_3$ ?



Determine how much sodium phosphate you need in order to react with calcium chloride to produce 32.5 g of sodium chloride. You will need to write a balanced chemical equation before you can begin the stoichiometry.



How many liters of hydrochloric acid with a concentration of 3 mols per liter (known as 3 molar, abbreviated 3M HCl) would it take to completely dissolve 23.2 g of aluminum? You need to write a balanced chemical equation for this single replacement reaction.

