

Stoichiometry

involves relating a quantity of substance A to a quantity of substance B.

Before we start applying this concept to Chemistry, let's look at a real world application...

Below is the recipe for a Garden Salad:

1 package of lettuce

2 whole tomatoes (chopped)

1.5 cucumbers

15 baby carrots

2 tsp chopped bacon

5 tsp Italian Dressing

feeds 6 people

If I have 2 tomatoes,
how many cucumbers do
I need for the salad?

$$\frac{2 \text{ tomatoes}}{1.5 \text{ cucumbers}}$$

If I have 2 tsp bacon,
how many tsp dressing
do I need for the
salad?

$$\frac{2 \text{ tsp bacon}}{5 \text{ tsp dressing}}$$

Below is the recipe for a Garden Salad:

1 package of lettuce

2 whole tomatoes (chopped)

1.5 cucumbers

15 baby carrots

2 tsp chopped bacon

5 tsp Italian Dressing

If I have 2 packages of lettuce, how many baby carrots do I need?

$$2 \text{ pkgs lettuce} \times \frac{15 \text{ carrots}}{1 \text{ pkg lettuce}} = 30 \text{ carrots}$$

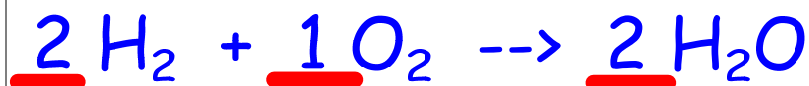
If I have 15 tsp of dressing, how many cucumbers do I need?

$$15 \text{ tsp dressing} \times \frac{1.5 \text{ cucumbers}}{5 \text{ tsp dressing}} = 4.5 \text{ cucumbers}$$

ingredient list
↓

When we are making food in a kitchen we follow a recipe.

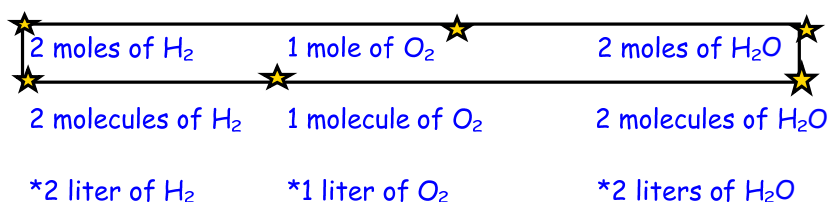
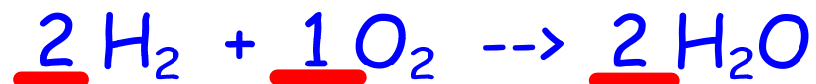
When we are performing a chemical reaction in the lab we follow a balanced chemical equation.



In chemistry, we get our ratios from a balanced chemical equation.

The coefficients tell us what amount of each substance we have.

Coefficients are mole ratios



* Liters can only be used if the substance is a GAS!

What is the mole ratio
of O₂ to H₂O?

We can use coefficient as the recipe amounts for a chemical equation.



If I have 3.5 moles of H₂, how many moles of H₂O can I make?

given

Solve using Dimensional Analysis

Use coefficients from equation here!

$$3.5 \text{ moles H}_2 \times \frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2} = 3.5 \text{ moles H}_2\text{O}$$