**Producing a standards solution (Method 1)**

* A **standard solution** is a solution whose concentration is known accurately.

**Primary Standards**

* A primary standard is a pure substance that can be used to prepare a standard solution.
* Not all pure substances are suitable, a primary standard should:
  + Cheap and be readily available
  + stable, (low reactivity)
  + have a low hygroscopicity (to minimize weight changes due to humidity)
  + have a high molar mass (to minimise weighing errors)
  + non-toxic
* Example primary standards include sodium carbonate, Na2CO3, and hydrated oxalic acid, H2C2O4.2H2O
* To make a standard solution, an accurately measured mass is made into an accurately known volume of solution.

**Calculating the Concentration of a Standard Solution**

**(Produced from a Primary Standard)**

The concentration of a standard solution prepared from a primary standard can be calculated by following the steps.

**Step 1**

* Calculate the number of moles of primary standard added using

n = m/M

**Step 2**

* Calculate the concentration of the standard solution produced using

c = n/V

**Example Problem**

Calculate the concentration of a standard solution produced from dissolving 10.0g of sodium carbonate Na2(CO3 )2 in water to a volume of 0.500 L

Step 1

Calculate the amount, in mol, of primary standard added.

M(Na2CO3) = (2 x 22.99) + 12.01 + (3 x 16.00)

= 106.0 g mol-1

n(Na2CO3) = m / M

= 10.0 / 106.0

= 0.09434 mol

Step 2

Calculate the concentration of the standard solution

c(Na2CO3) = n / V

= 0.09434 / 0.500

= 0.1887

= 0.189 mol L-1 (three significant figures)

**Try this Question**

Calculate the concentration of a standard solution produced from dissolving 12.0g of hydrated oxalic acid crystals, H2C2O4.2H2Oin water to a volume of 0.250 L (answer 0.146 mol L-1)