**Dilutions:**



This relationship is **NOT** given in the Chemistry Data Booklet.

It is strongly suggested that you memorise this relationship

The following relationship is a simple way of determining the effect of diluting a solution.

**c1V1 = c2V2**

To make a fixed amount of a dilute solution from a stock solution, you can use the formula: C1V1 = C2V2 where:

V1 = volume of original solution

c1 = concentration of original solution

V2 = volume of final solution

c2 = concentration of final solution

**Try these examples**

1. How much 2.0 mol L-1 NaCl solution would you need to make 250.0 mL of 0.15 mol L-1 NaCl solution? (0.019 L)
2. What would be the concentration of a solution made by diluting 45.0 mL of 4.2 mol L-1 KOH to 250.0 mL? (0.76 mol L-1 )
3. How much 0.55 mol L-1 HCl would need to be added to distilled water to produce 250.0 mL of solution with a pH 1.00 (0.045 L)
4. 100.0 ml of water is added to 50.0 ml of vinegar with a pH 2.40 Calculate the [H+] concentration and pH of the final solution. ( [H+] 1.33 x 10-3 mol L, pH = 2.88)
5. How much 2.0 M NaCl solution would you need to make 250.0 mL of 0.15 M NaCl solution?

V1 = c2 x V2 / c1 = 0.15 x 0.250 / 2.0 = 0.0188 L = 1.9 x 10-2 L

1. What would be the concentration of a solution made by diluting 45.0 mL of 4.2 M KOH to 250.0 mL?

c2 = c1 x V1 / V2 = 4.2 x 0.045 / 0.2500 = 0.76 mol L-1

1. How much 0.55 M HCl would need to be added to distilled water to produce 250.0 mL of solution with a pH 1.00

final [H+] = 10-1 = 0.100 mol L-1

V1 = c2 x V2 / c1 = 0.100 x 0.25 / 0.55 = 0.045 L

1. 100.0 ml of water is added to 50.0ml of vinegar with a pH 2.40. Calculate the [H+] concentration and pH of the final solution.

initial [H+] = 10-2.4 = 0.00398 mol

final [H+], c2 = c1 x V1 / V2 = 0.00398 x 0.0500 / 0.150 = 1.33 x 10-3 mol L-1

pH = -log([H+]) = 2.88