Concentrations of Solutions – Common Methods

Solutions have variable concentrations and as such require two numbers to adequately describe the concentration of the solution. There are a variety of two number choices that all follow a similar recipe:

$$\text{concentration} = \frac{\text{how much stuff is dissolved (amount, mass or volume)}}{\text{how much solution (volume or mass)}}$$

Some common examples are mass/volume percent, mass/mass percent or volume/volume percent:

    m/v% =   mass of solute in g   x 100 %
              volume of solution in mL

    m/m% =   mass of solute in g x 100 %
             mass of solution in g

    v/v% =   volume of solute in mL x 100 %
             volume of solution in mL

Smaller concentrations are often given in p.p.m. and p.p.b. or even p.p.t.

p.p.m. is short for parts per million and works out to mg solute per million mg of solution (i.e. 1 L of H_2O is equal to 1 000 000 mg)

       p.p.m. = _____mg of solute_____
                1 L of aqueous solution

Parts per billion and parts per tillion are similar but use smaller mass units

       p.p.b. = _____μg of solute_____
                1 L of aqueous solution

       p.p.t. = _____ng of solute_____
                1 L of aqueous solution