

# Measuring concentration molarity (M)

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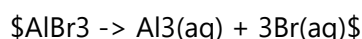
## Molarity

comparison of moles of solute to liters of solutions

water will pull the individual elements apart

$$M = \text{mol/L}$$

ex what is the molarity of Br<sup>-</sup> in 3.0L of solution containing 267.0g of AlBr<sub>3</sub>?



do t-chart to find the amount of mol in 267g of AlBr<sub>3</sub>

$$= 3.004 \text{ mol Br}^{-}$$

$$3.004\text{mol}/3.0\text{L} = 1.0 \text{ M Br}^{-}$$

## Parts per Million (ppm)

used when referring to very minor components.

1ppm means that out of 1 million particles there will be 1 of the specified molecule

$$1\text{ppm} = \text{solute/solvent} = 1 \text{ solute unit}/1,000,000 \text{ solvent units}$$

if you had .03g of solute in 1000g of solvent what is the concentration in ppm?

$$x/1,000,000 = .03\text{g}/1000$$

$$x = 30 \text{ ppm}$$

## Mass Percent (%)

mostly used by biologists

$$\text{percent} = \frac{\text{grams solute}}{\text{grams solution}} * 100$$

**grams solution is a total**

ex what is the mass percent of NaCl if 15.0 g are added to 50.0g of water

$$15.0/50+15 * 100 = 23.1\% \text{ NaCl}$$

how would you make 100mL of .15 M Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> solution

$$M = \text{mol/L}$$

$$.15 = \text{mol}/.1\text{L}$$

mol = .015

.015 mol Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> convert to grams --> 2.4g Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

**take 2.4g Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> and add 100mL of water**

you need a sentence explanation for these types of problems

## Dilutions

changing the concentration of a solution so that there are less solute particles dissolved in the solvent

$$M_1V_1 = M_2V_2$$

M<sub>1</sub> must be bigger than m<sub>2</sub>

how would you make a .060 M solution of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> if you had 100mL of a .15M stock solution

$$M_1V_1 = M_2V_2$$

$$.15(V) = (.060)(100\text{mL})$$

$$V = 40\text{mL}$$

**Take 40mL of the original "stock solution" and add 60mL of H<sub>2</sub>O** ask him about this last problem