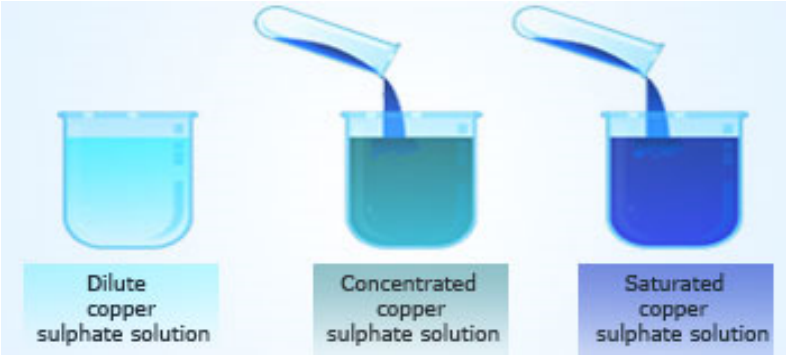
Solutions-Dilutions



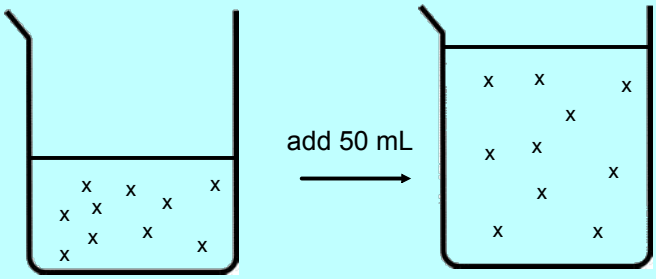
Mar 12-8:19 AM

Dilutions

$M_1 \cdot V_1 = M_2 \cdot V_2$

(more) concentrated

(less) dilute



10 particles ← same → 10 particles

50 mL ← doubled → 100 mL

molarity = $\frac{\text{mol}}{\text{L}}$ solve for mole: mol = M x V

solution 1: M x V = mol ← same (10 particles) → solution 2: mol = M x V

combine both equations:

$M_1V_1 = M_2V_2$ → reciprocal relationship -- as one goes up the other goes down

linear relationships: $\frac{x_1}{y_1} = \frac{x_2}{y_2}$ (proportional)

-as one goes up, the other goes up

V_1 x M_1 V_2

A 100 mL of a 5.0M solution of NaOH is diluted to 1.0 L.

What is the molarity of the diluted solution? M_2

1 L = 1000 mL

* units must be the same

$M_1 \cdot V_1 = M_2 \cdot V_2$

$(5.0\ M)\cdot(100\text{mL}) = M_2(1000\text{mL})$

1000 mL 1000 mL

$M_2 = 0.5\ M$

Mar 7-1:26 PM

Another example:

50.0 mL of 0.125M $CuSO_4$ was added to make a final volume of 0.500 L of pure water.
What is the final concentration of the solution?

$M_1 = 0.125M$

$V_1 = 50.0\,mL \left| \frac{1\,L}{1000\,mL} \right. = 0.05L$

$M_2 = ?$

$V_2 = 0.5L$

$$M_1 V_1 = M_2 V_2$$

$$(0.125M)(0.05L) = M_2 \cdot (0.5L)$$

$$\frac{(0.125M)(0.05L)}{0.5L} = \frac{M_2 \cdot (0.5L)}{0.5L}$$

$M_2 = 0.0125M$

Attachments

soluble-salts_en-1.jnlp