

Dilutions

-- adding solvent to decrease the concentration

Concentrated Solution : has a large amount of solute per solvent

Dilute Solution : has a smaller amount of solute per solvent

Apr 15-10:31 AM

Creating a Dilute Solution

$$M_1 V_1 = M_2 V_2$$

M_1 = molarity (M) of the original solution

V_1 = volume (mL or L) of the original solution

M_2 = molarity (M) of the dilute solution

V_2 = volume (mL or L) of the dilute solution

stock solution

Apr 15-10:31 AM

Practice:

What volume of a 3.00 M KI stock solution would you use to make 0.300 L of a 1.25 M KI solution?

$$3.00\text{M} \cdot V_1 = 1.25\text{M} \cdot 0.300\text{L} \quad M_1V_1 = M_2V_2$$

$$\frac{3.00\text{M} \cdot V_1}{3} = \frac{0.375}{3}$$

$$V_1 = 0.125\text{L}$$

Apr 15-10:31 AM

Practice:

How many milliliters of a 5.0 M H_2SO_4 stock solution would you need to prepare 100.0 mL of 0.25 M H_2SO_4 ?

$$M_1V_1 = M_2V_2$$

$$5.0\text{M} \cdot V_1 = 0.25\text{M} \cdot 100.0\text{mL}$$

$$V_1 = 5\text{mL}$$

Apr 15-10:31 AM

Practice:

If 0.50 L of 5.00 M stock solution of HCl is diluted to make 2.0 L of solution, how much HCl, in grams, is in the solution?

$$M_1V_1 = M_2V_2$$

$$5.00\text{M} \cdot 0.50\text{L} = X\text{M} \cdot 2.0\text{L}$$

$$= 1.25\text{M} = \frac{X\text{ mol}}{2.0\text{L}} = 2.50\text{ mol HCl}$$

$$2.50\text{ mol HCl} \times \frac{36\text{g}}{1\text{ mol HCl}} = 90\text{g HCl}$$

Apr 15-10:31 AM