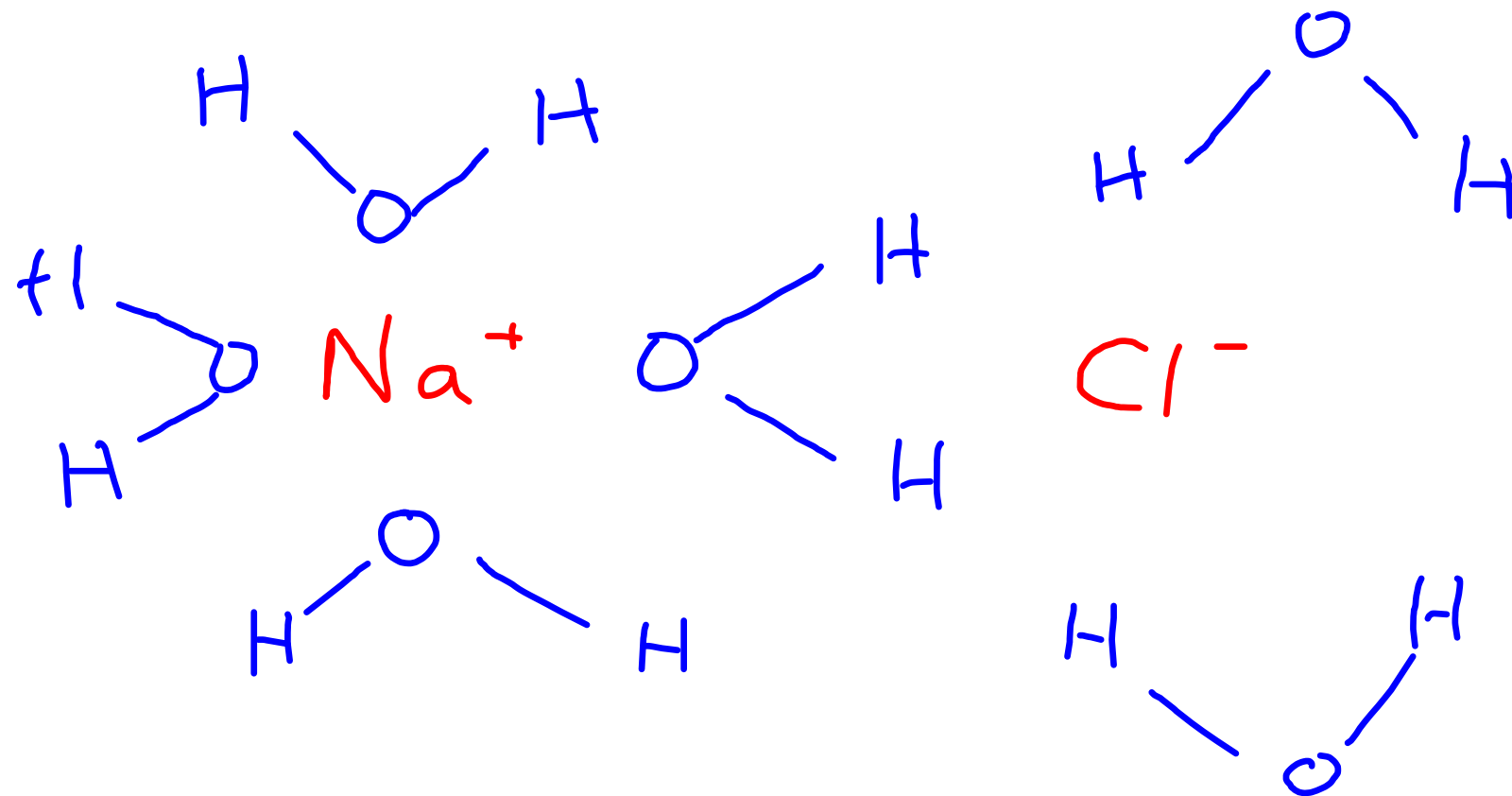
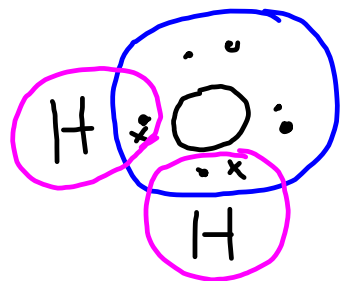






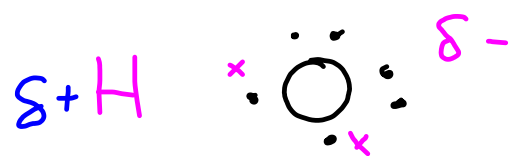
nonmetal

O

H

nonmetal

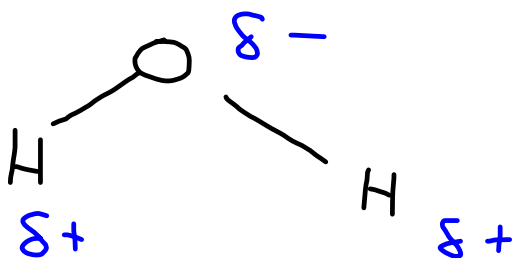
covalent -
sharing



H δ+

polar
molecule

δ = partial charge



pure H_2O does not
conduct electricity.

$C_6H_{12}O_6$ dissolves in H_2O
but does not conduct
electricity.

Salts, acids and bases
conduct electricity in H_2O
b/c they form ions.

acids H^+

bases

OH^-

"like dissolves like"

polar dissolves polar

water dissolves sugar

salts

acids

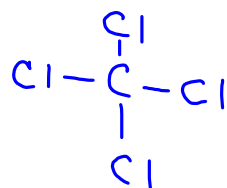
bases

Sugar must be a polar molecule.

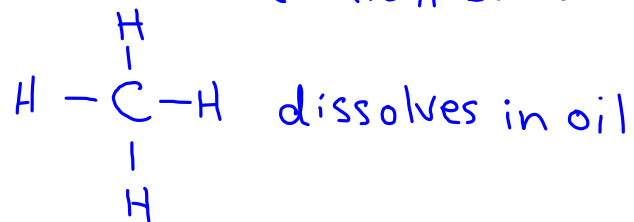
nonpolar dissolves nonpolar

gasoline dissolves oil

Carbon tetrachloride dissolves oil



molecules are nonmetal to nonmetal- covalent bonds



methane

Solute - Substance that is being dissolved

Solvent - substance that does the dissolving (usually in a larger amt than the solute)

Universal solvent = H_2O

1.
$$\frac{37.25\text{g}}{145.00\text{g} + 37.25\text{g}} \times 100 =$$

$$\frac{37.25\text{g}}{182.25\text{g}} \times 100 = 20.43896\%$$
$$20.44\%$$

2.

$$\frac{75.0 \text{ mL}}{850.0 \text{ mL}} \times 100 = 8.8235\%$$
$$8.82\% \left(\frac{v}{v}\right)$$

3.

$$\frac{15.62\text{g}}{250.0\text{mL}} \times 100 = 6.248\% (\text{g/mL})$$

4.

$$\frac{x}{1.500\text{ L}} \times 100 = 25.0\%$$

$$1.500\text{ L} \times \left(\frac{1000\text{ mL}}{1\text{ L}} \right) = 1500\text{ mL}$$

$$\frac{x}{1500\text{ mL}} = \frac{.25}{1}$$

$$x = 375\text{ mL}$$

5.

$$\frac{x}{350.0\text{mL}} \times 100 = 5.00\%$$

$$\frac{x}{350.0\text{mL}} = \frac{.05}{1}$$

$$x = 17.5\text{g}$$

6.

$$\frac{x}{465.36} \times 100 = 7.50\%$$

$$\frac{x}{465.36} = .0750$$

$$(465.36)(.0750) = x$$

$$x = 34.9 \text{ g solute}$$

$$\begin{array}{r} 465.36 \text{ g solution} \\ - 34.9 \text{ g solute} \\ \hline 430.46 \text{ g} \end{array}$$

430.5 g of H_2O

8.

$$\frac{24.9\text{g}}{x} \times 100 = 8.30\%$$

$$\frac{24.9\text{g}}{x} = \frac{.0830}{1}$$

$$\frac{24.9}{.0830} = \frac{x(.0830)}{.0830}$$

$$300\text{mL} = x$$

$$300.\text{ mL} = x$$

$$3.00 \times 10^2 \text{ mL} = x$$

9.

$$\frac{xg}{.050mL} \times 100 = 3.5\%$$

$$\frac{x}{.050mL} = .035$$

$$x = (.035)(.050)$$

$$x = .00175g$$

$$.00175g \times 12 = .021g \cdot \text{drops}$$

$$4 \text{ hrs} \times \frac{60 \text{ min}}{1 \text{ hr}} = 240 \text{ min}$$

$$(.021g \cdot \text{drop})(240 \text{ min}) =$$

5.04g Total solute
received

$$\begin{array}{r}
 8. \quad \text{Na } 23 \\
 \text{Cl } 35.5 \\
 \hline
 58.5 \text{ g} = 1 \text{ mol}
 \end{array}$$

$$.2500 \text{ L}$$

$$\frac{.154 \text{ M}}{1} = \frac{x}{.2500 \text{ L}}$$

$$(.154)(.2500) = x$$

$$x = .0385 \text{ mol}$$

$$.0385 \text{ mol} \times \left(\frac{58.5 \text{ g}}{1 \text{ mol}} \right) = 2.25 \text{ g}$$

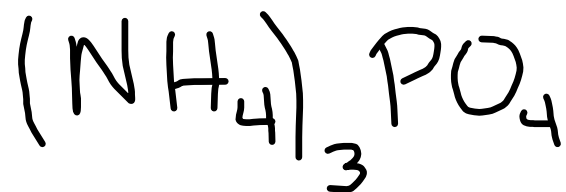
10.

$$\frac{.461342 \text{ mol}}{.845 \text{ L}} =$$

$$.54597 \text{ M}$$

$$.5460 \text{ M}$$

$$68.74 \text{ g} \times \left(\frac{1 \text{ mol}}{149 \text{ g}} \right) = .461342 \text{ mol}$$



$$\text{N } 14 \times 3 = 42$$

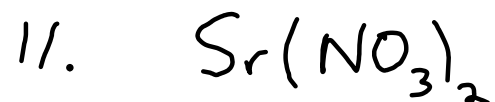
$$\text{H } 1 \times 12 = 12$$

$$\text{P } 31 \times 1 = 31$$

$$\text{O } 16 \times 4 = \underline{64}$$

$$149 \text{ g} =$$

$$1 \text{ mol}$$



$$\text{Sr } 88 \times 1 = 88$$

$$\text{N } 14 \times 2 = 28$$

$$\text{O } 16 \times 6 = 96$$
$$\underline{212 \text{ g} = 1 \text{ mol}}$$

$$\frac{x}{.5000 \text{ L}} = .369 \text{ M}$$

$$(.5000)(.369) = x$$

$$x = .1845 \text{ mol}$$

$$\text{wt/vol } \text{g/mL}$$

$$.1845 \text{ mol} \times \left(\frac{212 \text{ g}}{1 \text{ mol}} \right) = 39.11 \text{ g}$$

$$\frac{39.11 \text{ g}}{500.0 \text{ mL}} \times 100 = 7.82\%$$

$$C_1 V_1 = C_2 V_2$$

concentration (% , M) volume (mL, L)

4.

$$(2.50\text{ M})(x) = (.750\text{ M})(850.0\text{ mL})$$

$$\frac{(2.50)(x)}{2.50} = \frac{637.5}{2.50}$$

$$x = 255\text{ mL}$$

3. LiNO_3

$$\text{Li } 7 \times 1 = 7$$

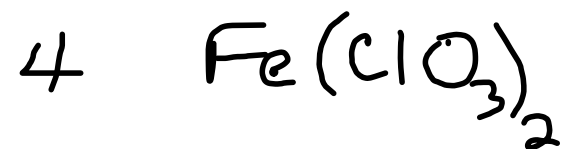
$$\text{N } 14 \times 1 = 14$$

$$\text{O } 16 \times 3 = 48$$
$$\frac{69 \text{ g}}{69 \text{ g}} = 1 \text{ mol}$$

$$42.5 \text{ g} \times \left(\frac{1 \text{ mol}}{69 \text{ g}} \right) = .6159 \text{ mol}$$

$$750.0 \text{ mL} \times \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) = .75 \text{ L}$$

$$\frac{.6159 \text{ mol}}{.75 \text{ L}} = .8212 \text{ M}$$
$$.821 \text{ M}$$



$$\text{Fe } 56 \times 1 = 56$$

$$\text{Cl } 35.5 \times 2 = 71$$

$$\text{O } 16 \times 6 = \frac{96}{223\text{g}} = 1\text{mol}$$

$$76.39\text{g} \times \left(\frac{1\text{mol}}{223\text{g}} \right) = .34255\text{mol}$$

$$518.3\text{mL} \times \left(\frac{1\text{L}}{1000\text{mL}} \right) = .5183\text{L}$$

$$\frac{.34255\text{mol}}{.5183\text{L}} = .6609\text{M}$$

1.



$$\text{Ca } 40 \times 1 = 40$$

$$\text{Br } 80 \times 2 = 160$$
$$\underline{\hspace{1.5cm}}$$
$$200\text{g} = 1\text{mol}$$

$$.184\text{M} = \frac{x}{1.500\text{L}}$$

$$(.184)(1.500) = x$$

$$.276\text{mol}$$

$$.276\text{mol} \times \left(\frac{200\text{g}}{1\text{mol}} \right) = 55.2\text{g}$$



Na $23 \times 1 = 23$

+1 $1 \times 3 = 3$

C $12 \times 2 = 24$

O $16 \times 2 = 32$
 $\underline{\hspace{1.5cm}}$
 $82\text{g} = 1\text{mol}$

$$.250\text{M} = \frac{x}{.125\text{L}}$$

$$x = 0.03125\text{mol}$$

$$.03125\text{mol} \times \left(\frac{82\text{g}}{1\text{mol}} \right) = 2.5625\text{g}$$

2.56g

3.

$$(.60)(375) = (.20)(x)$$

$$x = 1125 \text{ mL}$$

$$\begin{array}{r} 1125 \text{ mL} \\ 375.0 \text{ mL} \\ \hline 750 \text{ mL} \end{array}$$

6.

$$(.7280)(x) = (.2250)(500.0)$$

$$\frac{(.7280)(x)}{.7280} = \frac{112.5}{.7280}$$

$$x = 154.5329 \text{ mL}$$

$$x = 154.5 \text{ mL}$$

$$\begin{array}{r} 500.0 \text{ total} \\ - 154.5 \text{ conc. soln} \\ \hline 345.5 \text{ mL water} \end{array}$$

7.

$$(2.50)(25.0) = x(525.0)$$

$$\frac{62.5}{525.0} = \frac{x(525.0)}{525.0}$$

$$x = .1190 M$$

$$x = .119 M$$

8.

$$(.930)(2000) = x(60.0)$$

$$\frac{1860}{60.0} = \frac{x(60.0)}{60.0}$$

$$31.0\% = x$$

10.

$$\frac{23.44\text{g}}{100\text{ mL}} \times 100 = 23.44\%$$

$$\text{Mg } 24 \times 1 = 24$$

$$\text{S } 32 \times 1 = 32$$

$$\text{O } 16 \times 4 = 64$$

$$\hline 120\text{g} = 1\text{mol}$$

$$23.44\text{g} \times \left(\frac{1\text{mol}}{120\text{g}} \right) = .195\text{mol}$$

$$\frac{.195\text{mol}}{.1\text{L}} = 1.95\text{M} \Rightarrow 2\text{M}$$

30.

$$\frac{g}{mL} \times 100 = \%$$

$$\frac{x}{1255mL} \times 100 = 5.0\%$$

100 100

$$\frac{x}{1255} = .05$$

$$x = (.05)(1255)$$

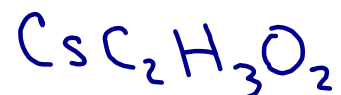
$$x = 62.75g$$

$$x = 63g$$

$$1. \quad M = \frac{\text{moles of solute}}{\text{L of solution}}$$

$$.76 = \frac{x}{.250}$$

$$.19 \text{ mol} = x$$



$$\text{Cs} \quad 133 \times 1 = 133$$

$$\text{C} \quad 12 \times 2 = 24$$

$$\text{H} \quad 1 \times 3 = 3$$

$$\text{O} \quad 16 \times 2 = \frac{32}{192\text{g} = 1\text{mol}}$$

$$.19 \text{ mol} \times \left(\frac{192\text{g}}{1\text{mol}} \right) = 36.48\text{g}$$

36g

5.

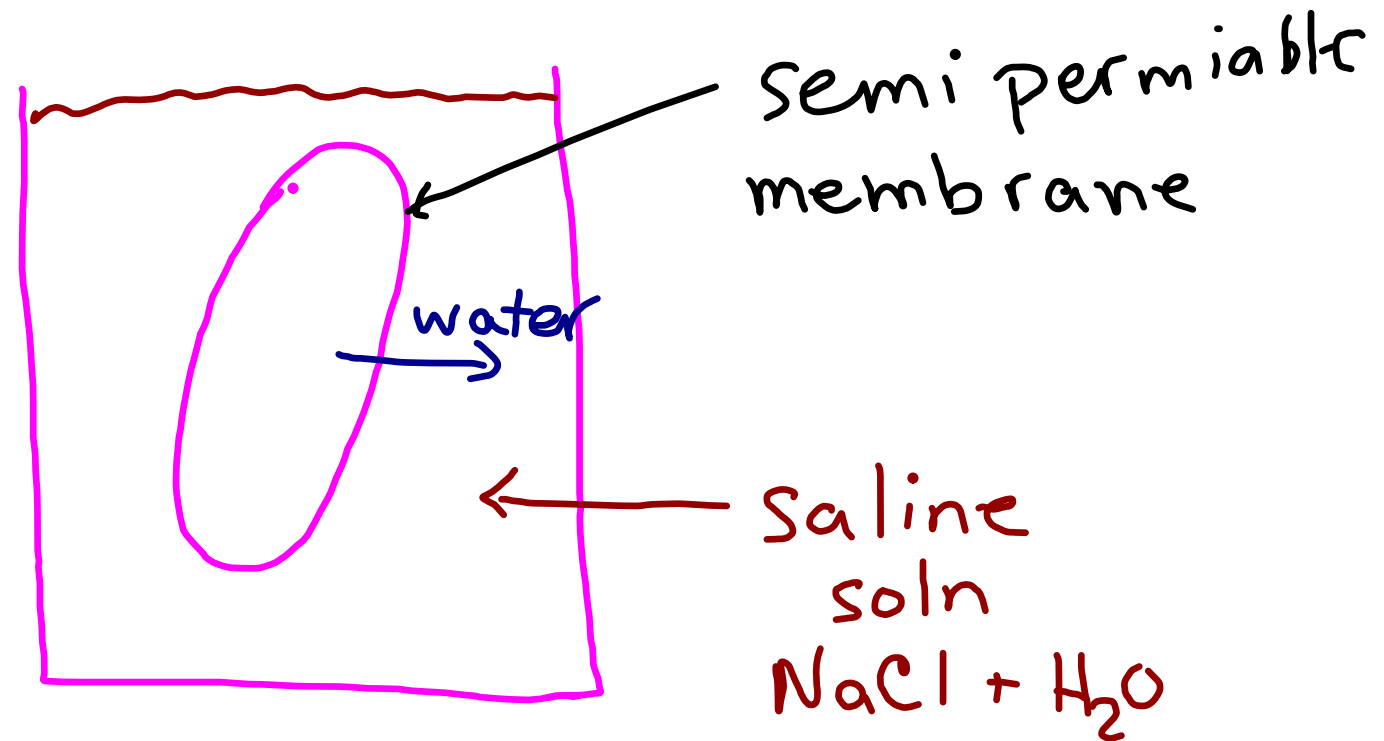
$$(12.0)(x) = (2.00)(5.0)$$

$$\frac{(\cancel{12.0})(x)}{\cancel{12.0}} = \frac{(10)}{12.0}$$

$$x = .83333$$

$$x = .83L$$

$$x = 830 \text{ mL}$$



trying to
dilute the saline
soln.

