MASS <-- need mol.mass --> MOLES <-- 6.02x10^23 --> # of particles

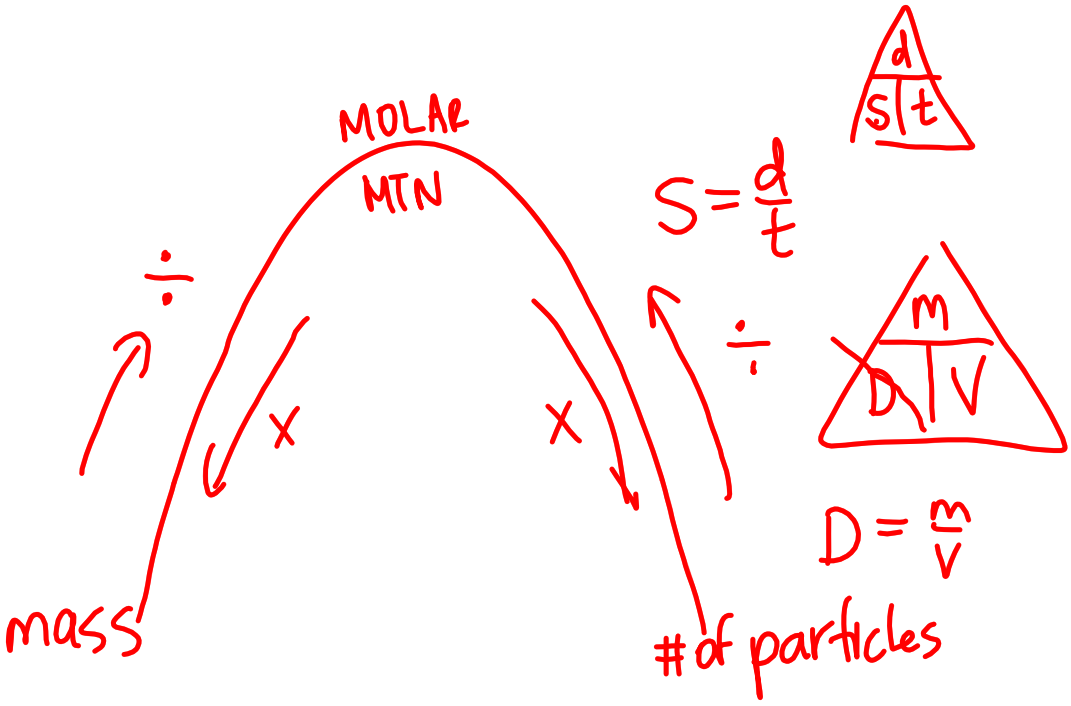
$$5.22\text{mol He} \times \frac{4.00\text{g}}{1\text{ mol}} =$$

$$4.22\times10^{15}\text{ U atoms} \times \frac{1\text{ mol}}{6.02\times10^{23}\text{ atoms}} \times \frac{238.04\text{ g}}{1\text{ mol}} =$$

$$25.8\text{g Hg} \times \frac{1\text{ mol}}{200.59\text{g}} \times \frac{6.02\times10^{23}\text{ atoms}}{1\text{ mol}} =$$

1.9 EE 18 ÷ 6.02 EE 23 =

1.9 x 10 ^ 18 ÷ 6.02 x 10 ^ 23 =


MOLAR
MTN
÷
x
x
÷
mass
# of particles
S = d/t
D = m/V
d
S t
m
D V

% composition (by mass)

ex) what is the % composition of H_2O

$H - 2(1.0) = 2.0$

$O - 1(16.0) = 16.0$

18.0

$\%H = \frac{2.0}{18.0}(100) = 11.1\%$

$\%O = \frac{16.0}{18.0}(100) = 88.9\%$

39.1 14.0 16.0

ex) what is the % comp. of KNO_3

$K - 1(39.1)$

$N - 1(14.0)$

$O - 3(16.0)$

101.1

$\%K = \frac{39.1}{101.1}(100) = 38.7\%$

$\%N = \frac{14.0}{101.1}(100) = 13.8\%$

$\%O = \frac{48.0}{101.1}(100) = 47.5\%$

100.0

empirical formula – simplest ratio

molecular formula – actual ratio

	MOLEC. FORM.	EMP. FORM.
GLUCOSE	$C_6H_{12}O_6$	CH_2O
HYDROGEN PEROXIDE	H_2O_2	HO
WATER	H_2O	H_2O

How to find EMPIRICAL FORMULA (simplest ratio) from % COMPOSITION:

ex) A compound has a % comp. of 40.0% C, 6.71% H, & 53.3% O. What is the emp. formula?

Assume 100g

$40.0\text{g C} \times \frac{1\text{ mol}}{12.0\text{g}} = 3.33\text{mol C}$ $\frac{3.33}{3.33} = 1$

$6.71\text{g H} \times \frac{1\text{mol}}{1.01\text{g}} = 6.64\text{ mol H}$ $\frac{6.64}{3.33} = 2$

$53.3\text{g O} \times \frac{1\text{mol}}{16.0\text{g}} = 3.33\text{mol O}$ $\frac{3.33}{3.33} = 1$

P. 348:
136a, 137
115b, 119

CH_2O

$$6\times10^{23}\text{ atoms}\times\frac{1\text{ sec}}{2\text{ atoms}}\times\frac{1\text{ min}}{60\text{ s}}\times\frac{1\text{ hr}}{60\text{ min}}\times\frac{1\text{ day}}{24\text{ hr}}\times\frac{1\text{ yr}}{365\text{ days}}=$$

$$=9.5\times10^{15}\text{ yr}$$

$$\frac{2\text{ atoms}}{1\text{ sec}}$$

$$4.5\times10^{9}\text{ yrs}$$

$$\frac{9.5\times10^{15}}{4.5\times10^{9}}=$$