<u>Aim</u>: How do we calculate the % composition <u>by mass</u>?

% composition = by mass	$\frac{\text{mass of part}}{\text{mass of whole}} \times 100$

1) What is the percent by mass of **hydrogen** in water?

H_2O

$2(1) + 16 = 18$ amu

Part Whole

$\% H = \frac{2}{18} \times 100 = 11.1$

$\% O = \frac{16}{18} \times 100 = 88.9$

2) What is the percent by mass of **oxygen** in $Mg(OH)_2$?

$Mg\ O_2\ H_2$

24 + 2(16) + 2(1) = 58 amu

$\% O = \frac{32}{58} \times 100 = 55$

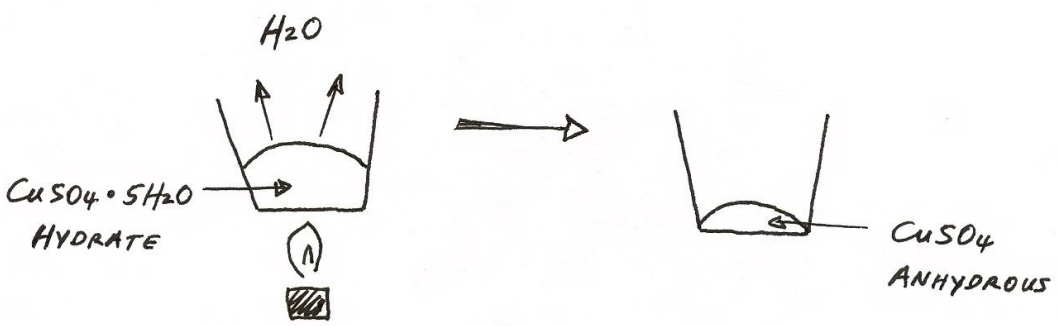
3a) What is the percent by mass of **water** in $CuSO_4 \bullet 5\ H_2O$?

$CuSO_4 \cdot 5H_2O$

$64 + 32 + 4(16) + \underbrace{5(18)}_{90} = 250$

% H_2O = 90/250 x 100 = 36%

In your next lab you will decompose $CuSO_4 \bullet 5\ H_2O$ into $CuSO_4$ and H_2O by heating it in a crucible. The heat energy causes the water to break away from the hydrate.



3b) How many grams of **water** can be obtained by decomposing **500 g** of **$CuSO_4 \bullet 5\ H_2O$**?

500 g x 0.36 = 180 g

3c) What is the mass of **$CuSO_4$** left over?

555 - 180 = 320 g

4) How much **Na** is present in 25 g of NaCl?

1st) NaCl
23+35=58 amu

2nd) Na = 23/58 x 100 = 40%

3rd) 25 g x 0.40 = 10 g OR In less steps, 25 g x 23/58 = 10 g

5) Which of the following compounds has the **greatest** % of **S**?

(a) Na_2S (b) K_2S (c) Rb_2S (d) Cs_2S

Atomic mass: 23 32 39 32 85 32 133 32

$$\% S = \frac{32}{((23)2+32)} \times 100 = 41 \qquad \% S = \frac{32}{((133)2+32)} \times 100 = 11$$

OR Just pick the element with the lightest atomic mass; the sulfur will be a greater part of that whole.