

Purpose:

when matter is weighed, how can we find the formula?

WARMUP:

#1 the law of definite proportions states that a chemical compound always contains exactly the same proportion of elements by mass (sometimes called **Proust's law**)

#2 What percent of this is X's?

$$\% = \frac{\text{things you're counting}}{\text{total things}} \times 100$$

Answer: 33%

#3 If a compound contains 24 grams of carbon and 4.0 grams of hydrogen, what percent is hydrogen?

$$\frac{4 \text{ grams}}{28 \text{ grams}} \times 100 = 10\%$$

what percent is carbon?

$$\frac{24 \text{ grams}}{28 \text{ grams}} \times 100 = 86\%$$

here's how we solved #5 in class

5. Compounds of copper and chlorine

Compound A: 35.9 g of Cl / 64.1 g of Cu Cl_2Cu

Compound B: 52.8 g of Cl / 47.2 g Cu Cl_3Cu

a. Determine the value of the ratio $\frac{\text{mass Cl}}{\text{mass Cu}}$ in each compound. A $\frac{56}{1}$ B $\frac{1.12}{1}$

A $\frac{35.9 \text{ gram Cl}}{64.1 \text{ gram Cu}} = 0.56 \frac{\text{Cl}}{\text{Cu}} = \frac{.56 \text{Cl}}{1 \text{Cu}}$ **B** $\frac{52.8 \text{ gram Cl}}{47.2 \text{ gram Cu}} = 1.12 \frac{\text{Cl}}{\text{Cu}} = \frac{1.12 \text{Cl}}{1 \text{Cu}}$

b. How does the mass ratio for compound B compare to that in compound A?
B is double of A

c. What are the simplest formulas for compounds A and B? Explain your reasoning.

A $\frac{.56 \text{Cl}}{1 \text{Cu}} \xrightarrow{\times 25} \frac{14 \text{Cl}}{25 \text{Cu}} \rightarrow \boxed{\text{Cl}_{14}\text{Cu}_{25}}$ **B** $\frac{1.12 \text{Cl}}{1 \text{Cu}} \xrightarrow{\text{from the top } \times 100} \frac{112}{100} \xrightarrow{\div 2} \frac{56}{50} \xrightarrow{\div 2} \frac{28}{25}$

strategy: We want integers on top + bottom. Algebra says whatever you do to top also do to bottom.

... is a compound known as sucrose. Sucrose is composed of the elements