



### What is gram atomic mass?

1 mole of an element =  
molar mass of that element

The unit for molar mass is  
**Gram!**

### What is the mass of 1 mol of each of these elements?

1 mol of C = **12.0 g**  
1 mol of Sr = **87.6 g**  
1 mol of Cu = **63.5 g**

### What is gram mass?

1 mole of a compound =  
molar mass of that compound

**Example 1:** Find the molar mass of  $K_2CO_3$

K:  $2 \times 39.1 = 78.2$   
C:  $1 \times 12.0 = 12.0$   
O:  $3 \times 16.0 = \underline{48.0}$   
**138.2**

1 mole of  $K_2CO_3 = 138.2 \text{ g of } K_2CO_3$

The subscripts tell you the number of **moles** of atoms!

**Example 2:** Find molar mass of  $Ca_3(PO_3)_2$

Ca:  $3 \times 40.1 = 120.3$   
P:  $2 \times 31.0 = 62.0$   
O:  $6 \times 16.0 = \underline{96.0}$   
**278.3**

1 mole of  $Ca_3(PO_3)_2 = 278.3 \text{ g of } Ca_3(PO_3)_2$

1 mol = molar mass in grams of the element, molecule or ionic compound

*We can use dimensional analysis to solve mole problems!*

**Ex:** How many moles are in  $4.2 \times 10^{24}$  grams of  $C_2H_6$ ?

$$4.2 \times 10^{24} \text{ g } C_2H_6 \times \frac{1 \text{ mol } C_2H_6}{30.0 \text{ g } C_2H_6} = 1.4 \times 10^{23} \text{ mol } C_2H_6$$

C:  $2 \times 12.0 = 24.0$   
H:  $6 \times 1.0 = \underline{6.0}$   
**30.0**

