

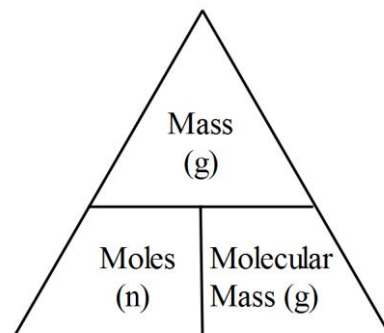
STOICHIOMETRY

You are given a chemical equation and the mass of a substance on one side of the equation. You are asked to find the mass of a different substance on the other side of the equation.

To do this you use the mole ratio from your equation
And these formulas from your triangle

$$\text{moles} = \frac{\text{mass}}{\text{molecular mass}}$$

$$\text{mass} = \text{moles} \times \text{molecular mass}$$



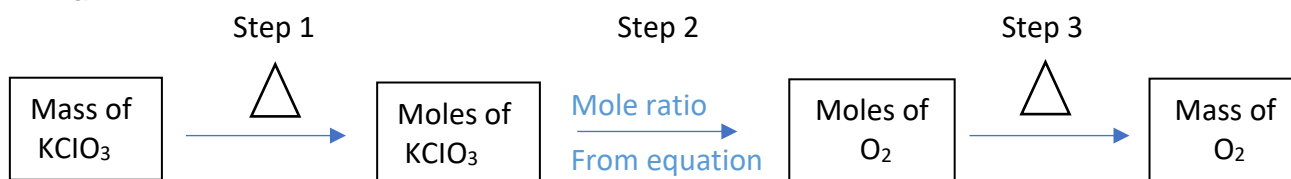
Remember molecular mass is found in the periodic table

Example

Consider the reaction: $2\text{KClO}_3 (\text{s}) \rightarrow 2\text{KCl} (\text{s}) + 3\text{O}_2 (\text{g})$

How many grams of oxygen gas are formed when 2 grams of KClO_3 completely reacts?

Plan:



Step 1: You start with 2g KClO_3
The molecular mass of KClO_3 is

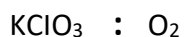
K	39.1
C	12.0
I	126.9
3 x O = 3 x 16.0 =	48.0
Total	226.0

$$\begin{aligned} \text{Moles} &= \frac{\text{mass}}{\text{molecular mass}} \\ &= \frac{2\text{g}}{226\text{g}} \\ &= 0.00885 \end{aligned}$$

0.00885 moles of KClO_3

**Step 2:**

Use the ratio from the equation



$$0.00885 \text{ moles} : \frac{0.00885}{2} \times 3$$

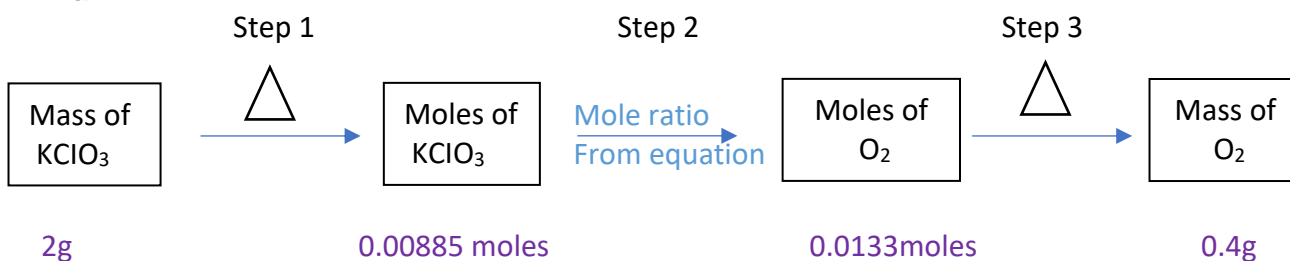
$$= 0.0133 \text{ moles of O}_2$$

(from 2KClO₃ in the equation and 3O₂)

the numbers are highlighted so you see which to use.

Step 3:The molecular mass of O₂ is mm of O x 2 = 16 x 2 = 32

$$\begin{aligned} \text{Mass} &= \text{moles} \times \text{molecular mass} \\ &= 0.133 \times 32 \\ &= 0.4248 \end{aligned}$$

Which rounds to 0.4g of O₂**Summary**Given 2g of KClO₃ and equation $2\text{KClO}_3 (\text{s}) \rightarrow 2\text{KCl} (\text{s}) + 3\text{O}_2 (\text{g})$ Find the mass of O₂**Plan:****Answer:** You have 0.4g of oxygen.