

Year 10 C Pathway

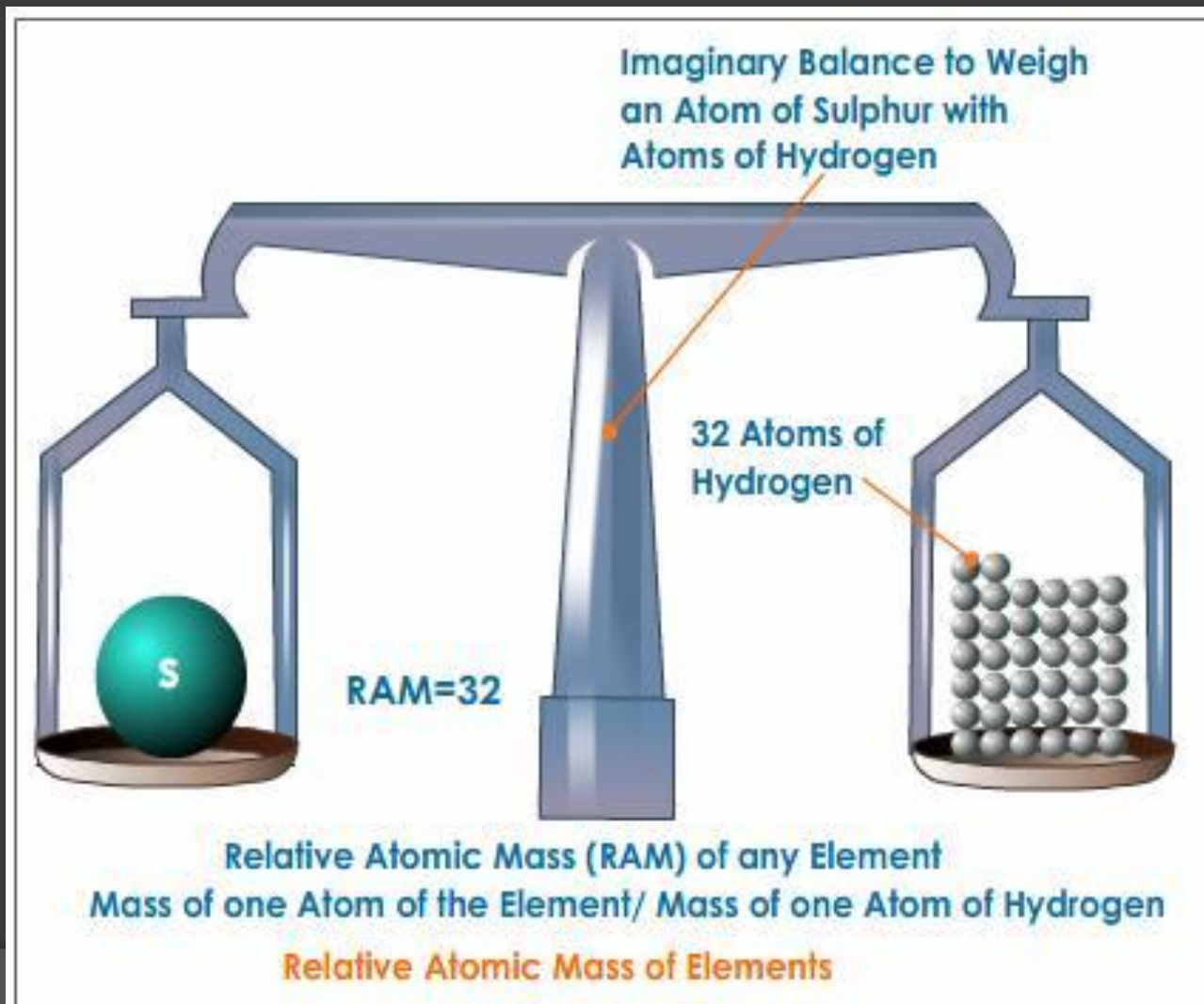
Mr. D. Patterson

# INTRODUCTORY CHEMISTRY

# Outcomes

- Determine the Molar Mass of a substance given its formula.
- Calculate the moles of a substance from its mass

# Relative atomic/molecular mass



# Molar mass

- ⦿ The **molar mass** of a substance is the weight of **one mole** of that substance
- ⦿ The **molar mass** is the relative molecular mass **measured in grams.**

# Molar mass to calculate moles

- Use the molar mass to determine how many moles.

$$n = \frac{m}{M}$$

n= number of moles

m= measured mass of substance

M= molar mass

- Or rearrange formula to find the mass from the moles

$$m = n * M$$

# Examples

- ⦿ How many moles in the following substances?
  - A) 50 g of hydrogen atoms
  - B) 150 g of water
  - C) 1 kg of sulfuric acid

# Examples

- How many moles in the following substances?
  - A) 50 g of hydrogen atoms
  - B) 150 g of water
  - C) 1 kg of sulfuric acid

$$A) \quad m = 50 \text{ g}$$

$$M(\text{H}) = 1.008$$

$$n(\text{H}) = \frac{m}{M(\text{H})} = \frac{50}{1.008} = 49.6$$

# Examples

- ⦿ How many moles in the following substances?
  - A) 50 g of hydrogen atoms
  - B) 150 g of water
  - C) 1 kg of sulfuric acid

$$B) \quad m = 150 \text{ g}$$

$$M(\text{H}_2\text{O}) = 2 \times 1.008 + 16 = 18.016$$

$$n(\text{H}_2\text{O}) = \frac{m}{M(\text{H}_2\text{O})} = \frac{150}{18.016} = 8.33$$



# Examples

- How many moles in the following substances?
  - A) 50 g of hydrogen atoms
  - B) 150 g of water
  - C) 1 kg of sulfuric acid

$$c) m = 1000 \text{ g}$$

$$M(\text{H}_2\text{SO}_4) = 2 \times 1.008 + 32.06 + 4 \times 16 \\ = 98.076$$

$$n(\text{H}_2\text{SO}_4) = \frac{m}{M(\text{H}_2\text{SO}_4)} = \frac{1000}{98.076} = \underline{\underline{10.2}}$$

# Examples

- Find the mass of 2.5 moles of carbon dioxide gas.

# Examples

- Find the mass of 2.5 moles of carbon dioxide gas.

$$n = 2.5$$

$$M(\text{CO}_2) = 12.01 + 2 \times 16 = 44.01$$

$$m = n(\text{CO}_2) \times M(\text{CO}_2) = 2.5 \times 44.01 \\ = 110 \text{ g}$$

# Outcomes

- Determine the Molar Mass of a substance given its formula.
- Calculate the moles of a substance from its mass
- Checkpoint 9.6, 9.7
- (9.8, 9.9, 9.10 challenging)
- Set 16, 17, 18, 19, 20