

WEEK: 23

Week Beginning: 24-8-20

Subject: SCIENCE

Year: 9

Lesson Objective:

- Go over homework
- Questions

Keywords/ Concepts

- Mole, relative formula mass, equations

Class Worksheets

- Questions

Homework

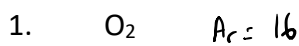
- Questions

Additional Notes

- Attach all the classroom worksheets and homework worksheets to this lesson plan and email together.
- Assume the students don't have revision guides and workbooks. Attach all the pages you want them to have.

Find Formula Mass Homework from last week

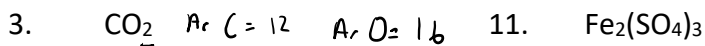
Li $\begin{matrix} \rightarrow & \text{Relative Atomic} \\ & \text{mass} \\ & \uparrow \\ & \text{Atomic Number} \end{matrix}$



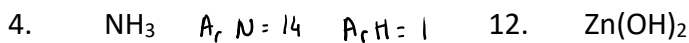
$$M_r = 2 \times 16 = 32$$



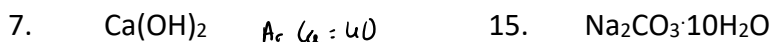
$$M_r = 2 \times 35.5 = 71$$



$$M_r = 12 + (16 \times 2) = 44$$

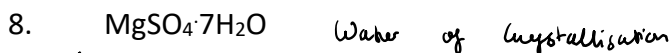


$$M_r = 14 + (1 \times 3) = 17$$



$$M_r = 40 + ((1 + 16) \times 2) = 74$$

$O = 16$ $H = 1$



$$A_r Mg = 24 \quad S = 32 \quad O = 16 \quad H = 1$$

$$24 + 32 + (16 \times 4) + 7(18) = 246$$

Percentage by mass

1. Determine the mass percent of each element in $Al_2(SO_4)_3$.

$Al = 27$
 $S = 32$
 $O = 16$

$$\% \text{ mass of Al} = \frac{27 \times 2}{(27 \times 2) + 3(32 + 16(4))} \times 100$$

$$A_r : 27 = 15.79\%$$

$$\% \text{ mass of S} = \frac{32 \times 3}{(27 \times 2) + 3(32 + 16(4))} \times 100 = 28.07$$

$$\% \text{ mass of O} = \frac{16 \times 12}{(27 \times 2) + 3(32 + 16(4))} \times 100 = 56.14$$

2. What mass of CaCl_2 will contain 15.0 g of chlorine?

$$\% \text{Cl} = \frac{2 \times 35.5}{40 + (35.5 \times 2)} \times 100 = 63.96 \%$$

$$15 \div \frac{63.96}{100} = 23.45 \text{ g}$$

3. What is the mass of oxygen in a 25.0 g sample of TiO_2 ?





4. Which substance has a greater percent by mass of hydrogen: C_4H_8 or C_8H_{18} ?

Mole Questions


1. How many moles are there in 44 g of CO_2 ? How many molecules is this?

2. How many molecules are there in 79 g of Fe_2O_3 ? How many atoms is this?

Classwork

- 1 Boron can form a number of covalent compounds.
Use the A_r values B = 11, O = 16, F = 19 and H = 1 to calculate the relative formula masses of these boron compounds: 
- 1.1 BF_3 [1 mark]
- 1.2 B(OH)_3 [1 mark]
- 2 A student was asked to calculate the number of moles and the masses of different compounds she would be using in her lab practical.
State the formula used to work out the number of moles from the mass of a compound.  [1 mark]
- 3 A teacher has a 140 g sample of potassium hydroxide (KOH).
Calculate, in grams, how much more KOH the teacher needs to have a 4 mole sample.  [3 marks]
- 4 A scientist burnt 300 g of metal X in an unsealed beaker. She then weighed the contents of the beaker and found that it now weighed 500 g.
All of the metal X reacted to form a single product, a metal oxide. 
- 4.1 Explain why the mass appeared to increase following the reaction. [1 mark]
- 4.2 Analysis of the metal oxide shows that it contains 40% oxygen by mass.
What is the percentage mass of metal X in the oxide? [1 mark]
- 4.3 The scientist plans to use the metal oxide as part of a mixture.
The final mixture contains 24% metal X by mass, which all comes from the metal oxide.
What mass of the metal oxide was used to make 8.0 g of the mixture? [2 marks]

Homework


- 1 3.5 g of Li reacts completely with 4 g of O₂ to produce 7.5 g of Li₂O. 
 $A_r(\text{Li}) = 7, M_r(\text{O}_2) = 32, M_r(\text{Li}_2\text{O}) = 30.$

1.1 Calculate how many moles of each substance reacted or was produced.

[2 marks]

1.2 Use your answer to part 1.1 to write a balanced symbol equation for this reaction.

[2 marks]

- 2 Sulfuric acid reacts with sodium hydrogen carbonate to produce aqueous sodium sulfate, water and carbon dioxide. The balanced equation for this reaction is: 




2.1 A student reacted 6.0 g of solid NaHCO₃ with an excess of sulfuric acid. Calculate the theoretical yield of Na₂SO₄ for this reaction.

[5 marks]

2.2 Sodium hydrogen carbonate is the limiting reactant in the example in 2.1. Describe what is meant by the limiting reactant.

[1 mark]

- 3 Calcium carbonate decomposes under heating to form calcium oxide and carbon dioxide. The balanced equation for this reaction is shown below: 



25 g of CaCO₃ were heated by a student.

Assuming that all the calcium carbonate decomposed, calculate the volume occupied at r.t.p. by the quantity of CO₂ produced by this reaction.

1 mol of gas occupies 24 dm³ at r.t.p.

[4 marks]