Nat 5 : Unit 1 – Chemical Changes and Structure

Key area – Formula and Reacting Quantities

Lesson 14 – Calculating Mass

Learning Outcomes

By the end of the lesson you should be able to …

1. Explain that the mass can be calculated from the number of moles of a substance.
2. Carry out calculations using the relationship between the mass and the number of moles of a substance.

Success Criteria

You will have been successful in this lesson if you:

1. Understood how to calculate the mass if given the number of moles and the formula of a compound.
2. **Completed Part 2 Caculating Mass Quiz** on forms by **Friday 19th February.**

If you have any questions about the content of this lesson, you should ask your **class teacher** either through your class MS team or via email. MS Teams will be monitored throughout the week by a chemistry teacher. If you need help or clarification with either the task or the content of the lesson, just ask.

Links to Prior Knowledge:

It is essential that you have completed lesson 13 and that you are confident about calculating formula mass. **If not contact your class teacher. You may want to revise your knowledge using the link below or rewatching the previous recorded lesoons**

National 4/5 Calculating gram formula mass (GFM) practice questions - YouTube

You may wish to have a copy of the data booklet handy for this lesson. Download from the SQA website - ChemistryDataBookletSQPN5.pdf (sqa.org.uk)

What to do

- **Follow the instructions to complete the check points. Remember to watch the video links**

Click on the link below to access the RECORDED lesson on Mass Calculations

https://youtu.be/VfK8Kt29_PI

Remember to add to your notes by copying or printing out and sticking in.

Mole Calculations

The mole

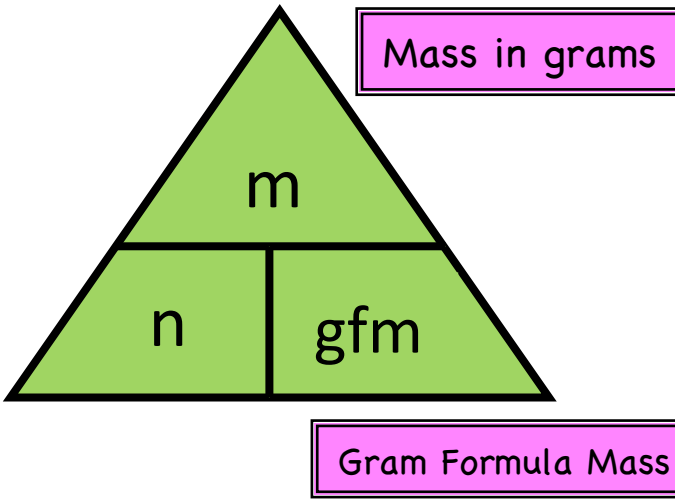
A mole of a substance is often referred to as the 'gram formula mass' and given the abbreviation GFM.

For any element or compound, the mass present can be calculated from knowledge of the number of moles and the formula mass.

n = number of moles

m = mass of substance (grams)

GFM n m GFM = gram formula mass



Mass = No of Moles X Gram formula mass

m= n xgfm

Example 1 Calculate the mass of 2 moles of sodium chloride.

Step1 Work out the formula

Symbol Na Cl

Valency 1 1

Swap **NaCl**

Step 2 Calculate the gfm

NaCl

1 x 23 = 23

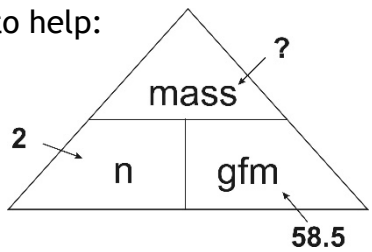
1 x 35.5 = 35.5

total 58.5

So, the formula mass =58.5

Step 3 Use the equation to calculate the mass

use the triangle to help:



mass = n x gfm

= 2 x 58.5

= 117g **(remember to use units)**

Example2 Calculate the mass of 0.06 moles of calcium carbonate.

Step1 Work out the formula

Symbol Ca CO_3

Valency 2 2

Swap $CaCO_3$

Step 2 Calculate the formula mass

$CaCO_3$

3 x 16 = 48

1x 12 = 12

1 x 40 = 40

= 100

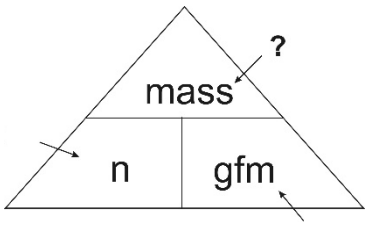
So, the formula mass =100

Step 3 Use the equation to calculate the mass

m = n x GFM

n = 0.06 moles

gfm = 100g



m = 0.06 x 100

= 6g

Check Point Calculating mass Quiz

Calculate the **mass** of each of the following. Add your answers to the forms quiz sheet to be marked. (Link below). You must give the correct unit of mass (g) in the quiz or you question will be marked wrong. Your teacher may post as an assignment. This has to be submitted. Good luck.

1. 2 mol of C
2. 0.5 mol of $MgCl_2$
3. 3 mol of CH_4
4. 4 mol of Na_2CO_3
5. 1.5 Cu_2O
6. 2.5 mol of carbon dioxide
7. 1 mol of lithium nitrate
8. 2 mol of oxygen
9. 0.4 mol of potassium carbonate
10. 0.1 mol of hydrogen sulphide

You NOW MUST COMPLETE the calculating mass check test.

https://forms.office.com/Pages/ResponsePage.aspx?id=oyzTzM4Wj0KVQTctawUZKV9pDH2i_JVJvH-NwfFQ2VJURFpDUTNVQ1hJQlhaNzlUWE9MSDlGQ04xUC4u

Further reading

To learn more about atomic structure, try the following online resources:
Calculating relative formula masses - Formula mass and mole calculations - GCSE Chemistry (Single Science) Revision - Other - BBC Bitesize

Evans2 chem web: https://www.evans2chemweb.co.uk/login/index.php#
Username: snhs password: giffnock

Select any teacher ◊ revision material ◊ Nat5 chemistry◊ Unit 1: chemical changes and structure ◊ chemical formula Several online sections for you to expand your knowledge