Nat 5 : Unit 1 – Chemical Changes and Structure

Key area – Formula and Reacting Quantities

Lesson 5 – Writing chemical equations

Learning Outcomes

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

1. State a chemical reaction which can be described using word equations
2. Explain how word equations can be shown using chemical symbol equations.
3. Use state symbols to desribe the physical state of he reactants and products.

Success Criteria

You will have been successful in this lesson if you:

1. Are up to date will all the notes given so far,
2. Completed all the self-checks and uploaded the ones your class teacher has asked for.
3. Completed the atomic structure and formula test by **Thursday 4th 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 10 and that you are confident writing formula using the valency rules **If not contact your class teacher.**

You may think this lesson is REVISION from 2nd year. You will see that Nat4 chemistry is mentioned. It is essential that you understand the Nat 4 chemistry before we progress to Nat5 which we will do later in this lesson and in lesson 12 and lesson 13.

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 power point lesson on formula

Lesson 2: https://youtu.be/6a9aXVu3Ue4

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

How to write chemical equations (Nat 4)

Word Equations

In a chemical reaction, substances present at the start (reactants) change to make new substances (products):

REACTANTS → **PRODUCTS**

starting substances reacting — new substances produced

e.g. carbon burns in oxygen to become carbon dioxide.

The starting substances are carbon and oxygen, the new substance formed is carbon dioxide.

This can be written as a **word equation** :

carbon + oxygen → carbon dioxide

When writing a word equation:

1. the '+' means '**and**'
2. the → means '**reacts to form**'
3. the REACTANTS are on the **left** of the arrow
4. the PRODUCTS are on the **right** of the arrow

Check

Write each of the following chemical reactions in the form of a word equation:

a) Carbon dioxide and water vapour are produced when methane gas reacts with oxygen
b) The reaction of dilute hydrochloric acid with calcium carbonate produces calcium chloride, carbon dioxide and water vapour
c) Silver oxide breaks up when heated to form the elements
d) Ammonium sulphate is a fertiliser produced by the reaction of ammonia with dilute sulphuric acid

Chemical Equations

Equations are mainly written using chemical symbols and formulae.

Using the example shown above, carbon burns in oxygen to form carbon dioxide :

carbon + oxygen → carbon dioxide

is written as: $C + O_2 \rightarrow CO_2$

State Symbols:

State symbols are used to tell us the physical state of the reactants or products in a reaction. It can be important to know the physical states of the substances involved in a reaction.

There are four state symbols that can be added after the formula of a substance.

State	Symbol Used
Solid	(s)
Liquid	(l)
Gas	(g)
Aqueous (dissolved in water)	(aq)

Check

Use symbols and formulae to write a chemical equation, with state symbols, for each of the following reactions.

a) carbon monoxide gas + oxygen gas → carbon dioxide gas
b) sodium metal + water → sodium hydroxide solution + hydrogen gas
c) calcium carbonate powder → calcium oxide powder + carbon dioxide gas

d) aluminium metal + oxygen gas → aluminium oxide solid
e) iron metal + chlorine gas → iron(III) chloride solid
f) nitrogen gas + hydrogen gas → ammonia gas (nitrogen hydride)
g) barium chloride solution + sodium sulphate solution → barium sulphate solid + sodium chloride solution
h) lead(II) nitrate solution + potassium chloride solution→ lead(II) chloride solid + potassium nitrate solution

Further reading

Using balanced equations - Balanced equations - National 5 Chemistry Revision - BBC Bitesize

If you've reached this point congratulations. You NOW MUST COMPLETE the Formula Quiz.

https://forms.office.com/Pages/ResponsePage.aspx?id=oyzTzM4Wj0KVQTctawUZKV9pDH2i_JVJvH-NwfFQ2VJUMFFGTjNMRk5DNFpOTzREWkdSNzRIUzNMRy4u

Student copy

If you've reached this point Well done.