**Literacy tasks for revising Chemical Reactions**

**True/False**

**Question 1** Sodium reacting with chlorine gas.

**Observations:** *When a shiny silver coloured solid is heated and placed in a jar of pure oxygen, it burns with a yellow flame and produces a white solid.*

1. (i) Write a word equation for this reaction

true/false

sodium + chlorine 🡪 sodium chlorine

(ii) Write a balanced chemical equation for this reaction, **including physical states.**

true/false

Na (s) + Cl(g) 🡪 NaCl(s)

1. Describe all observations and link them to the chemical species responsible

When a shiny silver coloured solid sulfur is heated and reacts with chlorine gas.

true/false

A yellow flame is seen and a white solid, sodium chloride is produced.

true/false

1. (i) Name the type of chemical reaction \_\_Combination reaction\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (ii) Justify your choice of reaction type by linking the observed changes to the “definition” of the

type of reaction.

This is a **combination** reaction because two reactants (solid sodium + gaseous chlorine molecules) combine together to form a single solid product (sodium chloride) when heated.

true/false

1. Discuss why this reaction occurs with reference to electron arrangements of the reactant(s) and product(s).

This reaction occurs between a metal and non-metal element.

The sodium atoms have an electron configuration of 2,8,1 and will lose 1 outer electron to achieve a stable, full outer shells of electrons.

The electron configuration of chlorine atoms is 2, 8,7 and will gain 1 outer electron to achieve a stable, full outer shell of electrons.

true/false

There is a transfer of electrons.

An ionic bond is formed with 1:1 ratio of sodium to chlorine ions. An ionic compound is formed, NaCl which has no overall charge.

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**Fill in the blanks**

**Use the words provided to help you to fill in the blanks**

|  |  |  |  |
| --- | --- | --- | --- |
| green | cloudy | precipitation | iron |
| displacement | oxide | decomposition | combination |
| carbonate | limewater | carbon dioxide | colourless |

**Question 2** Heating iron carbonate powder.

**Observations:** *When a green powder is heated in a Bunsen flame the powder appears to “boil” and a red solid remains.*

1. (i) Write a word equation for this reaction

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) This is the balanced chemical equation for this reaction, **including physical states.**

FeCO3(s) 🡪 FeO(s) + CO2(g)

1. Describe all observations and link them to the chemical species responsible

When \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solid/powder \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is heated, it gives off \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carbon dioxide gasand a red solid remains, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (i) Name the type of chemical reaction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) Justify your choice of reaction type by linking the observed changes to the “definition” of the

 type of reaction.

This is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_reaction because a single (solid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) reactant forms two separate products (solid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_) when heated.

1. Explain how you would identify the non-solid products produced in this reaction.

The carbon dioxide gas produced, if bubbled into \_\_\_\_\_\_\_\_\_\_\_\_\_ will turn \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ colour.

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**Comprehension**

**Read the following paragraph and use it to answers the questions below**

When a colourless solution of silver nitrate and pale orange solution of iron(II) iodide are added together, a cream coloured solid/precipitate of silver iodide is produced, which sinks to the bottom of a pale green solution of iron(II) nitrate.

This is an **precipitation** reaction because two solutions (silver nitrate and iron(II) iodide) combine together to produce a solid/precipitate (silver iodide) and a solution (iron(II) nitrate.

According to the solubility rules, “Nitrates are all **soluble**”, so silver nitrate is a soluble solution.

and according to the solubility rules, “Iodides are all **soluble** except silver iodide and lead iodide”, so iron(II) iodide is a soluble solution.

After they are mixed two new products are possible: silver iodide and iron(II) nitrate.

Iron(II) nitrate remains in solution because the attractive forces between the water molecules and the Fe2+ and NO3- ions are stronger than the attractions between the oppositely charged ions (Fe2+ and NO3- ions).

Silver iodide is insoluble because the attractive forces between the water molecules and the Ag+ and I- ions are weaker than the attractions between the oppositely charged ions (Ag+ and I- ions).

The spectator ions are Fe2+ and NO3- ions because they do not form the precipitate.

silver nitrate + iron iodide 🡪 silver iodide + iron nitrate

2AgNO3(aq) + FeI2(aq) 🡪 2AgI(s) + Fe(NO3)2(aq)

2Ag+(aq) + 2I-(aq) 🡪 2AgI(s) **or** Ag+(aq) + I-(aq) 🡪 AgI(s)

**Question 3** Adding silver nitrate solution to iron (II) iodide solution.

**Observations:** *When a colourless solution is added to a pale green solution, a white solid forms in a pale green solution.*

1. (i) Write a word equation for this reaction

(ii) Write a balanced chemical equation for this reaction, including **physical states**.

1. Describe all observations and link them to the chemical species responsible

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1. (i) Name the type of chemical reaction \_\_\_ \_\_\_\_\_\_\_\_\_\_\_

(ii) Justify your choice of reaction type by linking the observed changes to the “definition” of the

 type of reaction.

1. Use the solubility table on the datasheet to explain why this reaction happens.
2. (i) Identify any “spectator ions” and explain briefly why they do not need to be included in the nett ionic equation.

(ii) Write a balanced ionic equation

**Cloze test**

**Write in the missing words for each of the answers below**

**Question 4** Reaction of magnesium metal with silver nitrate solution

**Observations:** *When a grey coloured metal is placed into a colourless solution, the colour of the solution stays colourless and silver coloured crystals form a coating on the grey metal which becomes thinner.*

1. (i) Write a word equation for this reaction

\_\_\_\_\_\_\_\_\_\_ + silver nitrate 🡪 silver + \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_

(ii) Write a balanced chemical equation for this reaction, **including physical states.**

1. Describe all observations and link them to the chemical species responsible

When a grey coloured metal/solid \_\_\_\_\_\_\_\_\_ is placed into a colourless solution of \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_, a silver coloured solid of \_\_\_\_\_\_\_\_\_ forms on the surface and the solution turns \_\_\_\_\_\_\_\_\_\_\_\_ because of the Mg2+/Mg(NO3)2.

1. (i) Name the type of chemical reaction \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) Justify your choice of reaction type by linking the observed changes to the “definition” of the type of reaction.

This is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactionbecause a \_\_\_\_\_\_ reactive metal (\_\_\_\_\_\_\_\_\_\_) takes the place of a less reactive metal (\_\_\_\_\_\_\_\_\_\_\_) in a compound.

1. Use the activity series on the data sheet to explain why this reaction occurs by comparing the relative reactivity of the chemical species.

\_\_\_\_\_\_\_\_\_\_\_ is a more reactive metal than \_\_\_\_\_\_\_\_\_\_\_ and so magnesium will have \_\_\_\_\_\_\_\_\_\_\_\_\_for ending up in its \_\_\_\_\_\_\_\_\_ ionic/compound form.

Magnesium \_\_\_\_\_\_\_\_ its valence electrons more easily and “forces” the silver **ions** to accept them.

1. (i) Identify any spectator ions in this reaction.

NO3- ions are spectator ions because they are \_\_\_\_\_\_\_\_\_\_\_ in the reaction

(ii) Write a balanced ionic equation that does not include spectator ions.

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