**The Chemistry Audit: what you *really* need to know before starting Yr12**

**Topics:** atomic structure and the periodic table, structure and bonding, ionic formulas, balancing equations, reactions of acids

**Instructions**: write answers to the questions below on lined paper. You may use your periodic table to complete this assessment. You cannot use your books.

**Elements, compounds and the periodic table**

1. Write down the definition for each word below and give an example for each.

Element

Compound

Mixture

1. What is the difference between a chemical and a physical change? Give an example of each.
2. What element is in group 2, period 3 of the periodic table?
3. Which group of the periodic table contains alkali metals?
4. What groups of the periodic table contain non-metals?
5. What is the most reactive metal?
6. What is the most reactive non-metal?
7. Write down the **name** of an element that is a:

Noble gas

Halogen

Transition metal

Alkali metal

Alkaline earth metal

**Atomic structure and chemical reactivity**

9. Complete the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Subatomic particle** | **Symbol** | **Relative charge** | **Relative mass** | **Location in atom** |
| Proton |  |  |  |  |
| Electron |  |  |  |  |
| Neutron |  |  |  |  |

1. How many protons, electrons and neutrons does an atom of potassium have? Explain why atoms do not have an overall charge.
2. How many valence electrons does calcium have?
3. How many valence electrons does astatine have?
4. Explain why fluorine is more reactive than bromine.
5. Explain why potassium is more reactive than sodium.
6. Write down the **full electronic configuration** of:
7. Neon
8. Calcium
9. Ca2+
10. F
11. F-
12. How many atoms are in the following?
    1. H2O
    2. H2SO4
    3. CaCO3
    4. Ca(OH)2
13. How many different elements are in the following?
    1. H2O
    2. H2SO4
    3. CaCO3
14. What are the formulas for the following ions (include charges)?

* Potassium
* Magnesium
* Boron
* Oxide
* Fluoride
* Carbonate
* Hydroxide
* Nitrate

**Structure and bonding**

1. Draw a **labelled diagram** to show the bonding and structure in sodium metal.
2. Draw a dot and cross diagram for sodium bromide, showing outer electrons only.
3. NaBr has a high melting point, explain in terms of structure **and** bonding why this is.
4. Draw a dot and cross diagram for a chlorine molecule, showing only outer electrons. Use this diagram to explain the term diatomic.
5. Explain in terms of bonding and structure why chlorine is a gas at room temperature?
6. Explain why graphite is able to conduct electricity but diamond is not.
7. Explain why molten lead bromide can conduct electricity but solid lead bromide can’t.
8. Identify the bonding **and** structure in the following compounds:

* NaI
* H2S
* Sr
* H2O

**Writing chemical formulas and balancing equations**

1. Complete the following equations to show the different reactions of acids:

acid + metal oxide 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

acid + reactive metal 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

acid + metal carbonate 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_

acid + base 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Complete **a balanced symbol equation** (with state symbols) for the following:
2. methane + oxygen 🡪 carbon dioxide + water
3. magnesium + oxygen 🡪 magnesium oxide
4. chlorine + potassium iodide 🡪 iodine + potassium chloride
5. copper sulphate + iron 🡪 iron (II) sulfate + copper
6. copper(I) carbonate 🡪 copper(I) oxide + carbon dioxide
7. sulphuric acid + zinc oxide 🡪 \_\_\_\_\_\_\_\_\_\_\_\_ + water
8. Draw the displayed formula of each molecule in question 28a
9. Write the half equation for the conversion of I- to I2.

**I need to revise:**