

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

2. What is the difference between a chemical and a physical change? Give an example of each.
3. What element is in group 2, period 3 of the periodic table?
4. Which group of the periodic table contains alkali metals?
5. What groups of the periodic table contain non-metals?
6. What is the most reactive metal?
7. What is the most reactive non-metal?
8. 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				

10. How many protons, electrons and neutrons does an atom of potassium have?
Explain why atoms do not have an overall charge.
11. How many valence electrons does calcium have?
12. How many valence electrons does astatine have?
13. Explain why fluorine is more reactive than bromine.

14. Explain why potassium is more reactive than sodium.
15. Write down the **full electronic configuration** of:
1. Neon
 2. Calcium
 3. Ca^{2+}
 4. F
 5. F^-
16. How many atoms are in the following?
- a. H_2O
 - b. H_2SO_4
 - c. CaCO_3
 - d. $\text{Ca}(\text{OH})_2$
17. How many different elements are in the following?
- e. H_2O
 - f. H_2SO_4
 - g. CaCO_3
18. What are the formulas for the following ions (include charges)?
- Potassium
 - Magnesium
 - Boron
 - Oxide
 - Fluoride
 - Carbonate
 - Hydroxide
 - Nitrate

Structure and bonding

19. Draw a **labelled diagram** to show the bonding and structure in sodium metal.
20. Draw a dot and cross diagram for sodium bromide, showing outer electrons only.
21. NaBr has a high melting point, explain in terms of structure **and** bonding why this is.
22. Draw a dot and cross diagram for a chlorine molecule, showing only outer electrons. Use this diagram to explain the term diatomic.
23. Explain in terms of bonding and structure why chlorine is a gas at room temperature?
24. Explain why graphite is able to conduct electricity but diamond is not.
25. Explain why molten lead bromide can conduct electricity but solid lead bromide can't.

26. Identify the bonding **and** structure in the following compounds:

- NaI
- H₂S
- Sr
- H₂O

Writing chemical formulas and balancing equations

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

acid + metal oxide → _____ + _____

acid + reactive metal → _____ + _____

acid + metal carbonate → _____ + _____ + _____

acid + base → _____ + _____

28. Complete a **balanced symbol equation** (with state symbols) for the following:

a) methane + oxygen → carbon dioxide + water

b) magnesium + oxygen → magnesium oxide

c) chlorine + potassium iodide → iodine + potassium chloride

d) copper sulphate + iron → iron (II) sulfate + copper

e) copper(I) carbonate → copper(I) oxide + carbon dioxide

f) sulphuric acid + zinc oxide → _____ + water

29. Draw the displayed formula of each molecule in question 28a

30. Write the half equation for the conversion of I⁻ to I₂.

I need to revise: