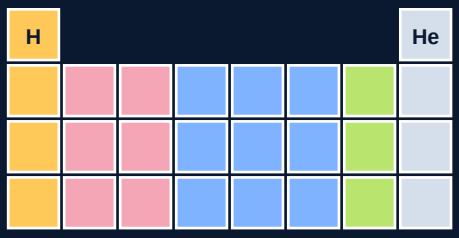
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YEAR 9 • CHEMISTRY

The Periodic Table

Groups 1, 7 and 0
Homework Worksheet • KS3 • GCSE foundations



Groups 1, 7 and 0

Name: _____

Class: _____

Date: _____

Time: about 40 minutes

Total: 45 marks

Score: _____ / 45

Key notes – read these first

- Elements are arranged in order of **atomic number**. A vertical column is a **group**; a horizontal row is a **period**.
- **Metals** are on the left and in the middle; **non-metals** are on the right. Elements in the same group have similar reactions.
- **Group 1 (alkali metals):** soft metals that react with water to make an alkaline solution and hydrogen. They get **more reactive** down the group.
- **Group 7 (halogens):** non-metals that exist as pairs of atoms (e.g. Cl_2). They get **less reactive** down the group. A more reactive halogen displaces a less reactive one from its compound.
- **Group 0 (noble gases):** very unreactive gases because their atoms have a full outer shell of electrons.

Instructions

- Answer **all** questions in the spaces provided.
- Use a pencil and ruler for any diagrams.
- The marks for each question are shown in brackets, e.g. [2].
- Read the key notes above if you get stuck.
- Questions marked CHALLENGE stretch you towards GCSE.

Section	Topic	Marks
A	Elements and the periodic table	13
B	Group 1: the alkali metals	12
C	Group 7 and Group 0	14
D	Challenge: element X and Mendeleev	6
	Total	**45**

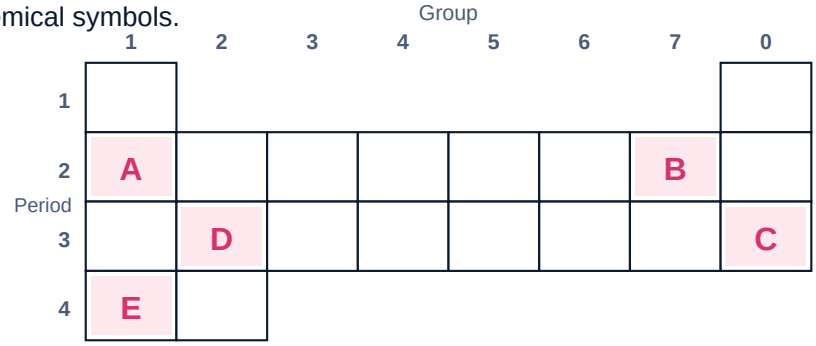
Section A – Elements and the periodic table 13 marks

1 Complete the sentences using words from the box. Each word is used once. Two words are not needed. [5]

group • period • left • right • atomic number • mass • colour

Elements in the periodic table are arranged in order of _____. A vertical column is called a _____ and a horizontal row is called a _____. Metals are found on the _____ of the table and non-metals on the _____.

2 The diagram shows an outline of the first four periods of the periodic table. Letters **A** to **E** are **not** chemical symbols.



(a) Which **two** letters are in the same group? [1]

.....

(b) Which letter is a noble gas? [1]

.....

(c) Which letter is a halogen? [1]

.....

(d) Which **two** letters are in the same period? [1]

.....

(e) Which letter is the most reactive metal? [1]

.....

(f) Give all the letters that are metals. [1]

.....

3 Put a tick in one box in each row to show whether the property is typical of a metal or a non-metal. [2]

Property	Metal	Non-metal
Conducts electricity well		
Dull and brittle when solid		
Shiny and can be bent into shape		
Many are gases at room temperature		

Section B – Group 1: the alkali metals 12 marks

4 A teacher drops small pieces of three Group 1 metals into water. The table shows what happened.

Metal	What happened
lithium	fizzes slowly and moves around on the surface
sodium	fizzes quickly, melts into a ball and whizzes around
potassium	fizzes very quickly, melts and catches fire with a lilac flame

(a) Write the three metals in order of reactivity, starting with the **most** reactive. [1]

.....

(b) Describe the trend in reactivity down Group 1. [1]

.....

(c) Rubidium is below potassium in Group 1. Predict how rubidium reacts with water. [1]

.....

(d) Complete the word equation: sodium + water → _____ + _____ [2]

(e) Explain why Group 1 metals are called the **alkali** metals. [1]

.....

(f) Suggest why Group 1 metals are stored under oil. [1]

.....

5 The table shows the melting points of some Group 1 metals.

Metal	lithium	sodium	potassium	rubidium	caesium
Melting point (°C)	181	98	63	39	?

(a) Describe the trend in melting point down Group 1. [1]

.....

(b) Predict the melting point of caesium. [1]

.....

(c) Give **two** safety precautions the teacher should take when showing these reactions. [2]

(d) How many electrons do Group 1 atoms have in their outer shell? [1]

Section C – Group 7 (halogens) and Group 0 (noble gases) 14 marks

6 The table shows some information about the halogens.

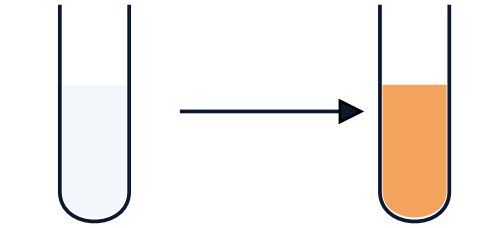
Halogen	State at room temperature	Colour
fluorine	gas	pale yellow
chlorine	gas	green
bromine	liquid	red-brown
iodine	solid	grey-black

(a) Describe the trend in state as you go down Group 7. [1]

(b) Astatine is below iodine. Predict its state and colour. [2]

(c) Describe the trend in reactivity down Group 7. [1]

7 A student adds chlorine water to potassium bromide solution. The solution turns orange.



potassium bromide solution (colourless) — after adding chlorine water

(a) Explain why the solution turns orange. [2]

(b) Complete the word equation: chlorine + potassium bromide → _____ + _____ [2]

(c) Would iodine react with potassium bromide solution? Explain your answer. [2]

8 The noble gases are in Group 0.

(a) Explain why the noble gases are very unreactive. [1]

.....

(b) Helium is used to fill party balloons. Give **two** reasons why helium is suitable. [2]

.....

.....

(c) Argon is used inside some light bulbs. Suggest why. [1]

.....

Section D – CHALLENGE: element X and Mendeleev — 6 marks

9 Element **X** is soft enough to cut with a knife. It reacts with water to make hydrogen and an alkaline solution. It melts at about 30 °C.

(a) Which group is element X in? [1]

.....

(b) Give **two** pieces of evidence from the description for your answer. [2]

.....

.....

(c) Mendeleev left gaps in his periodic table. Explain why he left gaps. [1]

.....

(d) Later, germanium was discovered. Its properties matched Mendeleev's predictions for one of the gaps. Explain how this supported his table. [2]

.....

.....

End of worksheet. Check your answers, then ask your teacher for the mark scheme. Total: 45 marks.