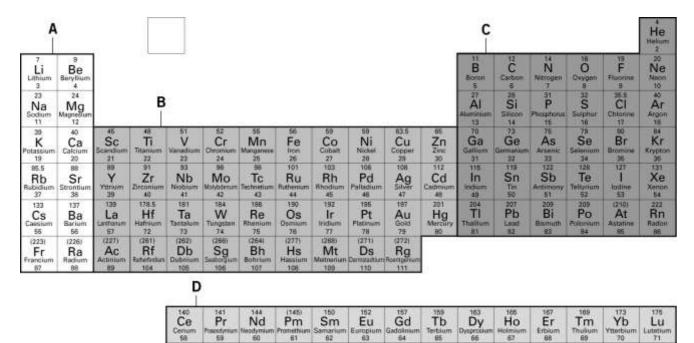# The Periodic Table

Aims

You have been asked to make a documentary about the Periodic Table and the elements and groups found within it.

Work through the tasks below. You teacher may ask you to use your answers to plan this documentary for homework.

Task 1: Metals and non-metals

1 Look at the Periodic Table below.

   a State the section of the Periodic Table in which you can find non-metals. _____

   b State whether Section A contains metals or non-metals. _____

2 a Categorise the following properties into those shown by metals, non-metals, or both. Complete the table below by ticking in the column.

Property	Metal	Non-metal
conductor of heat and electricity		
insulator of heat and electricity		
shiny		
low density		
dull		
sonorous (makes a ringing sound when hit)		
brittle (breaks easily)		
malleable (can be hammered into shape)		
ductile (can be drawn into wires)		
high density		
not sonorous		

b An unknown element is sonorous, conducts electricity, and can be drawn into wires. State whether this unknown element is a metal or a non-metal. Explain your answer.

_____

_____

3 An oxide is produced when an unknown substance dissolves in water. This solution turns universal indicator orange. Explain whether the unknown substance is a metal or non-metal, and describe how the observations will be different if the unknown substance is of the other category.

_____

_____

_____

Task 2: Patterns in groups and periods

1 Complete the sentences below by crossing out the incorrect answer.

The rows of the Periodic Table are called ***groups/periods***.

The columns of the Periodic Table are called ***groups/periods***.

2 a Look at the data provided in the table. Describe the trend shown across a period.

Element	sodium	magnesium	aluminium	silicon
Melting point (°C)	98	649	660	1410

_____

_____

b Here is another set of data for a different period. Compare the data provided for the two periods.

Element	lithium	beryllium	boron	carbon
Melting point (°C)	181	1287	2076	3527

_____

_____

Task 3: Patterns in Group 1

The following table shows some of the trends in Group 1 elements.

	Melting point (°C)	Boiling point (°C)	Reactivity with water
lithium		1330	fizzes steadily
sodium	98	890	
potassium	64		fizzes and burns with a lilac flame
rubidium	39	688	explodes with sparks

1 Describe the pattern shown in the data for Group 1 elements.

_____

_____

_____

2 Predict the missing properties in the table above using the patterns described in Question 1. Fill in the missing entries in the table above.

Task 4: Patterns in Group 7

The table below shows whether reactions will occur between Group 7 elements (halogen water) and Group 7 compounds in solution (potassium halide).

	potassium fluoride	potassium chloride	potassium bromide	potassium iodide
fluorine water	✗	✓	✓	
chlorine water	✗			✓
bromine water	✗		✗	✓
iodine water		✗	✗	✗

1 Complete the table above using patterns in Group 7 elements.

2 a State what is meant by a displacement reaction.

_____

_____

b Describe displacement reactions using examples from the table above.

_____

_____

_____

3 Predict if the following pairs of reactants will undergo displacement reactions. Write a word equation for reactions that occur. Explain your answer.

a chlorine water and sodium iodide

_____

_____

b bromine water and magnesium bromide

_____

_____

c iodine water and aluminium chloride

_____

_____

Task 5: Patterns in Group 0

1 The table below shows some of the properties shown by Group 0 elements.

Categorise them into chemical or physical properties by ticking the appropriate column for each property stated.

	Physical	**Chemical**
low melting points		
low boiling points		
colourless gas at room temperature		
good insulator of heat		
unreactive		

2 Describe the differences between chemical and physical properties. Use examples from the table above.

_____

_____

_____

3 Predict if xenon will react with nitrogen. Explain your answer.

_____

_____

4 The boiling points of helium, neon, and argon are −269 °C, −246 °C, and −186 °C respectively. Predict the boiling point of krypton. Explain your answer.

_____

_____