



Science Home Learning Task

Year 8

The Periodic Table

Name _____

Tutor Group _____

Teacher _____

Given out: Monday 16 December Hand in: Monday 6 January

Parent/Carer Comment

Staff Comment

Target



Investigating science

Welcome to your science homework booklet. This booklet is designed to give you some extra practice in the “periodic table” section of the course.

You need to carry out tasks **1, 2, 3, 4 and 5.**

Don't forget to fill in the last page and ask a parent/carer to sign the box on the front.

Reading task

An **element** is a substance consisting of atoms that can no longer be broken down into other substances, which all have the same number of protons, which translates into its atomic number. Since there are more than 100 of these elements, chemists and other scientists needed a method of classifying them. This led to the original periodic table which was first proposed by Russian chemist Dmitri Mendeleev in 1869. Today it is called the **Periodic Table of Elements**.

The current Periodic Table is a method for listing about 115 different elements. The elements are listed by the structure of each element. Atoms are made up of protons, neutrons, and electrons. The Periodic Table indicates the number of protons and electrons each atom has in its outer shell, located outside the nucleus.

On the Periodic Table of Elements, the atoms are listed from left to right and top to bottom. All of the elements are listed in the order of their atomic number, which corresponds to the number of protons in each atom's nucleus.

The elements are lined up in cycles or periods, which is why it is called a 'periodic' table. They are first lined up in rows based on their atomic numbers, but then some columns are skipped so elements with the same number of electrons line up on the same column. Elements in the same columns will then have the same properties.

The seven or eight horizontal rows of the Periodic Table are called periods. The first period is the shortest and has only two elements, hydrogen and helium. The sixth horizontal row or period contains 32 elements. The left most element in a period, or row, has just one electron in its outer shell, and the right most element has a full shell.

The eight vertical columns are different groups and each have different properties. An example of a group is the noble (inert) gases. They are lined up in the final (8th) column or group of the Periodic Table. Each of these elements have a full outer shell of electrons, which means they are very stable. When an element is stable they usually do not react to other elements. They don't mix well or easily.

A second example are the metals called alkali. They align in the first column, or group, and are all very similar having only one electron in its outer shell. These elements are very reactive, meaning they easily mix with the other elements.

The classification of grouping of these elements help chemists and other scientists understand, foresee, and predict how the different elements will react with each other during experiments or in other situations.

Finally, each element has a name and a one or two-letter abbreviation to make it easier for scientists to use the table. Some of the single-letter abbreviations are easy to remember, like *H* for hydrogen, *O* for oxygen, and *C* for carbon. Some may be a bit more difficult because the name of the element comes from a different language. For example, *AU* is the abbreviation for gold because gold comes from the Latin word *aurum*.

In summary, the Periodic Table of Elements is a helpful and useful tool for chemists and scientists. It is used as a quick method to discover how the different elements will react to each other.

Answer the following questions about what you have just read

Questions

1. Which of the following is a substance of atoms that can no longer be broken down?
 - A) Proton
 - B) Neutron
 - C) Electron
 - D) Element

2. In what year did Russian chemist Dmitri Mendeleev first propose using the periodic table of the elements?
 - A) 1869
 - B) 1968
 - C) 1698
 - D) 1815

3. Approximately how many elements are listed in the periodic table?
 - A) 18
 - B) 32
 - C) 115
 - D) Infinite number

4. Helium is a gas and element located in which column of the periodic table?
- A) 1st
 - B) 2nd
 - C) 4th
 - D) 8th
5. Sodium is an element located in the alkali metal group. Which column is it located in the periodic table?
- A) 1st
 - B) 2nd
 - C) 3rd
 - D) 4th
6. What is the difference between elements in the first column and elements in the last column?
- A) Elements in the 1st column are less reactive than those in the last column?
 - B) Elements in the last column are less reactive than elements in the 1st column
 - C) Elements in the 1st column are gases and elements in the last column are solids
 - D) Elements in the last column are gases and elements in the 1st column are solids

The Periodic Table of the Elements

1 2 3 4 5 6 7 0

1 H hydrogen

7	Li	relative atomic mass
3	Li	symbol
3	Li	name
3	Li	atomic (proton) number

7 Li lithium 3	9 Be beryllium 4	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36	11 Na sodium 11	24 Mg magnesium 12	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54	85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54	133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86	[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated Metals ← → Non-metals									
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TASK 1 - Metals and non-metals

Answer each of the questions below. Use the periodic table on the previous page to help you.

1. Where in the periodic table are the **metals** found?

2. Where in the periodic table are the **non-metals** found?

3. Unscramble the metals and non-metals below using the periodic table. Then write the unscrambled name in the correct section below. **Also add 1 metal and 1 non-metal of your own to the correct section.**

BOCARN RINO DOUSIM GOXENY
PERCOP NARGO

Metals:-

Non-metals:-

TASK 1 continued

4. **Metals** and **non-metals** have different properties. Write the word “**metal**” or “**non-metal**” beside each property in the table below.

Property	Metal or non-metal?
Shiny	
Dull	
Conductor of heat and electricity	
Malleable (can be shaped)	
Sonorous (rings when hit)	
Low density	
Ductile (can be made into wires)	
Not sonorous	
High density	
Insulator of heat and electricity	

An unknown substance is shiny, malleable, has a high density and can conduct heat and electricity. Is this substance a metal or a non-metal?

Explain your answer.

TASK 1 continued

5. Look at the table below and answer the following questions.

Element	Melting point (°C)	Does the element conduct electricity?
A	44	No
B	2440	Yes
C	217	No
D	3000	Yes
E	1780	Yes
F	120	No

a) What is the link between melting point and whether the element conducts electricity or not?

b) From the table above, give the letters of **3** elements that are likely to be metals. Explain your choice.

TASK 2 – Groups and periods

Answer the following questions in the spaces provided.

1. What are the columns in the **periodic table** called?

2. What are the rows in the **periodic table** called?

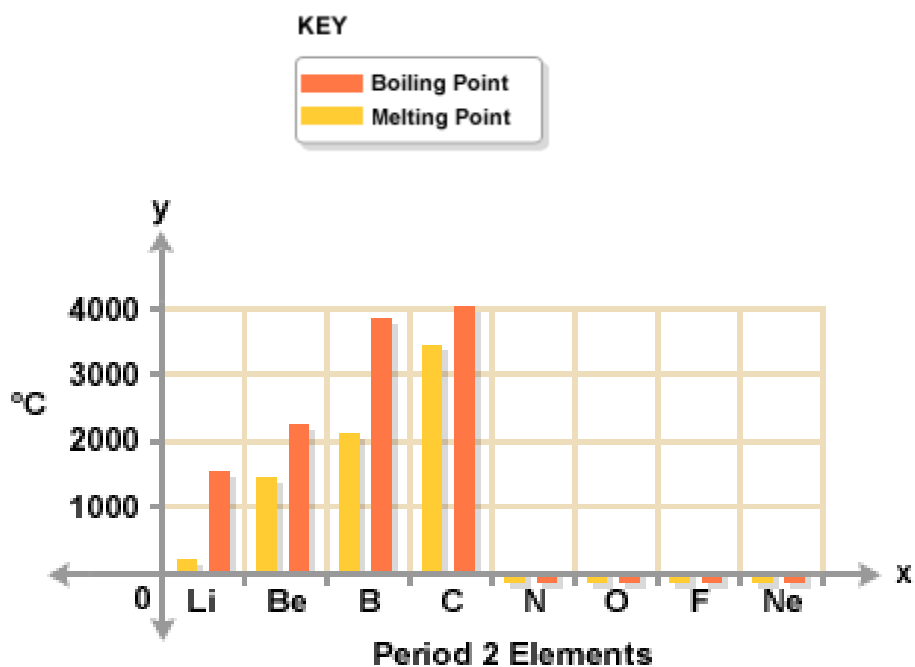
3. The table below shows data for the elements in group 2 of the periodic table.

Element	Melting point (°C)
Beryllium	1287
Magnesium	650
Calcium	842
Strontium	768
Barium	
Radium	699

- a) Describe the pattern in the melting point as you move down the group.

b) Use the pattern you have identified to predict the **melting point** of barium.

4. Look at the graph below showing the **melting** and **boiling points** for period 2 of the **periodic table**.



a) **Describe** the pattern in the **melting points** and **boiling points** as you move across the **period**.

b) What conclusion can you make about the **elements** in the same **group** or **period**?

TASK 3 – Elements of Group 1

1. Write down the symbols of the elements in **Group 1**. Use the **periodic table** to help you.

2. Are the elements in **Group 1** metals or non-metals? Explain your answer.

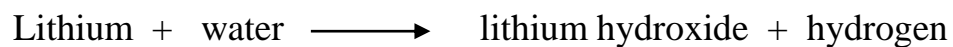
3. The table below shows the melting point of elements in **Group 1** and **Group 2**.

Element	Group number	Melting point (°C)
Lithium	1	180
Sodium	1	97
Potassium	1	63
Rubidium	1	39
Cesium	1	28
Magnesium	2	650
Calcium	2	839
Strontium	2	764

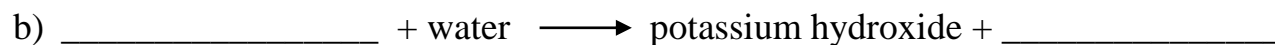
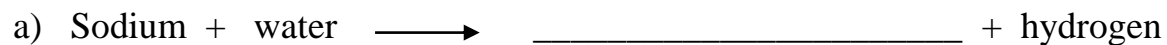
a) Describe the pattern of the melting points for the **Group 1** elements.

b) Compare the **melting points** of the elements in **Group 1** and **Group 2**. Use the table above to help you.

4. **Group 1** elements are very reactive. The equation below shows the reaction between lithium and water.



Use the equation above to predict the missing parts in the equations below.



TASK 4 – Group 7 elements

1. What name is given to the elements in **Group 7**?

2. List the elements that are found in **Group 7**. Use the **periodic table** to help.

3. **Group 7** elements are able to carry out **displacement** reactions.

- a) What is meant by a **displacement** reaction?

The table below shows whether reactions will occur between **Group 7** elements (halide 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		×	×	×

b) Complete the table above to show whether a displacement reaction will happen (tick) or not (cross).

4. Complete the equations below for the following displacement reactions.

a) Chlorine + potassium bromide \longrightarrow

_____ + _____

b) Bromine + potassium iodide \longrightarrow

_____ + _____

c) Fluorine + potassium chloride \longrightarrow

_____ + _____

d) Bromine + sodium iodide \longrightarrow

_____ + _____

e) Chlorine + sodium bromide \longrightarrow

_____ + _____

TASK 5 - Group 0 elements

Find the words on the next page in the grid below.

N	A	P	M	D	F	X	G	R	I	C
F	O	L	T	A	H	S	L	M	E	O
D	X	B	V	E	U	I	O	N	A	L
I	J	S	L	X	C	G	W	O	S	O
R	C	I	O	E	K	O	H	N	F	U
G	U	R	W	L	G	Y	E	E	M	R
M	N	F	M	T	H	A	Z	X	C	L
L	B	I	E	P	F	B	S	I	O	E
R	N	D	L	R	W	M	Q	E	G	S
S	O	X	T	I	O	C	V	L	S	S
T	E	C	I	S	O	F	T	N	K	G
Q	N	B	N	H	U	B	G	I	T	A
B	D	U	G	K	L	R	W	Y	J	S
J	G	L	A	O	Q	M	F	O	H	K
A	R	G	O	N	I	S	E	P	L	D
E	V	I	T	C	A	E	R	N	U	U

Words to find:-

Argon

Colourless gas

Glow

Helium

Low boiling (point)

Low melting (point)

Neon

Noble gases

Unreactive

Xenon

When you have found the words above, colour those words in the grid that are **physical properties** of the elements in **green** and those words that are **chemical properties** of the elements in **blue**.

