



# HOMework BOOKLET

**C1**

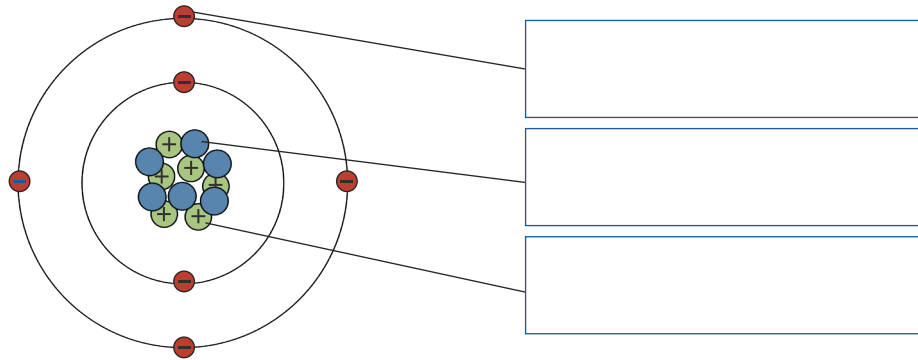
# Atoms, Elements and Compounds

Atoms are tiny particles which make up all substances and matter. They contain a central nucleus made up of neutral neutrons and positively charged protons. Negatively charged electrons orbit the nucleus.

1. Label the diagram of the atom.

Use the words in the box.

electron
neutron
proton



An element is made up of only one type of atom. There are around 100 different elements, which can all be found on the periodic table.

A compound is formed when two or more different atoms are chemically bonded together. For example, water ( $H_2O$ ) is a compound made up of hydrogen and oxygen atoms. Compounds can be represented by their chemical formula; this shows the number of atoms of each element present in the compound.

2. For each of the substances below, write down the element(s) that it contains. The first one has been done for you.

You might find it helpful to use a periodic table for this question.

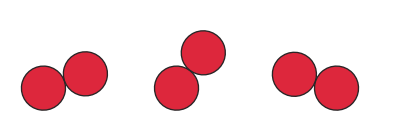
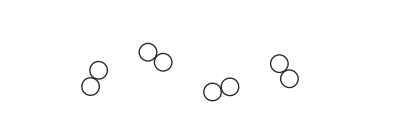
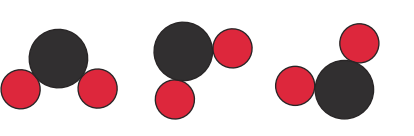
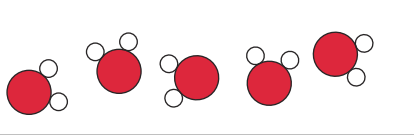
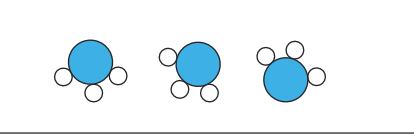
Name of Substance	Chemical Formula	Element(s)
water	$H_2O$	hydrogen and oxygen
magnesium oxide	$MgO$	
carbon	$C$	
oxygen	$O_2$	
methane	$CH_4$	
iron	$Fe$	
glucose	$C_6H_{12}O_6$	

3. Sort the following substances into the table. Each substance should be written into one column only. The chemical formulae of the substances have been included to help you.

aluminium (Al)	copper sulfate ( $\text{CuSO}_4$ )	sodium chloride (NaCl)
boron (B)	hydrogen ( $\text{H}_2$ )	sulfur (S)
carbon dioxide ( $\text{CO}_2$ )	hydrogen peroxide ( $\text{H}_2\text{O}_2$ )	tin (Sn)
calcium carbonate ( $\text{CaCO}_3$ )	magnesium (Mg)	zinc oxide (ZnO)

Elements	Compounds

4. Match the common substances listed below with the correct diagram.

carbon dioxide $\text{CO}_2$		<p><b>Key</b></p> <ul style="list-style-type: none"> <li><span style="color: red; font-size: 1.2em; margin-right: 5px;">●</span> oxygen</li> <li><span style="color: black; font-size: 1.2em; margin-right: 5px;">●</span> carbon</li> <li><span style="color: white; border: 1px solid black; border-radius: 50%; width: 10px; height: 10px; display: inline-block; margin-right: 5px;"></span> hydrogen</li> <li><span style="color: blue; font-size: 1.2em; margin-right: 5px;">●</span> nitrogen</li> </ul>
water $\text{H}_2\text{O}$		
ammonia $\text{NH}_3$		
oxygen $\text{O}_2$		
hydrogen $\text{H}_2$		

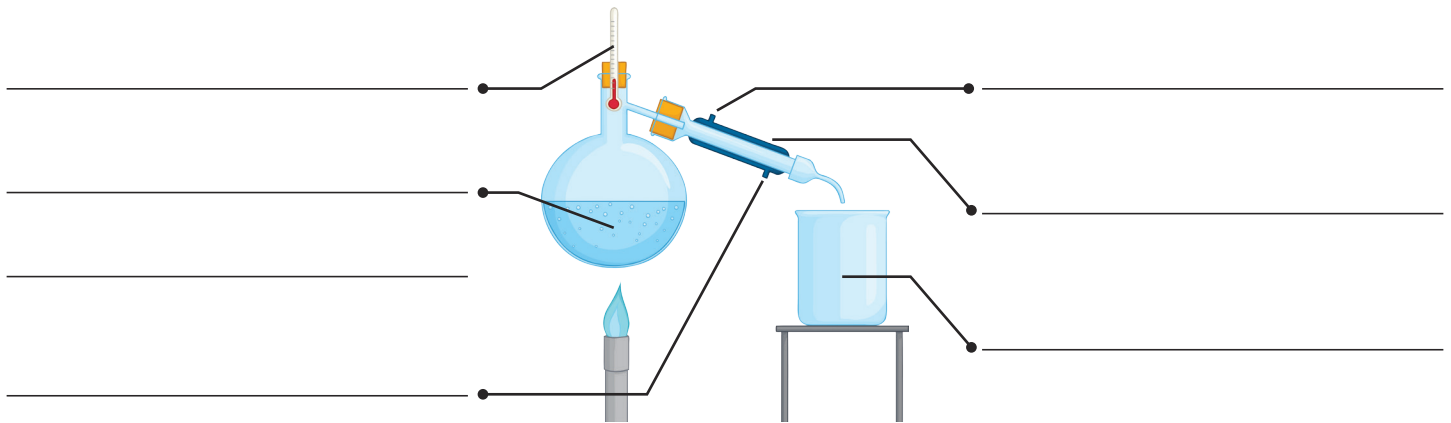
# Distillation

Complete the following tasks:

Simple distillation is used to separate \_\_\_\_\_.

Use the words in the box below to label the distillation apparatus.

- thermometer
- solution of food colouring and water
- water in
- water out
- condenser
- pure water



Describe how distillation enabled the solution containing food colouring and water to be separated.

Keywords:

- condenses
- evaporate
- cooled
- heated
- boiling point

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Extension

What would happen if the mixture was heated to a temperature higher than the boiling points of both substances?

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How could you separate a solution that contained several different liquids?

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# History of the Periodic Table Worksheet

The element magnesium has 12 electrons. State magnesium's group number and show how you could prove your answer is correct.

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Part of Mendeleev's periodic table is shown below.

Group I		II	III	IV	V	VI	VII	VIII
Period 1	H=1							
2	Li=7	Be=9.4	B=11	C=12	N=14	O=16	F=19	
3	Na=23	Mg=24	Al=27.3	Si=28	P=31	S=32	Cl=35.5	
4	K=39	Ca=40	?=44	Ti=48	V=51	Cr=52	Mn=55	Fe=56, Co=59 Ni=59
5	Cu=63	Zn=65	?=68	?=72	As=75	Se=78	Br=80	
6	Rb=85	Sr=87	?Yt=88	Zr=90	Nb=94	Mo=96	?=100	Ru=104, Rh=104 Pd=106
7	Ag=108	Cd=112	In=113	Sn=118	Sb=122	Te=125	J=127	
8	Cs=133	Ba=137	?Di=138	?Ce=140				
9								
10			?Er=178	?La=180	Ta=182	W=184		Os=195, Ir=197 Pt=198
11	Au=199	Hg=200	Tl=204	Pb=207	Bi=208			
12				Th=231		U=240		

1. Give the symbols of two elements that Mendeleev placed in group 2 which are not found in group 2 today.

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2. Name these two elements.

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3. Mendeleev left gaps in his periodic table. Explain why.

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The table shows the melting and boiling points for the alkali metals.

Element	Melting Point (°C)	Boiling Point (°C)
lithium	180	1342
sodium	98	883
potassium	64	759
rubidium	39	
caesium	29	671
francium	27	677

3. Why are the alkali metals solid at room temperature?

Tick **one** box.

- Their melting points are higher than room temperature.
- Their melting points are lower than room temperature.
- Their boiling points are lower than room temperature.
- Because metals are always solid.

4. Predict the boiling point of rubidium.

\_\_\_\_\_ °C

The table shows what happens when some alkali metals are added to water.

Element	Observations
lithium	It floats on the water and fizzes, gradually becomes smaller until it disappears.
sodium	It fizzes rapidly and melts to form a ball that moves about on the surface of the water. The ball gets smaller quickly and disappears.
potassium	It melts and moves quickly around the surface of the water and gives off sparks and a violet flame. It disappears rapidly, sometimes with a small explosion.

5. Predict how rubidium would behave if added to water.

Tick **one** box.

- It melts quickly, shoots across the water and disappears.
- It melts quickly and burns with a violent flame, then disappears in a violent explosion.
- It fizzes slowly and gradually disappears over a few minutes.
- It fizzes rapidly and melts. It sets alight as it disappears.

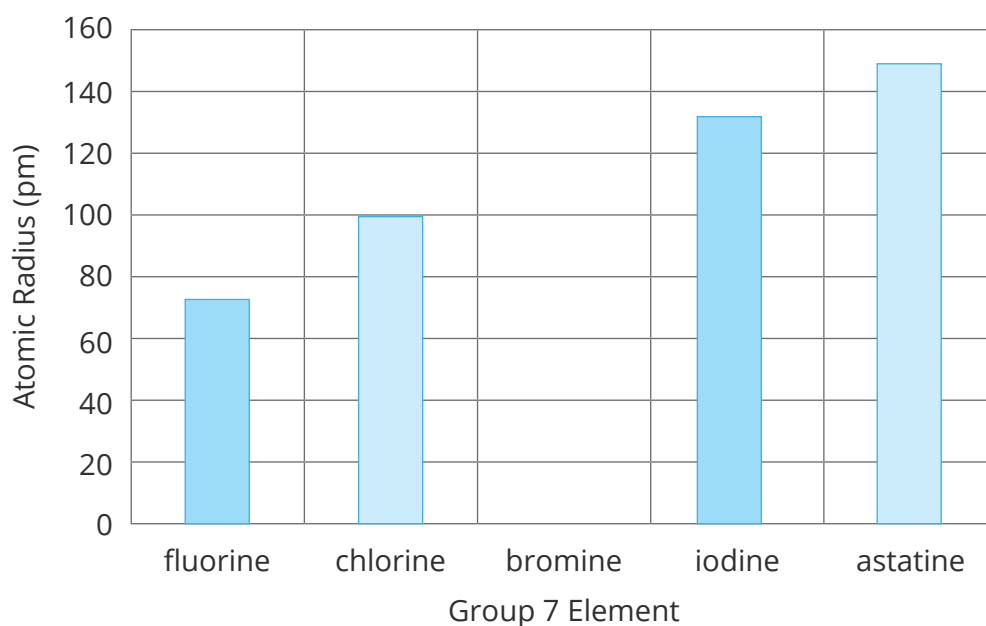


# Trends in Group 7 Elements

The halogens are found in Group 7 of the periodic table.

	1	2										3	4	5	6	7	0	
																		He
	Li	Be										B	C	N	O	F	Ne	
	Na	Mg										Al	Si	P	S	Cl	Ar	
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	Fr	Ra	Ac															

The graph shows the radius of an atom of each halogen. The bar for bromine is missing.



1. Complete the sentence to describe the trend in the size of the atoms of the halogens.  
As you move down Group 7, the radius of the atoms

\_\_\_\_\_

2. Draw a bar on the graph to predict the radius of a bromine atom.



The table shows the melting and boiling points for the halogens.

Element	Melting Point (°C)	Boiling Point (°C)	State at Room Temperature
fluorine	-220	-188	gas
chlorine	-101		gas
bromine	-7	59	
iodine	114	184	solid
astatine	302	337	solid

3. Predict the state of bromine at room temperature (20°C).

Tick **one** box.

solid

liquid

gas

4. Predict the boiling point of chlorine.

\_\_\_\_\_ °C

The table shows what happens when halogens react with iron wool.

Element	Observations
fluorine	It reacts instantly, setting the iron wool on fire.
chlorine	It reacts very quickly with a bright glow and a flame.
bromine	The iron must be heated and the bromine warmed to start the reaction. There is a bright glow.
iodine	Both substances must be heated strongly to start the reaction which then proceeds slowly. There is a faint glow.

5. Compare the reactivity of the Group 7 halogens with the alkali metals in Group 1.

Tick **one** box.

The elements get less reactive as you move down Group 7, the same as Group 1.

The elements get less reactive as you move down Group 7, the opposite of Group 1.

The elements get more reactive as you move down Group 7, the same as Group 1.

The elements get more reactive as you move down Group 7, the opposite of Group 1.