

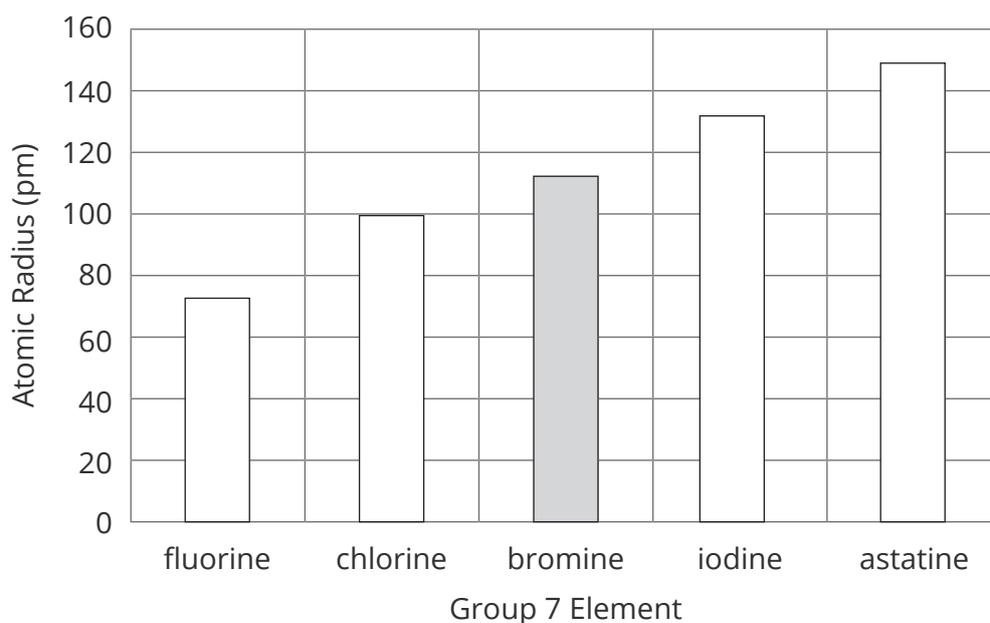


Trends in Group 7 Elements **Answers**

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

	1	2										3	4	5	6	7	0	
							H										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. Describe the trend in the size of the atoms of the halogens.

As you go down the group, the radius of the atoms increases.

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

Allow any bar drawn on the graph that is taller than the bar for chlorine and shorter than the bar for iodine.

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

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. **liquid**

Explain your prediction.

The melting point is lower than room temperature, so room temperature is too high for it to be a solid. The boiling point is higher than room temperature, so room temperature is too low for it to be a gas.

4. Predict the boiling point of chlorine.

Any value above -101°C and below 20°C/room temperature

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.

As you go down Group 7, the elements get less reactive. This is different to the alkali metals, which have more vigorous reactions the further you go down the group.