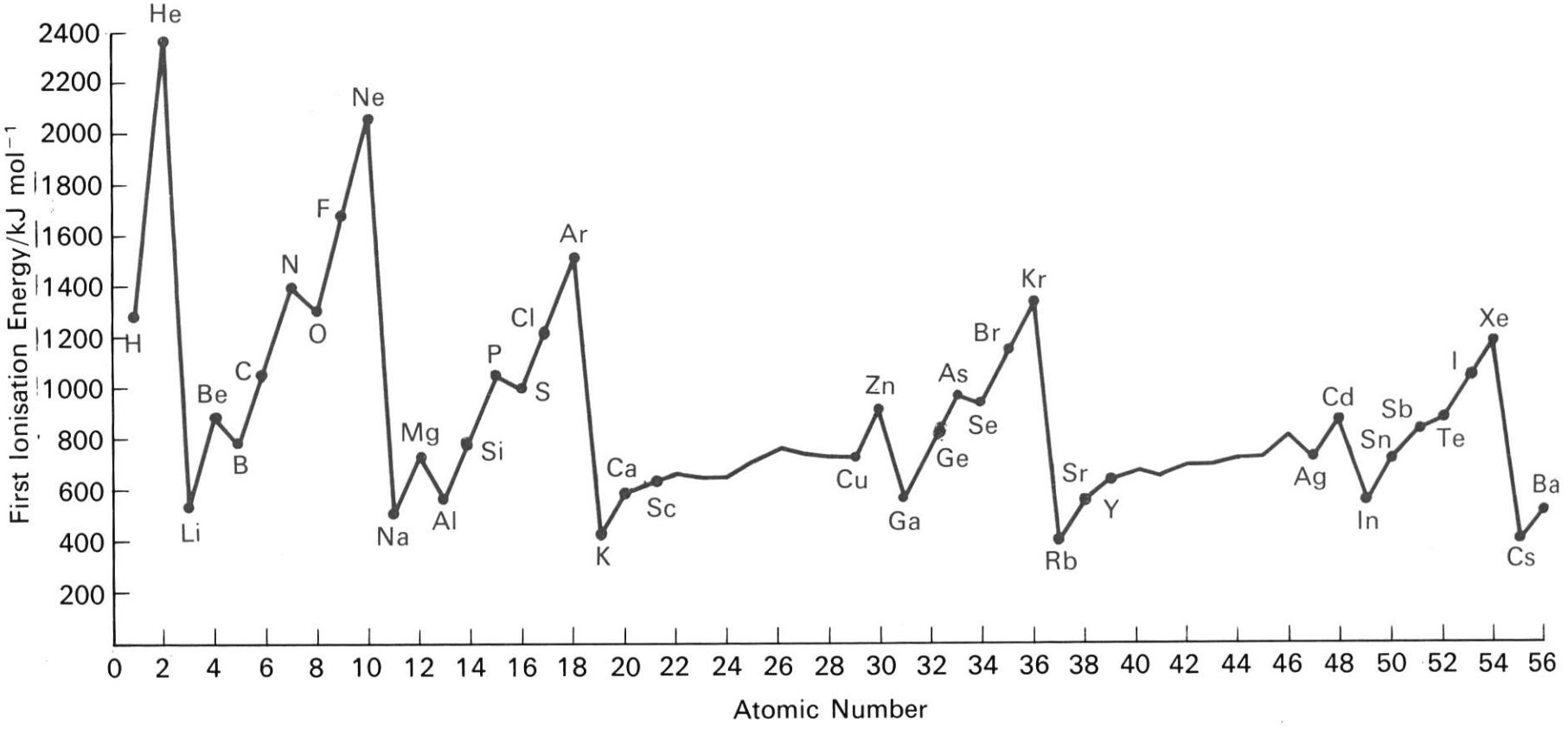
Ionisation Energy

- 1st ionisation energy = energy required to remove one electron from each atom in a mole of gaseous atoms producing one mole of 1+ gaseous ions.

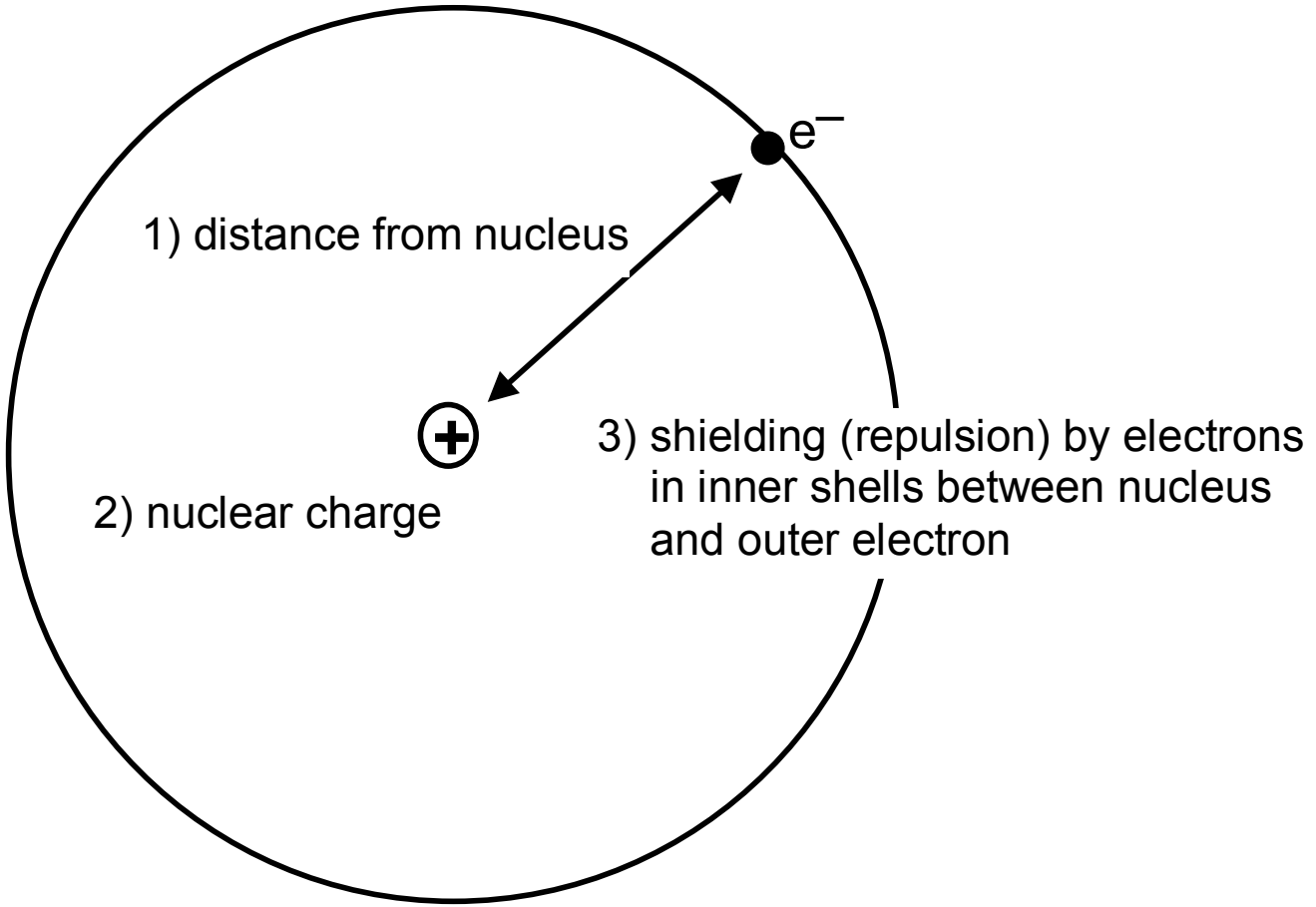
  e.g. 1st IE of Na: $Na(g) \rightarrow Na^{+}(g) + e^{-}$

1st ionisation energy



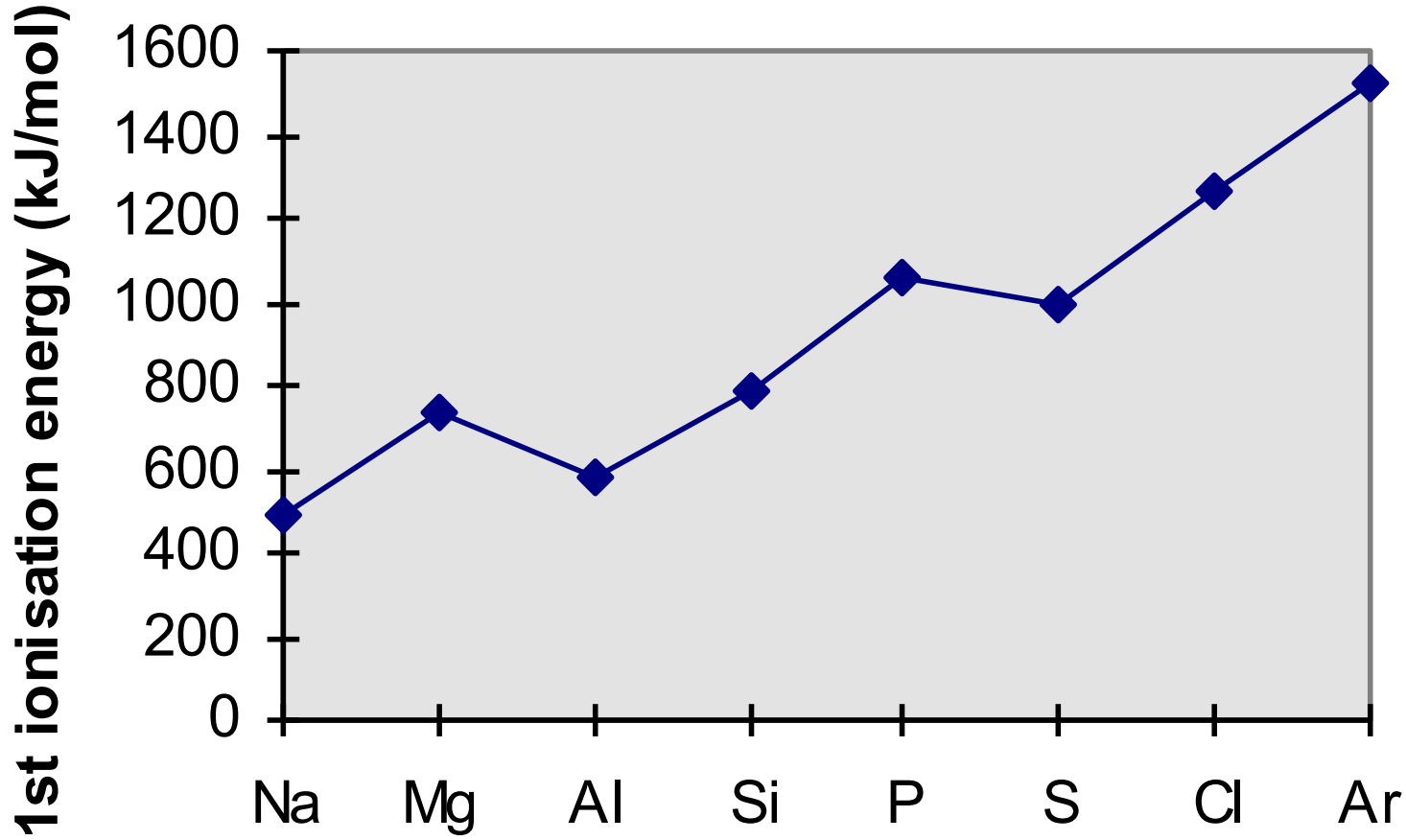
- What factors do you think effect the ionisation energy?

Ionisation Energy



- What is happening across a period in the periodic table?
- What is the general trend for the first ionisation energy across a period in the periodic table?
- How can we explain the general trend for ionisation energy across the period?

1st ionisation energy (across period)



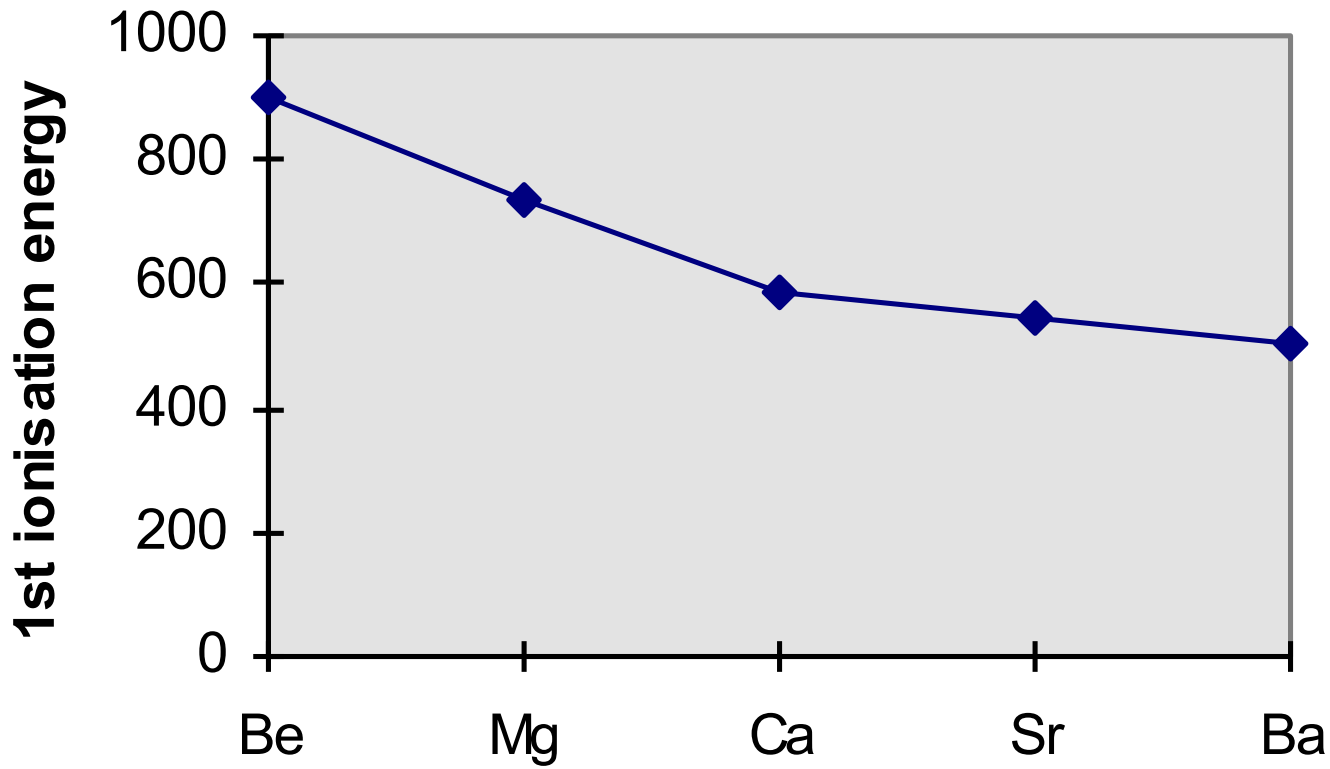
1st ionisation energy (across period)

General trend

- Increased nuclear charge (i.e. more protons)
- Atoms get smaller
- Therefore stronger attraction from nucleus to electron in outer shell

- What is happening down a group in the periodic table?
- What is the general trend for the first ionisation energy down a group in the periodic table?
- How can we explain the general trend for ionisation energy down a group?

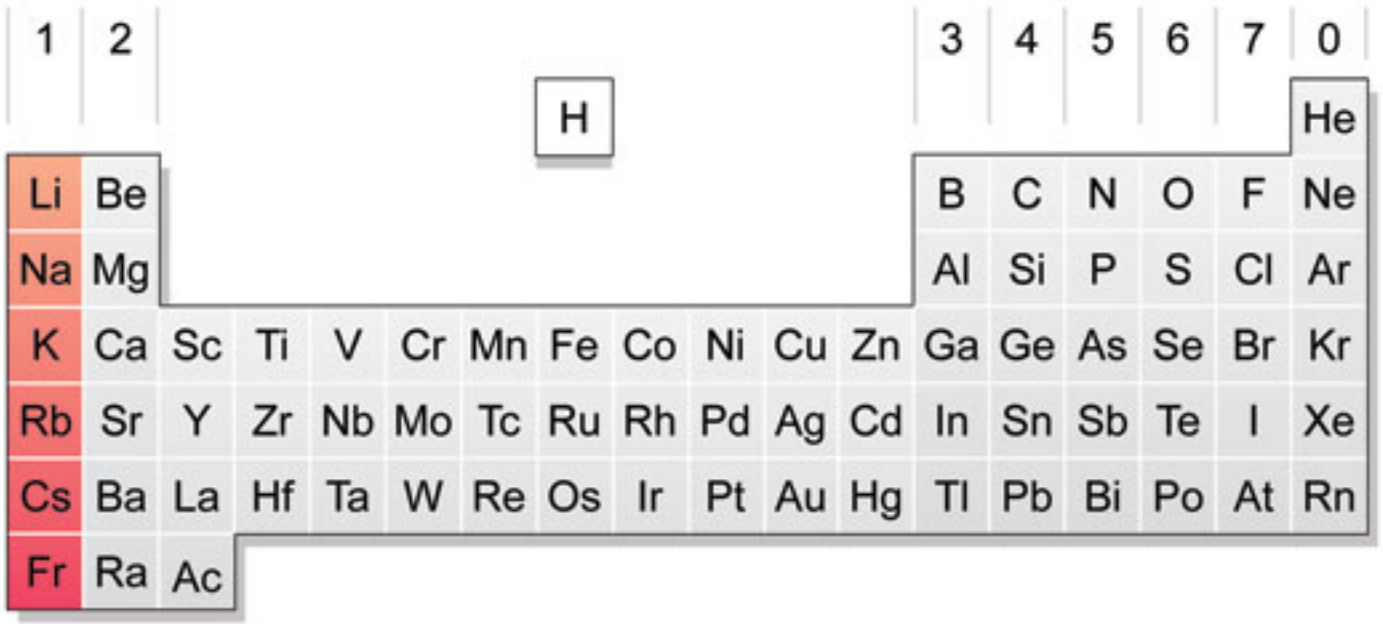
1st ionisation energy (down group)



1st ionisation energy (down group)

- Atoms get bigger
- More shielding
- Therefore weaker attraction from nucleus to electron in outer shell

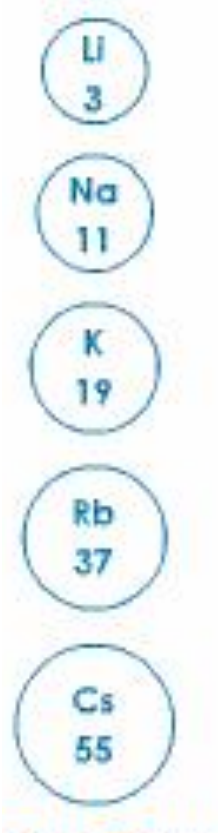
Which group is highlighted in red?



Element	Symbol	Atomic No.	Mass No.	Reactivity	Electron Configuration.
Lithium					
Sodium					
Potassium					

Group I The Alkali Metals

		Electronic configuration
Li	Lithium	**2,1**
Na	Sodium	**2,8,1**
K	Potassium	**2,8,8,1**
Rb	Rubidium	2,8,8,18,1
Cs	Cesium	2,8,8,18,18,1
Fr	Francium	2,8,8,18,18,32,1



Alkali metals react with fluorine

$$2Na(s) + F_2(g) \rightarrow NaF(s)$$

How would you expect lithium (Li) and potassium (K) to react with fluorine (F) compared to say sodium.

The electron is easier to remove from potassium than sodium and lithium and so the reaction is more vigorous.

- $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$

- https://www.youtube.com/watch?v=D4pQz3TC0Jo