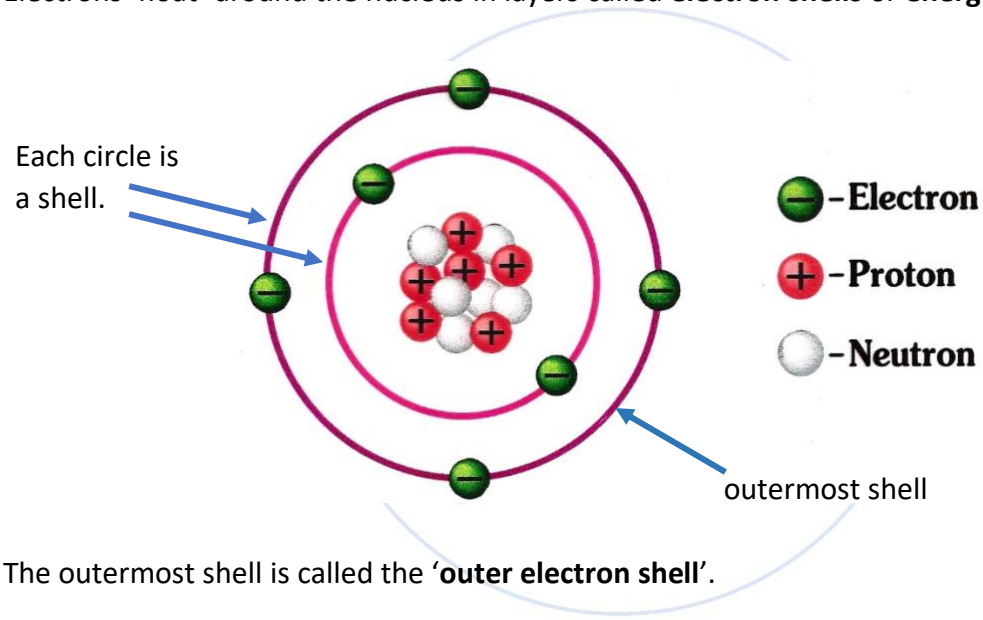
Revision sheet – IGCSE Chemistry

Lesson 1: Atoms & the periodic table

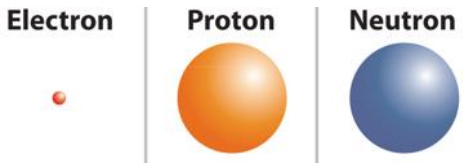
LOTS of facts. Are you ready?

ATOMIC STRUCTURE

- Nearly everything is made of atoms.
- Many atoms joined (bonded) are called matter.
- Atoms bonding in different combinations make the variety of things that exist in our universe.
- Atoms are made from three sub-atomic (inside the atom) particles called **protons, neutrons and electrons** (there are more, but for your IGCSE this is all you need).
- Protons and neutrons sit in the **nucleus** at the centre of the atom.
- Electrons 'float' around the nucleus in layers called **electron shells** or **energy levels**.



- The outermost shell is called the '**outer electron shell**'.
- The protons and neutrons are considered the same size i.e. they have the same mass.
- Mass is how much stuff something is made of. Generally smaller things have a smaller mass, but don't forget density. A small, dense object can have a greater mass than a large, light object.
- Electrons have a much smaller mass relative to protons and neutrons. They are 1/2000 the size!



CHARGE

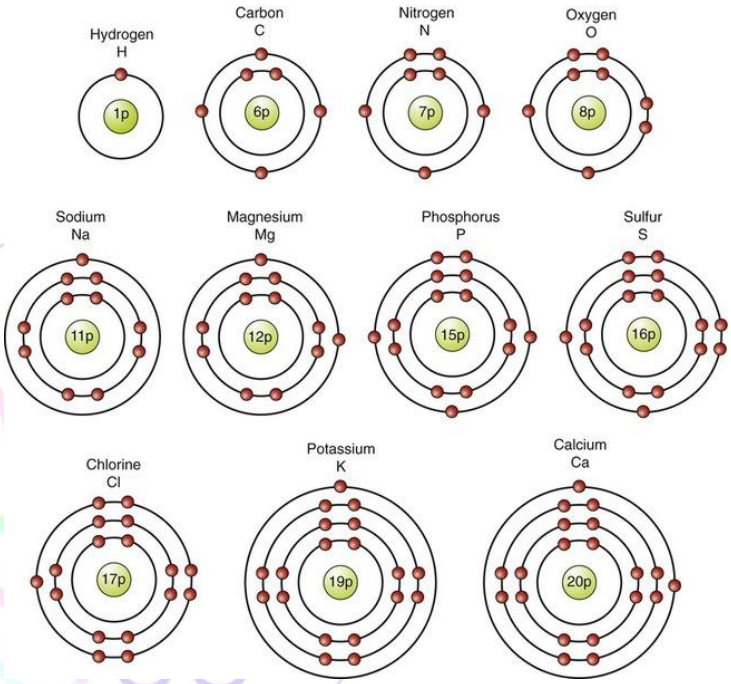
- You might associate the word charge with 'charging your phone' or electricity in general. You're right. Have you ever thought what charge actually is? It's electrons and protons.
- These sub-atomic particles are literally charge.

Weird!

- Protons are positive charge. Electrons are negative. Neutrons have no charge (they're neutral).
- The charge used in electricity is generally negative (electrons), but **positive charge is still charge**!
- There are around 100 ish different types of atom called elements (humans are still making more).

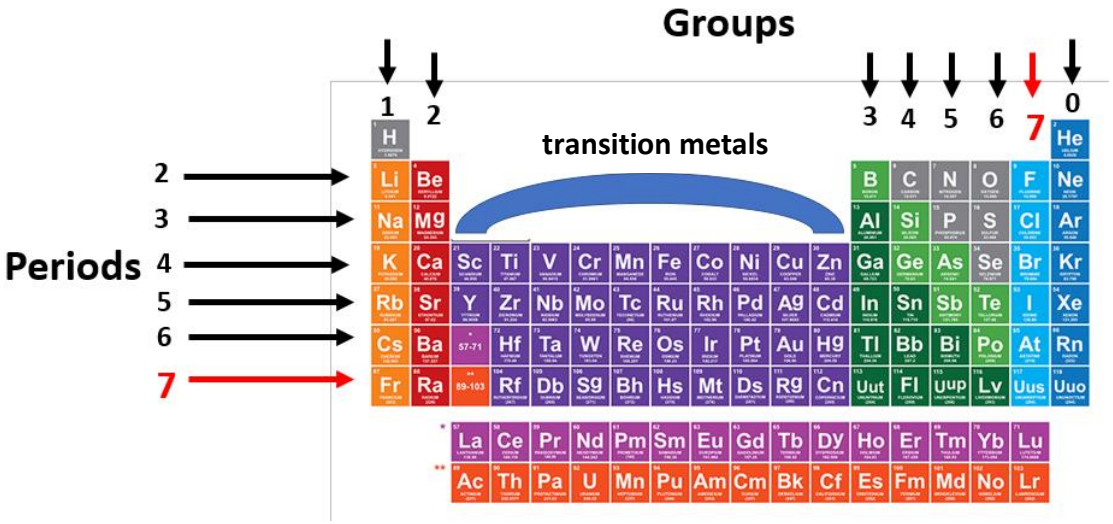
Particle	Relative mass	Relative charge
Proton	1	+1
Neutron	1	0
Electron	1/2000	-1

- Each element has a different name, symbol, number of protons, neutrons and electrons.
- Because of this they may have a different number of electron shells (there are set rules on how many electrons can fit inside each shell – T1L9).
- Sometimes neutrons are left out of diagrams because they don't have charge and we'll find out later that charge is super important when atoms interact with each other.

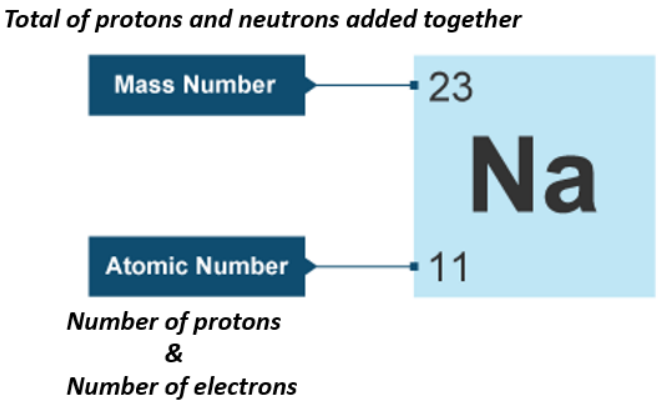


THE PERIODIC TABLE

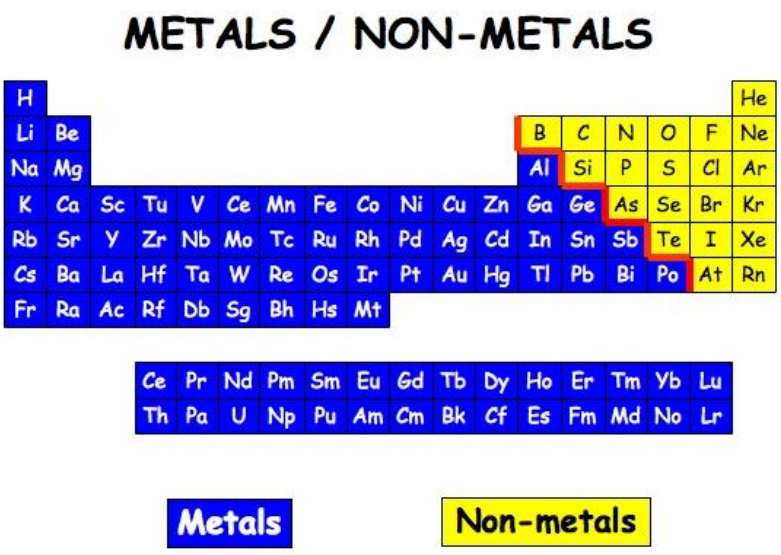
- Elements are organised in to a periodic table. The columns are called groups. The rows are called periods.
- Groups are named from 1 to 7. The final group is not called 8, but 0. Hydrogen is in group 1 and Helium in group 0.
- Elements in the same group have similar characteristics (they behave the same). This is because they have the same number of electrons in their outer shell.
- **The number of electrons in the outer shell of an element is the same as the group number.**



- **EXCEPTION TO THE RULE: All elements in group 0 have 8 electrons in their outer shell apart from Helium. This has 2.**
- The period number tells us the number of electron shells in one atom of that element.
- Each element has an atomic number (number of protons). A lot of the time it happens to also be the number of electrons in an element. This is because elements have neutral charge. If electrons are negative charge and protons are positive, there must be equal amount to be neutral.



- To make sure you are looking at the atomic number, check it is increasing one by one from top to bottom and left to right of the periodic table.
- The mass number is the number of protons added to the number of neutrons. You know you're looking at the mass number because it is larger.
- Each element has a symbol. Sometimes these are obvious like C for carbon. Other times not, for example Ag for silver and Fe for iron.



- Finally, the periodic table is arranged to easily identify elements that are metals and non-metals. Be ready to identify each.
- It is important to familiarise yourself with the most common element symbols in the periodic table as early as possible. Practice locating them with ease.