



ATOMS



WHAT IS AN ATOM?

- Atoms are the building blocks of all matter
- EVERYTHING is made up of different combinations of atoms
- Atoms are made up of a nucleus (at its center) and an electron cloud (surrounding the nucleus)

SUBATOMIC PARTICLES

- Sub= under (think submarine)
- Subatomic particles are the smaller parts that make up an atom
- Atoms are made up of 3 different subatomic particles
 - Protons
 - Neutons
 - Electrons

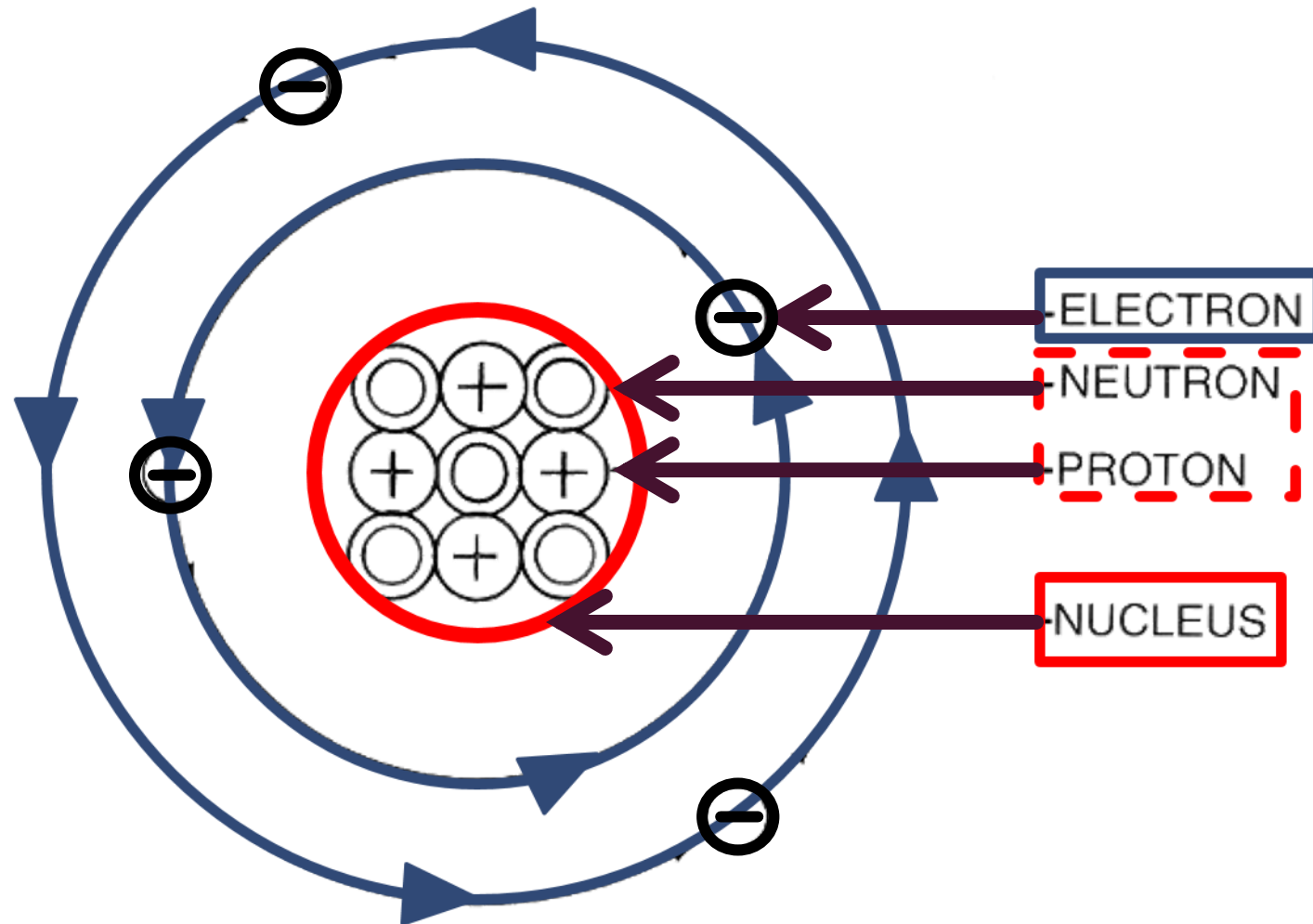
THE THREE SUBATOMIC PARTICLES

- **Protons**- positively charged (+), found IN the nucleus; mass of 1 atomic mass unit (amu)
- **Neutrons**- no charge (0), found in the nucleus; mass of 1amu
- **Electrons**- negatively charged (-), found in the electron cloud, much smaller than protons and neutrons (mass \ll 1 amu)

ELECTRON CLOUD THEORY

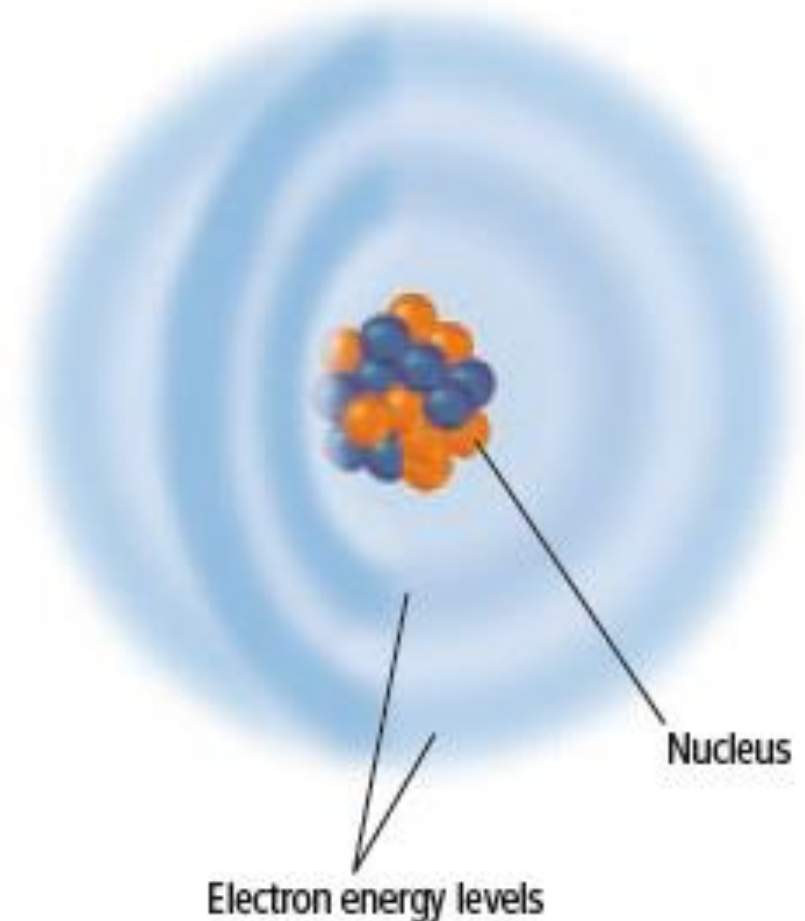
- Modern Atomic Theory (the theory we use to explain the structure of atoms) is called electron cloud theory
- Says that an atom has a nucleus surrounded by an “electron cloud” that has different energy levels (layers) and that each can hold a different number of electrons and electrons fill layers closest to the nucleus first

WHAT WE THINK ATOMS LOOK LIKE TODAY



WHY IS IT AN ELECTRON “CLOUD”?

- Electrons orbit the nucleus somewhere in their energy level- they don't have an exact spot like planets orbiting the sun but instead move around their level



VALENCE ELECTRONS

- Valence electrons are found in the outermost energy level of the electron cloud- they're on the outside of the cloud
- These are the **ONLY** electrons involved in bonding
- Valence electrons determine...
 - The chemical properties of an element
 - Reactivity- the ability of an atom to chemically react with another atom

VALENCE ELECTRON PAIRINGS

- 8 is the magic number- if there are 8 valence electrons (electrons in the outermost energy level) the atom is stable and doesn't want to react with other atoms
- Hydrogen (H), helium (He), lithium (Li), and beryllium (Be) are the exceptions. They only need 2 electrons to be stable

WHERE THE VALENCE SHELL IS

