

Atom - the “building block” of matter – what everything is ultimately made up of

Protons (+) and **Neutrons** (no charge) are in **nucleus** (center) and make up all the mass

Electrons (-) orbits the nucleus in the **electron cloud**

If an atom has more protons than electrons it has a positive charge (is a positive ion), if it has more electrons than protons it has a negative charge (is a negative ion)

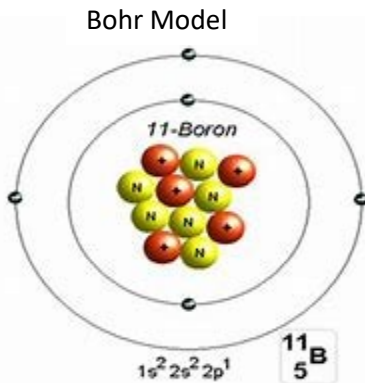
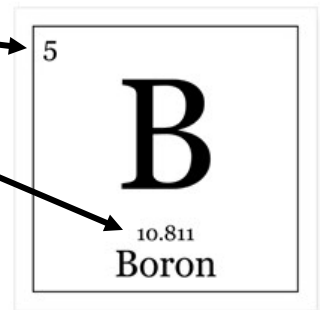
Below is a Bohr Model of a Boron atom and an example of a cell from the periodic table of elements for Boron.

Boron has an **atomic number** of 5 which means it has 5 protons.

We assume atoms are neutral so the atom also has 5 electrons.

It has an atomic mass (average mass) of 10.811 which we would round up to 11 (the mass of the most common Boron atom) so it has 11 total particles in its nucleus (protons + neutrons).

Since it has 11 total particles in the nucleus and 5 of them are protons then 6 must be neutrons.

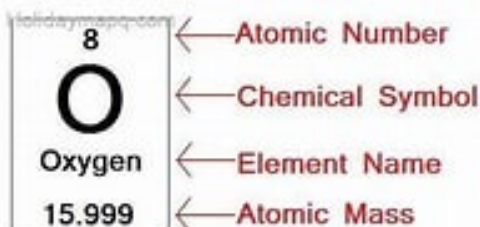


Two is the maximum number of electrons that fit in the first ring (shell, or energy level) and up to eight electrons fit in the second so we have two rings to fit the 5 electrons that this Boron atom has.

Except for the first ring (shell / energy level) all other rings are considered full if they contain 8 electrons.

The electrons in the outermost ring are called **Valence electrons**.

Periodic table – elements are listed in order of atomic number (number of protons) – this is what makes an element what it is. The atomic number is the number with no decimal point.



Atomic number – number of Protons (the number of Protons equals the number of electrons in a neutral atom)

Atomic mass – average of total number of protons and neutrons in the nucleus or a given element (number with the decimal point)

Isotope – atoms that have the same number of protons but different number of neutrons {a “version” of an atom} ex. Oxygen always has 8 protons but an oxygen atom may have 5, 6, 7, 8, 9 ... neutrons (in other words oxygen atoms don't all have the same mass but they all have 8 protons because that's what makes them oxygen)