**Unit 7: The periodic table**

The periodic table is an arrangement of elements in a table form, ordered by their atomic number, electron configuration and chemical properties.

**Three basic subatomic particles of the atom.**

* **Proton –** this particle has a ***positive charge*** and is located in the ***nucleus.***
* **Neutron *–*** has ***no charge*** and is located in the ***nucleus***, but ***adds mass*** to the atom.
* **Electron –** has a ***negative charge*** and ***moves around*** the nucleus in ***shells***. They are ***tiny*** but they cover a lot of ***space.*** Each successive shell is further from the nucleus.

**Useful definitions**

* **Atomic number –** this is the number of ***protons*** an atom has, given by the symbol ***Z.***
* **Mass number –** the total number of ***protons*** and ***neutrons*** found in an atom, given by the symbol ***A.***

**Formulas**

**Isotopes**

Isotopes are atoms of the ***same element*** with the same ***number of protons***but different ***number of neutrons.***

**Isotope symbols**

Where:

* **14** is the ***mass # (A)***
* **6** is the ***atomic # (Z)***

**Periodic table**

The periodic table is arranged with *increasing atomic* *numbers*. The horizontal rows are called ***periods*** and are labelled 1-7 from top-bottom. The vertical columns are called ***groups*** or ***families***.

**Major groups and regions on the periodic table**

* 1st group – ***alkali metals***
* 2nd group – ***alkaline earth metals***
* 3rd group - ***triels***
* 4th group – ***tetrels***
* 5th group – ***pnictogens***
* 6th group - ***chalcogens***
* 7th group – ***halogens***
* 8th group – ***noble gases***

**Elements belonging to the 8 main groups with similar properties**

**Alkali metals**

* *Lithium (Li)*
* *Sodium (Na)*
* *Potassium (K)*

**Properties**

* ***Highly*** reactive metals
* ***Low*** density
* ***Low*** ***melting*** and ***boiling*** points
* ***Soft,*** can be cut by a knife.
* ***Good*** conductors of ***heat*** and ***electricity***.
* ***Reactiveness*** ***increase*** as the move ***down*** the group.

**Alkaline earth metals**

* *Magnesium (Mg)*
* *Calcium (Ca)*
* *Radium (Ra)*

**Properties**

* ***Less*** reactive than ***alkaline*** ***metals***.
* ***High*** density
* ***High*** melting point.
* ***Less*** soft and ***more*** stable than ***alkali metals***

**Triels (Boron group)**

* *Copper (Cu­­­)*
* *Gold (Au)*
* *Zinc (Zn)*

**Properties**

* Metals and metalloids
* ***Varying*** degrees of ***reactivity***.
* ***Boron*** element is a non-metal.

**Tetrels (Carbon group)**

* *Carbon (C)*
* *Lead (Pb)*
* *Tin(Sn)*

**Properties**

* ***Group*** contains ***metals***, ***non-metals***, ***metalloids***.
* ***Varied*** ***reactivity*** and ***physical*** properties among the elements

**Pnictogens (Nitrogen group)**

* *Nitrogen (N)*
* *Phosphorus (P)*

**Properties**

* ***Group*** contains ***metals***, ***non-metals***, ***metalloids***.
* ***Varied*** ***reactivity*** and ***physical*** properties among the elements.

**Chalcogens (Oxygen group)**

* *Oxygen (O)*
* *Sulfur (S)*

**Properties**

**Halogens**

* *Chlorine (CI)*
* *Fluorine (F)*
* *Iodine (I)*

**Properties**

* ***Highly***reactive***nonmetals****.*
* ***Poor*** conductors of***heat***and***electricity****.*
* Reactivity***decreases*** *as you move* ***down***the group*.*

**Noble gases**

* *Helium (He)*
* *Neon (Ne)*
* *Argon (Ar)*

**Properties**

* ***Very low***reactivity due to ***stable electron configurations****.*
* ***Colorless***, ***odorless***, and have ***low*** boiling points.

**Useful definitions**

**Alloy** – is a mixture between two or more metals

**Disparities between metals, non-metals, metalloids**

**Metals**

* Are **solids** except (*mercury)*
* Are hard (except *alkali metals)*
* Are shiny
* Have high melting points (*generally)*
* Good conductors of electricity

**Non-metals**

* Can either be solids, liquids or gases
* Are soft
* Are not shiny
* Non-metals that are solids and liquids have low melting points.
* Poor conductors of electricity

**Metalloids**

* Break/shatter easily under stress
* Are solids
* Semiconductors of electricity (*under certain conditions*)