Unit 1 : lesson 2 : Periodic table for classification of elements

Chemical elements differ in physical properties and chemical properties... Therefore, there have been multiple attempts to classify the elements, and their goal is to facilitate study and find the relationship between the elements and their physical and chemical properties.

The most important attempts to classify elements:-

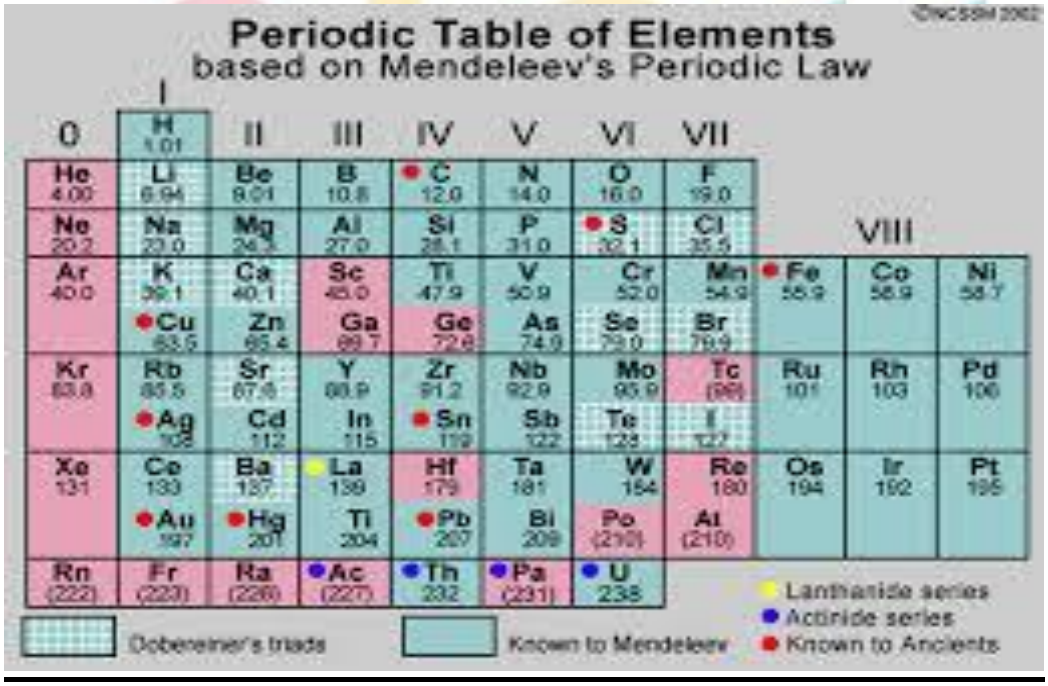
1) The periodic table of the scientist Mendeleev

2) The periodic table of the scientist Moseley

3) The modern periodic table

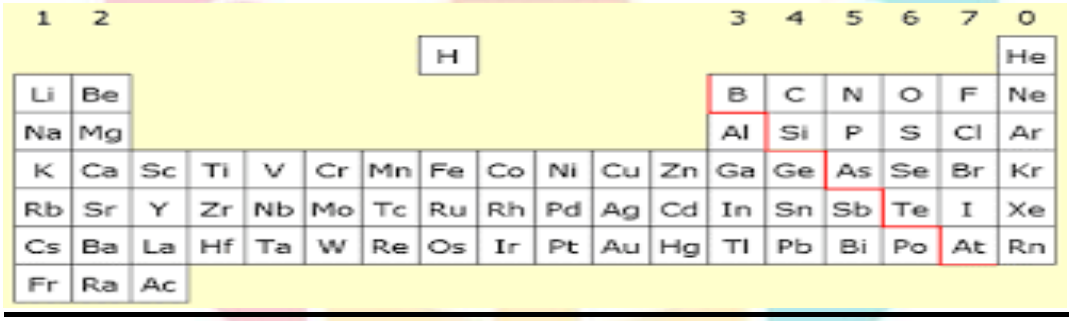
1) The periodic table of the scientist Mendeleev...

- **The scientist Mendeleev's table is considered the first true periodic table for classifying elements...**
- **The elements are arranged in ascending order according to their atomic mass, without a regular progression when moving from left to right in horizontal rows.**
- **He discovered that the properties of the elements are repeated periodically at the beginning of each new row.. This means that the elements that exist in the form of vertical columns are similar in properties**



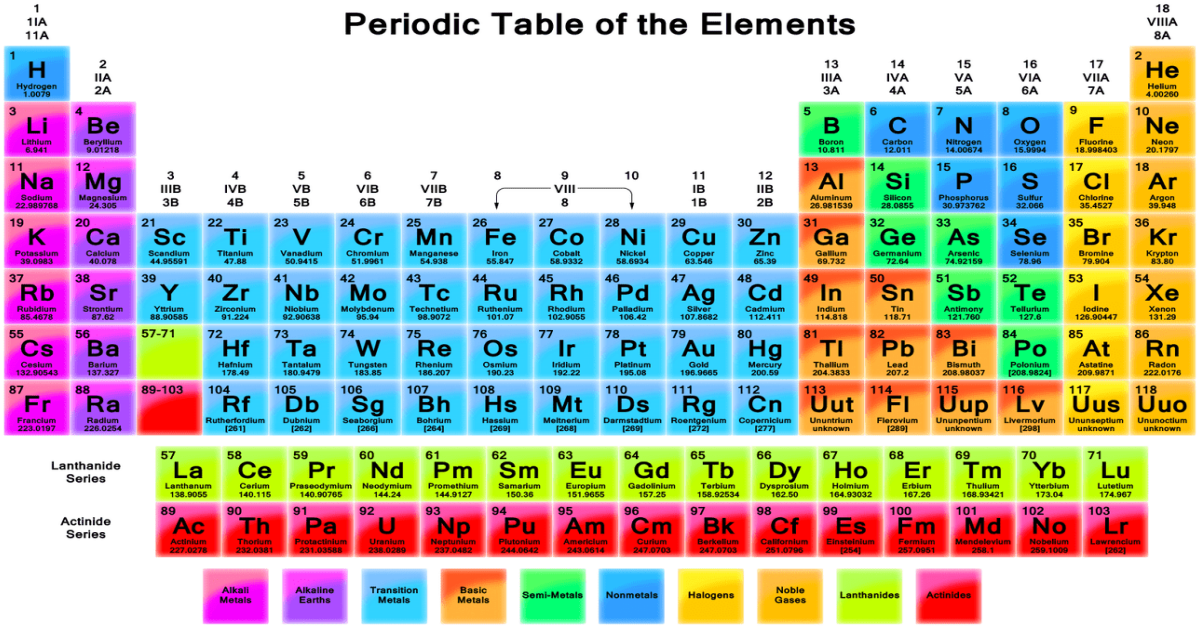
2) The periodic table of the scientist Moseley…

- After the discovery of protons by the scientist Rutherford, the scientist Moseley discovered that the periodicity of the properties of elements is related to their atomic numbers and not to the atomic mass.
- Moseley modified Mendeleev's table in which the elements were arranged in ascending order according to their atomic number.
- Each element exceeds the element that precedes it in the same period by one integer
- Moseley added to the scientist Mendeleev's table the group of inert gases and other new elements that were discovered after the publication of Mendeleev's table.



3) The modern periodic table:-

- The elements are arranged in ascending order according to their atomic numbers and the method of filling the sub-energy levels with electrons.



Description of the modern periodic table:-

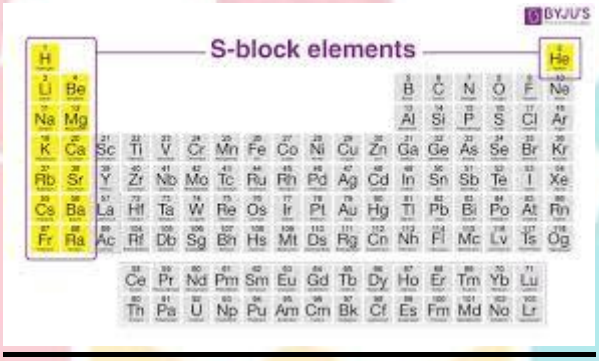
- The modern periodic table consists of 7 horizontal period and 18 vertical groups

(7 cycles because the number of energy levels is 7 levels... In each cycle we begin to fill a new energy level with electrons)

- **The number of elements in the modern periodic table is 118**

Elements are found in 4 basic Blocks: S, P, D, and F

Block s elements:-

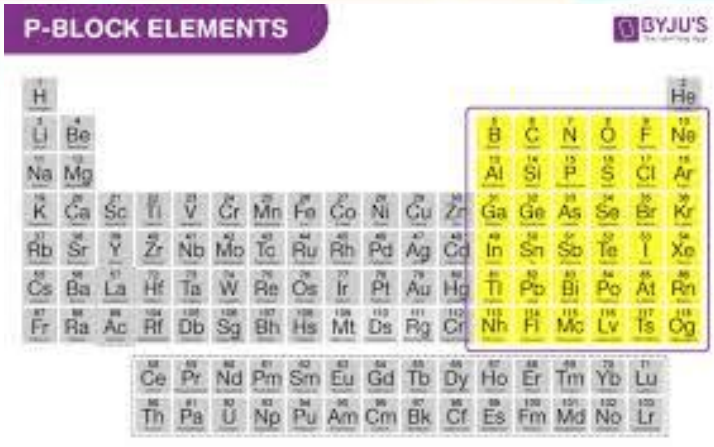


- **Location: left of the modern periodic table**
- **It consists of two vertical groups: 1A and 2A**

(1A alkali metals , 2A are called alkaline earth metals)

- **All of its elements are solid metals except hydrogen, which is not a gas metal.**

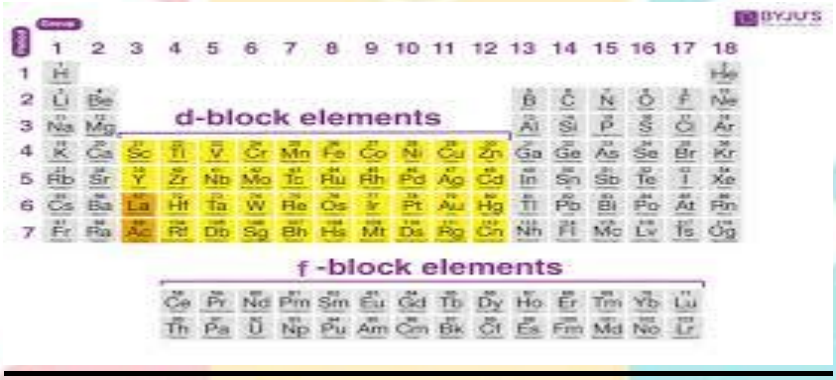
Block p elements:-



- **Location: Right of the modern periodic table**
- **It consists of 6 groups starting with group 3A and ending with group zero**
- **Most of its elements are non-metals, in addition to metalloids and some other metals**
- **Its elements exist in solid and gaseous forms, with the exception of bromine (Br), which is a liquid nonmetal**
- **One of its most important groups is the penultimate group 7A, which is called the halogens, and the last group (zero) is called the noble gases.**

Block d Elemens

- **Location: in the middle of the modern periodic table**
- **It consists of 10 groups starting with Group 3B and ending with Group 2B**
- **It begins to appear in the fourth period and its elements are called transitional elements**
- **All of its elements are metallic elements in the solid state, except for mercury (Hg), which is a liquid fluid element**



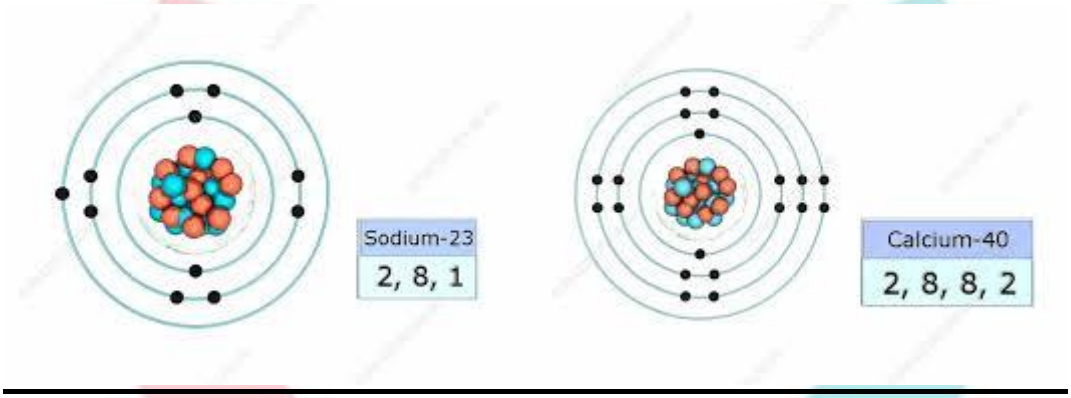
Block f Elemens

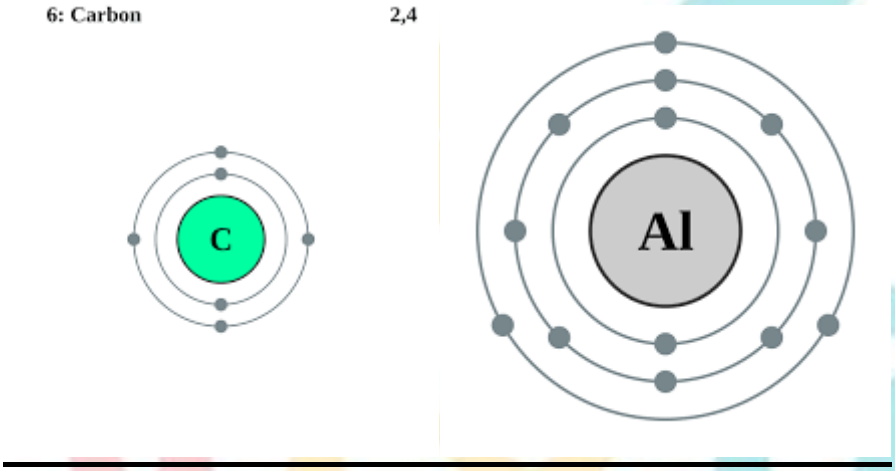
- **Location at the bottom of the modern periodic table**
- **It consists of two series: the lanthanide series and the actinide series.**
- **All of its elements are metallic elements.**

The location of the elements in the groups symbolized by the symbol A can be determined by the atomic number...

(1) The electron configuration of the atom is determined (The number of energy levels is the period number)

(2) The number of electrons in the last energy level determines the group number (we put the letter A next to the number of electrons in the last energy level)





$_{11}$Na : 2, 8 , 1 period 3 / group 1A

$_{20}$Ca : 2, 8 ,8 ,2 period 4 / group 2A

$_{6}$C : 2. 4 period 4 / group 4A

^{13}Al : 2, 8 ,3 period 3 / group 3A

Exercises : Complete the following phrases:-

1) The period number is equal to the number of -----

2) Block s is located ----- the modern periodic table

3) Block p contains ----- group

4) Noble gases fall into the category -----

5) Block d is located in ------ the modern periodic table

6) The first scientist to create a true periodic table -----

7) Moseley arranged the elements in ascending order according to -----

8) Number of elements in the modern periodic table -----

9) The scientist discovered ----- that the nucleus contains positively charged protons

10) The scientist added -------- the group of inert gases to the periodic table