History of the Periodic Table

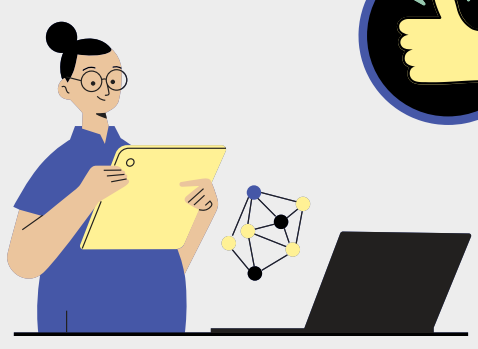
Dmitri Mendeleev developed the periodic classification of the elements.In February 1869, he jotted down the symbols for the chemical elements putting them according to their atomic weights and the periodic table was invented.

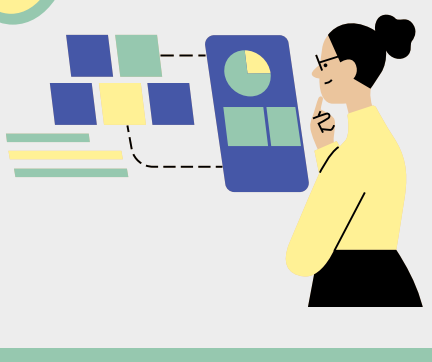
Glenn Seaborg (1940)

Synthesized transuranic elements (part of the Actinides)
Aristotle
Four element theory- earth, fire, water, air

Antoine Lavoisier (1770-1789)

Wrote the first list of elements containing 33 elements and distinguished metals and non-metals





Johns Jakob Berzelius (1828)

Introduced letters to symbolize elements and developed atomic weights

Lothar Meyer (1869)

Compiled a periodic table of 56 elements based on periodicity of properties

William Ramsay (1894)

Discovered noble gases

Henry Moseley (1993)

Determined the atomic number of each element and modified the “periodic law” to read that the properties of the elements vary periodically with their atomic numbers

The periodic table is an arrangement of the chemical elements structured by their electron configuration and atomic number.

Parts of the Periodic Table

The periodic table is divided into nine groups based on the properties of the elements.

ALKALI METALS (first column excluding Hydrogen)

Alkali metals are the elements that react with water to produce heat. It also reacts with air to form caustic metal oxide. They are usually soft metals with low melting points.

ALKALINE EARTH METALS (second column)

Alkaline earth metals are also reactive, but not as reactive as the alkali metals. They are shiny metals and have higher melting points compared to the alkali metals. When they come in contact and react with water, they also form hydroxide and hydrogen gases.

TRANSITION METALS (third to tenth column)

Unlike the alkali metals, transition metals are usually hard and they have high density compared to other elements. Transition metals form colored compounds and ions. Its melting and boiling points are also high and they are good conductors of electricity.

PNICTOGENS (fifteenth column)

Pnictogens have the ability to form stable compounds. Except for nitrogen, pnictogens are solid elements when they are at room temperature environments. All these elements have 5 electrons in their outer electron shell.

CHALCOGENS (sixteenth column)

Chalcogens are elements that are gases except Polonium, which is the only metal in the group. Chalcogens do not have stable metallic elements. They are known to be very reactive towards alkaline earth metals.

HALOGENS (seventeenth column)

The elements under halogens can all produce sodium salts of similar properties. They react quickly which is why they are usually not found in nature. Halogens are similar both in their chemical behavior and in the properties of their compounds with other elements.

NOBLE GASES (eighteenth column)

Noble gases are colorless, odorless, tasteless, and nonflammable gases. It was believed that these gases can not bond with other atoms and that their atoms can not combine with other elements to form chemical compounds.

LANTHANIDES (first row at the bottom of the periodic table)

Lanthanides are reactive, silver colored metals. They tarnish when exposed to air then form their oxides. Lanthanides are soft metals but their hardness increases when their atomic number is higher. They have high melting and boiling points and they burn easily in air.

ACTINIDES (second row at the bottom of the periodic table)

All actinides are radioactive and they have no stable isotope. Just like lanthanides, they tarnish when exposed in the air. Actinides are very dense metals. They react to boiling water or diluted acid to release hydrogen gas. They are malleable, paramagnetic and ductile. Actinides are soft silver colored metals that remain solid when they are at room temperature.

5 elements in the periodic table and how they were discovered

K - Potassium

Discovered By: Humphry Davy
Location/Year: England 1807
Experiment Used: Isolated Potassium using the Electrolysis of Molten Caustic Potash

Lr - Lawrencium

Discovered By: Robert M. Latimer, Almon E. Larsh, Torbjørn Sikkeland and Albert Ghiorso
Location/Year: Lawrence Radiation Laboratory, California in 1961
Experiment Used: In a linear accelerator, the researchers bombarded 3 mg of californium containing four different isotopes of californium with boron ions. Several lawrencium isotopes were obtained as a result of this.

Ar - Argon

Discovered By: William Ramsay and Lord Rayleigh
Location/Year: British Association Meeting in 1894
Experiment Used: In 1894, Ramsay replicated Henry Cavendish's experiment and used spectroscopy to study the unidentified gas that was left over. In the meantime, Rayleigh was conducting the same experiment, almost simultaneously. The unnamed gas was discovered by both scientists and given the name Argon.

La - Lanthanum

Discovered By: Carl-Gustav Mosander
Location/Year: Karolinska Institute, Stockholm in 1839
Experiment Used: Mosander was looking for contaminants in cerium samples that he suspected existed. He discovered lanthana (La_2O_3) after reacting cerium nitrate ($Ce(NO_3)_3$) with dilute nitric acid (HNO_3).

Fr - Francium

Discovered By: Marguerite Perey
Location/Year: Curie Institute, Paris in 1939
Experiment Used: Despite the fact that she had refined a sample of actinium devoid of all known radioactive contaminants, its radioactivity still suggested the presence of another element, which she correctly concluded to be the missing element 87.

5 elements in the periodic table and their uses in real life

Silver

Silver is a relatively soft, and shiny metal and this metal tarnishes slowly in the air as sulfur compounds react with the surface forming black silver sulfide. Silver actually has many uses in real life and some of these are:
(1) Making silverware and jewelry using sterling silver
(2) Creating mirrors
(3) Usage in dental alloys or equipments
(4) Usage in solder and brazing alloys, electrical contacts and batteries
(5) Silver is also used in coins

Iodine

Iodine is a black, shiny, crystalline solid and when it is heated, it sublimes to form a purple vapor. Iodine actually has many uses in real life and some of these are:
(1) Iodine is used in photography and photographic chemicals. It was also the first commercial use for Iodine.
(2) Iodine salts are used in pharmaceuticals.
(3) Iodine salts are also used in disinfectants. Iodine is used on cuts & wounds to eliminate germs.
(4) Iodine salts are also used in printing inks and dyes.
(5) Iodine salts are also used in animal feed supplements.

Chlorine

Chlorine is a yellow-green dense gas with a choking smell. Chlorine actually has many uses in real life and some of these are:
(1) Chlorine can kill germs and bacteria as it is a disinfectant.
(2) Chlorine is used to treat drinking water and swimming pool water.
(3) Chlorine is also used to create hundreds of consumer products from paper to paints, and from textiles to insecticides.
(4) Chlorine is also used in organic chemistry and It is used as an oxidising agent and in substitution reactions.
(5) Chlorine is also used in table salt.

Carbon

Carbon has several pure forms including graphite, diamond, fullereness and graphene. Carbon actually has many uses in real life and some of these are:
(1) It is used as a feedstock for the petrochemical industries producing polymers, fibres, paints, solvents and plastics.
(2) Impure carbon in the form of charcoal and coke is used in metal smelting. This is especially significant in the iron and steel industries.
(3) Graphite is used in pencils, to make brushes in electric motors and in furnace linings.
(4) Carbon fibre is used in tennis rackets, skis, fishing rods, rockets and aeroplanes.
(5) Carbon is found in coal, oil gas, living things, and inks.

Iron

Iron is a shiny, greyish metal that rusts in damp air. Some of its uses are:
(1) 90% of all metal that is refined today is iron.
(2) Iron is mostly used to manufacture steel, used in civil engineering (reinforced concrete, girders and other more) and in manufacturing.
(3) Stainless steel is very resistant to corrosion. Other metals are added to enhance its strength and workability.
(4) Cast iron contains 3–5% carbon and it is used for pipes, valves and pumps. It is not as tough as steel but it is cheaper.
(5) Iron is used used in the construction of buildings, steel, and machines.