

### Dalton's atomic theory – Teoria atomistyczna Daltona

All matter is composed of minute indivisible particles called atoms. These atoms cannot be created or destroyed by chemical means. All atoms of any one element are identical in every respect; the most important respect being their weight. The atoms of any one element are different (particularly in weight) from those of any other element. When elements combine to form a compound, they do so by a union of atoms in simple small numbers. (For example, one atom of element A will combine with one of B, or two of A with one of B, or two of A with three of B and so on. These groups of atoms, forming a unit particle of a compound, are called molecules). All molecules of any one compound are identical in every respect, and are different from the molecules of any other compound even if that compound is composed of the same elements as the first.

### Kepler's laws of planetary motion – Prawa ruchu planet Keplera

The planets go about the sun in ellipses, with the sun at one focus.

The square measure (area) of the space gone over by a line joining the middle-point of any planet to that of the sun is in relation to the time of motion (equal areas are covered in equal times).

### Newton's laws of motion – Prawa ruchu Newtona

A) Every body keeps its condition of rest or regular motion in a straight line if a change of that condition is not produced by outside forces.

Change of motion is in relation to the given moving force, and takes place in the direction of the straight line in which such force is acting.

Reaction is opposite to action; the force-effects (actions) of two bodies on one another are equal and in opposite directions.

B) A body remains in a state of rest or of uniform motion in a straight line unless compelled by some external forces acting upon it to change that state.

A change in momentum is proportional to the force causing the change and takes place in the direction in which the force is acting, or the increase or decrease in velocity is proportional to the force.

To every action there is an equal and opposite reaction.

Atoms and molecules possess energy which is stored within them. This energy is of various types. Part of it is chemical energy, i.e. energy which can be released by a chemical reaction. Chemical energy is distinct from nuclear energy as well as from other forms of energy. The science of chemistry is primarily concerned with chemical energy. This, however, does not imply disregard of the existence of other forms of energy. These are of relevance in both physical and chemical research.

Carbon dioxide (CO<sub>2</sub>) is a chemical compound. Its properties are quite unlike those of the component elements, i.e. carbon (C) and oxygen (O). Carbon dioxide is one of the constituents of air.

Air is a mixture of gases among which nitrogen and oxygen are the most abundant.

Being a mixture of gases, air is neither an element nor a compound. Hence its properties are identical with those of the constituent gases.

Moreover, air is not a homogeneous substance. Its composition and density differs in different layers of the atmosphere.

Gold (Au), platinum (Pt) and silver (Ag) are noble metals.

Iron (Fe), lead (Pb), tin (Sn), copper (Cu) and zinc (Zn) are base metals.

Long ago alchemists tried to convert base metals, e.g. iron, into gold. They did not succeed. They failed. For a long time the idea was considered irrational.

However, with the advent of atomic physics, nuclear transmutations of matter became feasible.