

**Matter** is anything that takes up space and has mass

**Element** is a substance that cannot be broken down to other substances by chemical reactions.

**Compound** is a substance consisting of two or more elements combined in a fixed ratio.

**Trace elements** are those required by an organism in only minute quantities.

**Atom** is the smallest unit of matter that still retains the properties of an element

**Neutrons, protons, and electrons** are the only three kinds of particles of an atom that are strong enough to be of relevance

**Atomic nucleus** The dense core formed by tightly packed neutrons and protons.

**Dalton** the British scientist who helped develop atomic theory around 1800.

**Atomic number** is the number of protons which is unique to that element, it is written as a subscript to the left of the symbol for the element.

**Mass number** the sum of protons plus neutrons in the nucleus of an atom.

Na, has 11 protons, 11 electrons and 12 neutrons. The simplest atom is hydrogen,

H which has no neutrons- a lone proton with a single electron moving around it constitutes a hydrogen atom

**Atomic Weight** is the approximation of the total mass of an atom.

We say that the atomic weight of He is 4 Daltons, although it is really 4.003

**Isotopes** are the different atomic form of the same element

**Radioactive isotope** is one in which the nucleus decays spontaneously, giving off particles and energy.

**Energy levels** the different states of potential energy for electrons in an atom

**Valence electrons** the number of electrons in the outermost shell

**Valence shell** is the outermost electron shell

**Chemical bonds** Atoms with incomplete valence shells interact with certain other atoms in a way that each one completes its valence shell. The atoms either share or transfer valence electrons. These interactions usually result in atoms staying close together held by chemical bonds.

**Covalent bond** is the sharing of a pair of valence electrons by 2 atoms. The strongest kinds of chemical bonds.

**Molecule** Two or more atoms held together by covalent bonds

**Double covalent bond** is when an atom shares two pairs of valence electrons

**Valence** when bonds form, they give the atom a full complement of valence electrons. This bonding capacity is called the atom's valence and equals the number of unpaired electrons in the atom's outermost shell.

**Electronegativity** the attraction of an atom for the electrons in a covalent bond

**Nonpolar covalent bond** a covalent bond between 2 atoms of the same element, the outcome of the tug of war for common electrons is a stand off; the 2 atoms are equally electronegative.

**Polar covalent bond** a compound where covalent bond joins atoms of different elements. If one atom is more electronegative than the other, electrons of the bond will not be shared equally.

**Ion** a charged atom (or molecule)

**Cation** when the charge on an atom is positive

**Anion** a negatively charged ion.

**Ionic bond** any two ions of opposite charge ionic compounds are called salts.

**Hydrogen bond** occurs when a hydrogen atom covalently bonded to an electronegative

atom is also attracted to another electronegative atom.

**van der Waals interactions** are weak and occur only when atoms and molecules are very close together

**Reactants** are written to the left of the arrow in a chemical equation React to give products

**Products** are written to the right of the arrow in a chemical equation, and are formed from reactants.

**Chemical equilibrium** The point at which the reactions offset one another exactly

Almost 25 of the 92 natural elements are essential to life. Four of these, carbon, oxygen, hydrogen, and nitrogen, make up 96% of all living matter. Phosphorus, sulfur, calcium, potassium, and a few other elements account for most of the remaining 4% of an organism's mass.