

Chapter 2 Chemical Basis of Life

Matter: Matter is anything that has _____ and takes up _____
Elements: Elements are the _____ form of matter. Elements are composed of atoms; atoms of different elements vary in size and in how they interact.
Atom: An atom consists of a nucleus containing _____ and _____, with _____ in orbit around the nucleus. Which has the positive charge? _____ negative charge? _____ No charge? _____ Which two have a mass of 1?
Formulas and Bonds: Atoms form bonds by gaining, losing, or sharing electrons. Atoms want to have _____ electrons in their first energy shell, and _____ electrons in the following outer shell.
Ionic bonds: When atoms gain or lose electrons, they become ions with a charge. Whether they gain or lose will depend on what? _____ and $-$ -charged ions attract each other and form an ionic bond.
Covalent bonds: Covalent bonds are formed when atoms _____ electrons to become stable with filled outer shells.
Molecules and compounds: A _____ is formed when two or more atoms combine. If atoms of different elements combine, the resulting structure can also be called a _____.
Formulas and Reactions: A molecular formula represents the _____ and _____ of atoms in a molecule Those changed by the reaction are the _____; those formed are the _____. Two or more atoms or molecules can be joined during a process called _____. Larger molecules can be broken into smaller ones in _____ reactions. _____ reactions occur as parts of molecules trade places.
Inorganic Compounds: Compounds that contain both hydrogen and carbon are called _____, the others are _____.
Acids, Bases and pH: Substances that release ions in water are called _____. If they release hydrogen ions in water they are called _____. If they release ions that combine with hydrogen ions in water they are called _____. _____ represents the concentration of hydrogen ions $[H^+]$ in solution. If it is less than 7, the substance is an _____. If it is more than 7, the substance is a _____. 7 is neutral. Between each whole number of the scale there is a tenfold difference in hydrogen ion concentration.

H₂O, gases and salts: Are neutral. Why is water important to life?

List and describe two gases important to life.

List salts important to physiology.

Organic Compounds: Must contain _____ and _____ but may contain other elements as well.

Carbohydrates: Carbohydrates provide _____ for cellular activities and are composed of what 3 elements?

Carbohydrates are made from monosaccharides (simple sugars); disaccharides are two _____ joined together; complex carbohydrates called _____, such as starch, are built of many sugars.

Humans synthesize the complex carbohydrate called _____.

Lipids: Three kinds: What 3 elements do they all contain?

_____ supply energy, are built from glycerol and three fatty acids.

Fatty acids with hydrogen at every position along the carbon chain are saturated; those with one or more double bonds are called _____ fats.

_____ contain glycerol, two fatty acids, and a phosphate group, and are important in cell structures.

_____ are complex ring structures, and include cholesterol, which is used to synthesize the sex hormones

Proteins: Proteins have a great variety of functions in the body---as structural materials, as energy sources, as certain hormones, as receptors on cell membranes, as antibodies, and as enzymes to catalyze metabolic reactions.

Proteins contain what 4 elements?

Building blocks of proteins are the amino acids, each of which has a _____ group, an _____ group and a _____ chain called the R group.

Proteins have complex shapes held together by _____ bonds.

Protein shapes, which determine how proteins function, can be altered by pH, temperature, radiation, or chemicals. This is called _____.

Hydrogen Bond: Form when compounds formed from _____ bonding do not share the electrons equally. Result from slight + and - charges. Important in water and proteins and DNA.

Nucleic Acids: Nucleic acids form structures called _____ and take part in _____ synthesis. They contain what 5 elements?

What are the building blocks of nucleic acids called?

Nucleic acids are of two major types: DNA (with deoxyribose) and RNA (with ribose).

Deoxyribonucleic acid: DNA (deoxyribonucleic acid) stores the molecular code in genes.

How many strands does it have? How many different bases?

Ribonucleic acid: RNA (ribonucleic acid) functions in protein synthesis. How many strands does it have? How many different bases?