Chapter 2 Chemical Basis of Life

Structure of Matter: Matter is anything that has mass and takes up _____

Elements: Elements are composed of tiny particles called _____

Atomic Structure:

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 each 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(n) _____ is formed when two or more atoms combine.

If atoms of different elements combine, the resulting structure can also be called a(n) _____.

Formulas and Reactions:

A molecular formula represents the _____ and _____ of atoms in a molecule

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.

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.

Inorganic Compounds:

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
_____, such as starch, are built of many sugars.

Humans synthesize the complex carbohydrate called _____.

Lipids:

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:

List three functions of proteins.
Proteins contain what 4 elements?
Building blocks of proteins are the amino acids, each of which has a(n) _____ group, a(n) _____ group and a(n) _____ chain called the R group.
Proteins have a _____, _____ and _____ structure.
Protein shapes, which determine how proteins function, can be altered by pH, temperature, radiation, or chemicals. This is called _____.

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?