Unit 1: Biology and Life

Biology is the scientific study of life. This is a neat and simple definition, but it covers a fascinating and diverse world. This textbook is an introduction to the world of biology, and in it you will learn what living organisms are made of, how they function, and how they have evolved and continue to do so. Our study of life will be a scientific one, following the scientific method of asking questions, collecting data, making and testing hypotheses, and formulating theories. All the information, hypotheses, and theories presented in this textbook have been derived by countless scientists following such procedures. Biological knowledge has been steadily built up and refined over hundreds of years. Today our biological knowledge is increasing at a phenomenal rate, and biology has assumed an ever more important role in all of our lives.

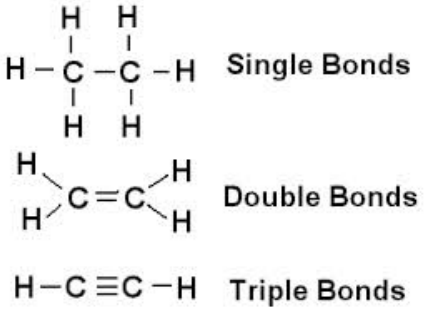
Unit 1: Biology and Life (cont)

Only through understanding biology can we hope to address and solve vital medical and ecological problems, for example, and help improve the quality of life for all organisms on this planet. We begin our study of biology by examining the theory of evolution by natural selection-what it says, the evidence on which Darwin based his theory, and how the theory has withstood the test of time. We start with this theory because it forms the foundation of modern biology.
Independent Variable: Cause, Dependent Variable: Effect, Controlled Variable: Constant. Plants take in and release water: Homeostasis. Redwood trees start off as small saplings: Growth/development. Deer eats plants for energy: Metabolism. Redwood tree offspring look like their parents; Heredity. Onions under the microscope look like they have small boxes: Cell organization. Plants release pollen into the air: Reproduction.

Organic Molecules

In the previous chapter we learned that all matter is composed of atoms. The atoms of living organisms are arranged into large, complex macromolecules. Life is built upon these macromolecules. They store energy for later use, form membranes, provide structural support, help control chemical reactions within the organism, and store the hereditary information that is used to direct every aspect of the organism's life and is passed on to the next generation. The four major categories of macromolecules are carbohydrates, lipids, proteins, and nucleic acids. Monomer=simplest form of a carb. Dimer= pair of 2 monomers of same type. Polymer= set of many monomers of same type bonded together. Dehydration Synthesis= removal of water. Hydrolosis= Addition of water..

Bonds



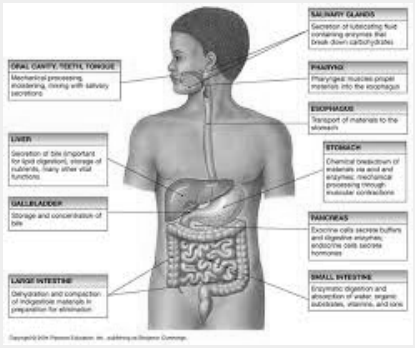
Organic Chemistry

Our study of life begins with an examination of chemistry because all living organisms are composed of chemicals, and all life processes follow chemical rules. All matter, living and nonliving, is made up of atoms. Atoms can interact by transferring electrons or by sharing electrons and forming molecules. Atoms and the bonds that hold them together contain energy; this energy is harnessed and utilized by the chemistry of life. The single most important molecule for life as we know it is water. Water's unique and vital properties are a direct consequence of its chemistry. Atoms are the basic unit of matter (smallest) they are made of protons, neutrons and electrons. Each water molecule is made up of 2 H atoms and 1 O atom which are held together by a covalent bond. Water moves up the small space between to microscope slides= capillary action.

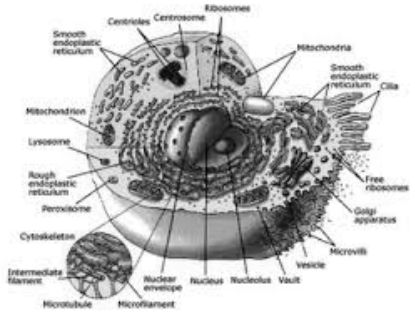
Organic Chemistry (cont)

Water sticks to a plastic surface when upside down= Adhesion. A paperclip can float on the surface of water= surface tension. Water sticks to other water molecules= Cohesion. Oxygen has an atomic mass of 16 and an atomic number of 8 so it has 2.6 electrons. Covalent bonds are formed when pairs of electrons are shared by atoms. A weak bond between 2 molecules resulting from an electro-static attraction makes a hydrogen bond. Ph Scale= the higher, the more basic, the lower, the more acidic..

Digestive System



Cell diagram



Cell functions

Structure	Function
Cell wall	Protects the cell and gives shape to the cell
Outer membrane	Protects the cell against some antibiotics (only present in gram negative cells)
Cell membrane	Regulates movement of materials into and out of the cell;contains enzymes important in cellular respiration
cytoplasm	Contains DNA,ribosomes and organic compounds required to carry out life processes;
Chromosome	Carries genetic information inherited from past generations
Plasmid	Contains some genes obtained through genetic recombination
Capsule and slime layer	Protects the cell and assists in attaching the cell to other surfaces
Endospore	Protects the cell against harsh environmental conditions,such as heat or drought
Pilus (Pili)	Assist the cell in attaching to other surfaces,which is important for genetic recombination
Flagellum	Moves the cell.

cell organelles

CELL ORGANELLES

ORGANELLE	LOCATION	DESCRIPTION	FUNCTION
CELL WALL	Plants cells only	OUTER LAYER , RIGID, STRONG, STIFF, NON-LIVING	*Protects and Support Cell * Allows oxygen and water to pass through
CELL MEMBRANE	Both plants and animal cells	Plant - inside cell wall Animal - outre layer	Controls what comes in and out of the cell
NUCLEUS	Plant and Animal Cells	Rounded shape surrounded by rest of organelles	Controls the cells activities
CYTOPLASM	Both plants and animal cells	Clear gel-like fluid	Home to the cell's organelles
MITOCHONDRIA	Both plants and animal cells	Bean shaped with inner membrane	Breaks down sugar molecules to create energy
ENDOPLASMIC RETICULUM	Both plants and animal cells	Network of folded tubes or membranes	Carries protein and other materials from one part of the cell to another
RIBOSOMES	Both plants and animal cells	Small bodies floating free or attached to the endoplasmic reticulum	Produces proteins
GOLGI BODIES	Both plants and animal cells	Flattened sacs or tubes	Receives proteins and other materials from the Endoplasmic Reticulum and packages them and then redistributes them
CHLOROPLASTS	Plants cells only	Green, oval structures usually containing chlorophyll	Captures energy from sunlight and uses it to produce food for cells
VACUOLES	Both plants and animal cells	Fluid-filled sacs	Storage area for cells
LYSOSMES	Plants cells -uncommon Animal cells - common	Small round structures	Use chemicals to break down large food particles into smaller ones, and breaks down old cells.

phospholipid