

Standard 4 Review Sheet / Key Idea 1

Living Environment

The living things in an area interacting with their physical environment make up an **ecosystem**.

Organisms which can make their own food by photosynthesis are called **autotrophs** or **producers**.

primary consumers are herbivores which eat producers.

secondary consumers are consumers which eat primary consumers.

autotrophs -- organism able to make its own food (usually using the life process of **photosynthesis**)

heterotroph -- is an organism which depends upon other organisms for its food

habitat -- is the place an organism lives

niche -- is the role of an organism in the environment, especially its feeding role

** No **2** species can occupy the same ecological **niche**.

As the number of organisms in an ecosystem and their interactions increase, the stability of the ecosystem **increases**.

Organize the four ecological levels of organization from simplest to most complex.

population (one species) → community (more than one species in an area) → ecosystem (community plus physical factors) → biosphere (all parts of world where life is found)

Life Processes

digestion -- breakdown of food to simpler molecules which can enter the cells

circulation -- the movement of materials within an organism or its cells

movement -- (**locomotion**) change in position by a living thing

excretion -- removal of waste products by an organism (wastes may include carbon dioxide, water, and urea in urine and sweat)

respiration -- process which converts the energy in food to **ATP** (the form of energy which can be used by the cells)

reproduction -- the making of more organisms of one's own kind -- not needed by an individual living thing but is needed by its **species**

immunity -- the ability of an organism to resist disease causing organisms and foreign invaders

Coordination --the control of the various activities of an organism (mostly involves the **nervous** system and **endocrine** glands in complex animals)

synthesis -- the production of more complex substances by combining two or more simpler substances

homeostasis -- is the maintenance of stable internal state in an organism

Explain how we maintain temperature homeostasis in our bodies.

body temp increases → we perspire → evaporation cools body back to normal temp

tissues -- are groups of cells which perform similar functions

organs -- are groups of tissues which perform similar functions

organ systems -- are groups of organs which work together to perform similar functions

Name three cell structures and human body structures which perform the same job and state that job.

1. Food vacuole/stomach (store food)

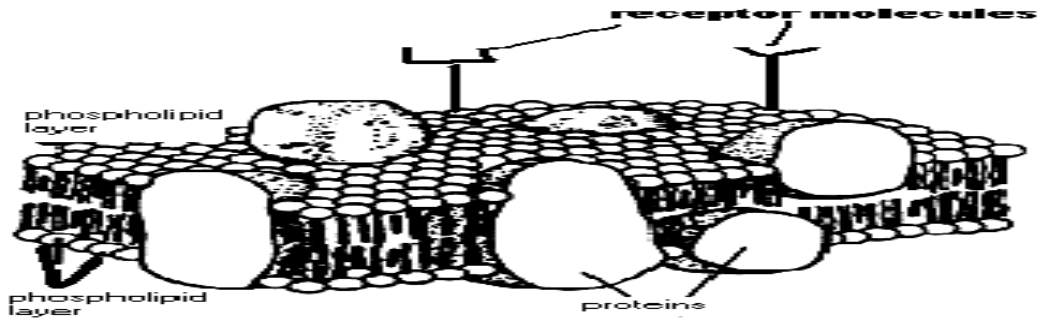
2. cell membrane/lungs (gas exchange)

3. contractile vacuole/urinary bladder (pump out wastes)

cell membrane -- cell structure composed of 2 **lipid** layers and **transport proteins** which allows materials to selectively enter and leave the cell based on their **size**

List three functions of the cell or plasma membrane.

- a. **Separate the inside cell environment from the outside.**
- b. **Has receptors which attach to other molecules.**
- c. **Selectively permeable (lets molecules in and out of cell based on size and charge)**



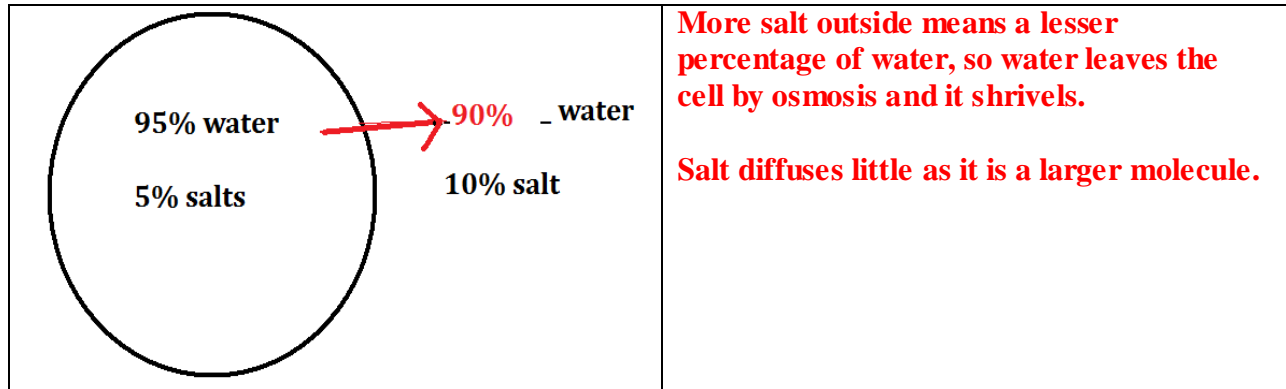
diffusion -- is the movement of materials from high to low concentration

active transport -- is the movement of materials from low to high concentration requiring **ATP energy**

Explain with a labeled picture why a cell placed in distilled water may burst.

<p>The diagram shows an oval representing a cell. Inside the cell, it is labeled '95% water' and '5% salts'. Outside the cell, it is labeled '100% water'. A red arrow points from the '100% water' label outside the cell towards the '95% water' label inside the cell, indicating the direction of water movement.</p>	<p>There is a greater percentage of water outside the cell, so water enters the cell by osmosis.</p> <p>Salt diffuses little as it is a larger molecule.</p>
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Explain with a labeled picture why a cell placed in concentrated salt solution may shrivel.



receptors -- molecules on the surface of cells which can attach to other molecules (like hormones)



Why must digestion (chemical hydrolysis) break down large molecules?

The molecules are too large to pass through membranes and into the blood or cells _____

amino acids _____ -- are the digestive end products of complete protein chemical digestion

simple sugars _____ -- are the digestive end products of complete carbohydrate chemical digestion

Glucose is an example of a **simple** _____ sugar.

Glycogen _____ or **starches** _____ are complex carbohydrates

Parts of the Cell Theory

- The cell is the unit of **structure** in all living things.
- The cell is the unit of **function** in all living things.
- All cells come from **pre-existing** cells.

Some Cell Organelles

nucleus -- contains DNA which directs the synthesis of **proteins** by the cell

mitochondria -- carries on the process of cell **respiration** converting glucose to **ATP** energy the cell can use

ribosomes -- responsible for the synthesis of proteins for the cell

cell membrane -- selectively regulates the materials moving to and from the cell

food vacuole -- stores and digests food

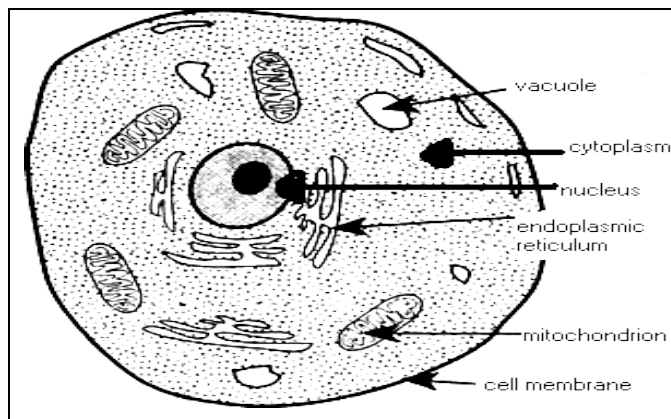
contractile vacuole -- pumps out wastes and excess water from the cell

chloroplast -- found in plant cells and algae carries on the process of photosynthesis

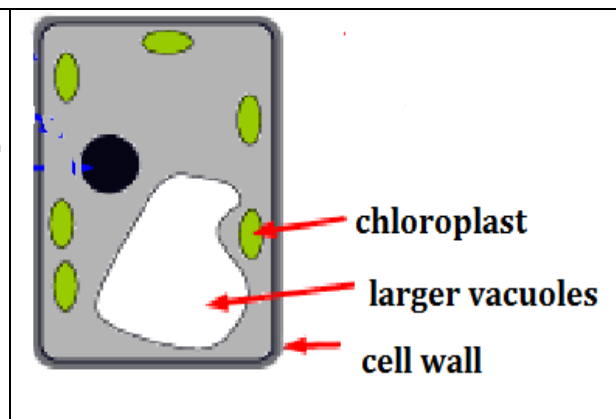
cell wall -- surrounds and supports plant cells

** **chloroplasts** and **cell walls** are found in plants but not in animals

Animal Cell

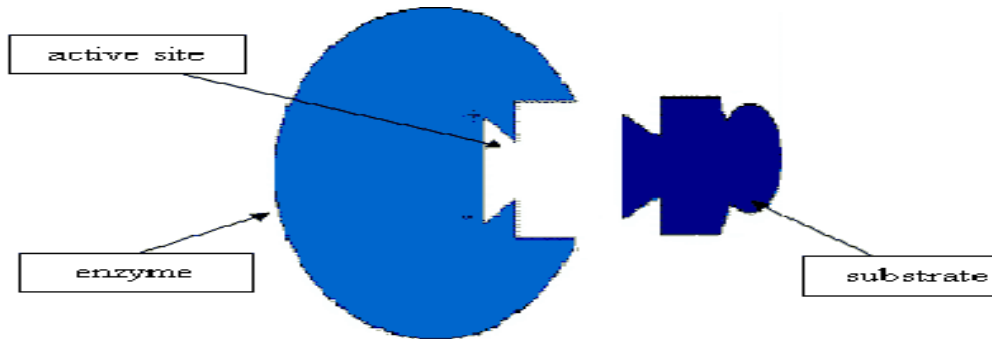


Plant Cell



What is the form of energy cells use? ATP

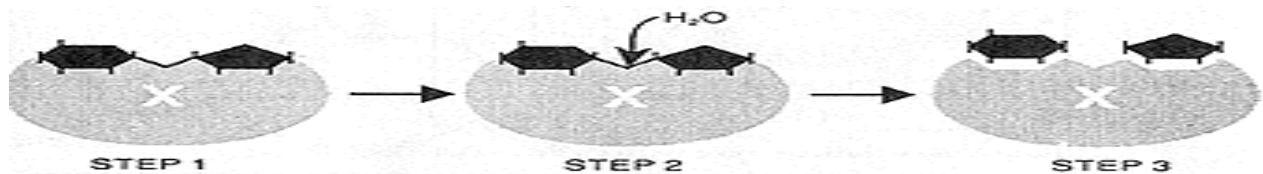
Enzymes



The place where the enzyme fits with the substrate is called its active site.

catalyst -- substance which speeds up a chemical reaction without becoming part of the reaction itself

enzyme -- an organic catalyst made of mostly protein



What are two ways you can tell an enzyme in a pictured reaction above?

- The enzyme is often the largest molecule
- The enzyme will go through the reaction unchanged

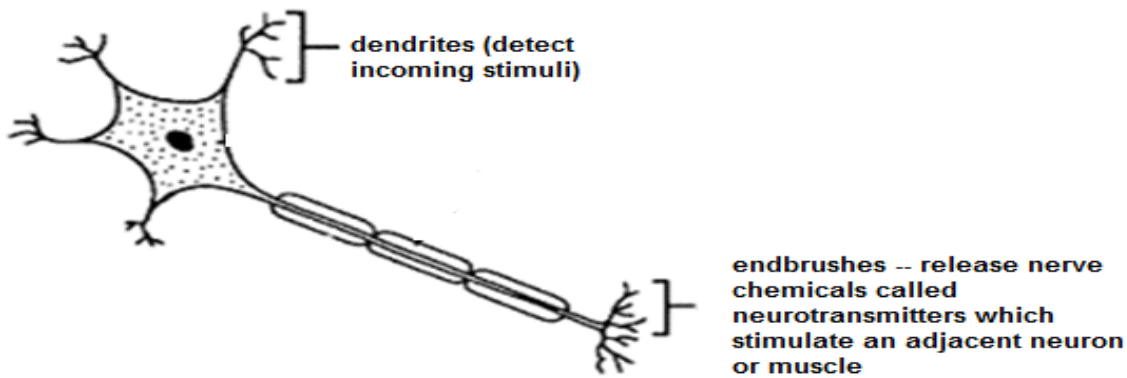
Is this a synthesis or chemical digestion reaction? How do you know?

It is a digestion reaction because the molecule was broken apart (a synthesis puts molecules together and would be the reverse of this pictured reaction)

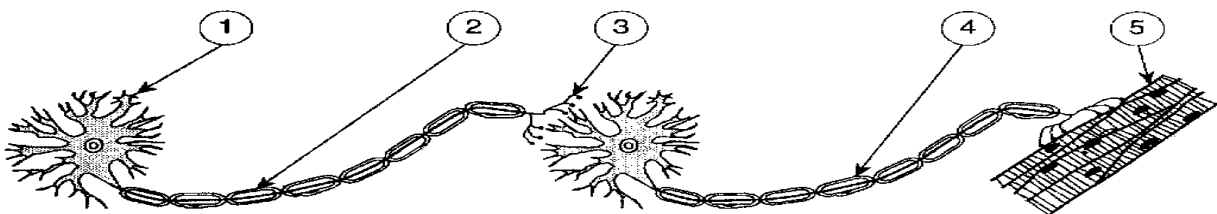
Factors Influencing Enzyme Activity

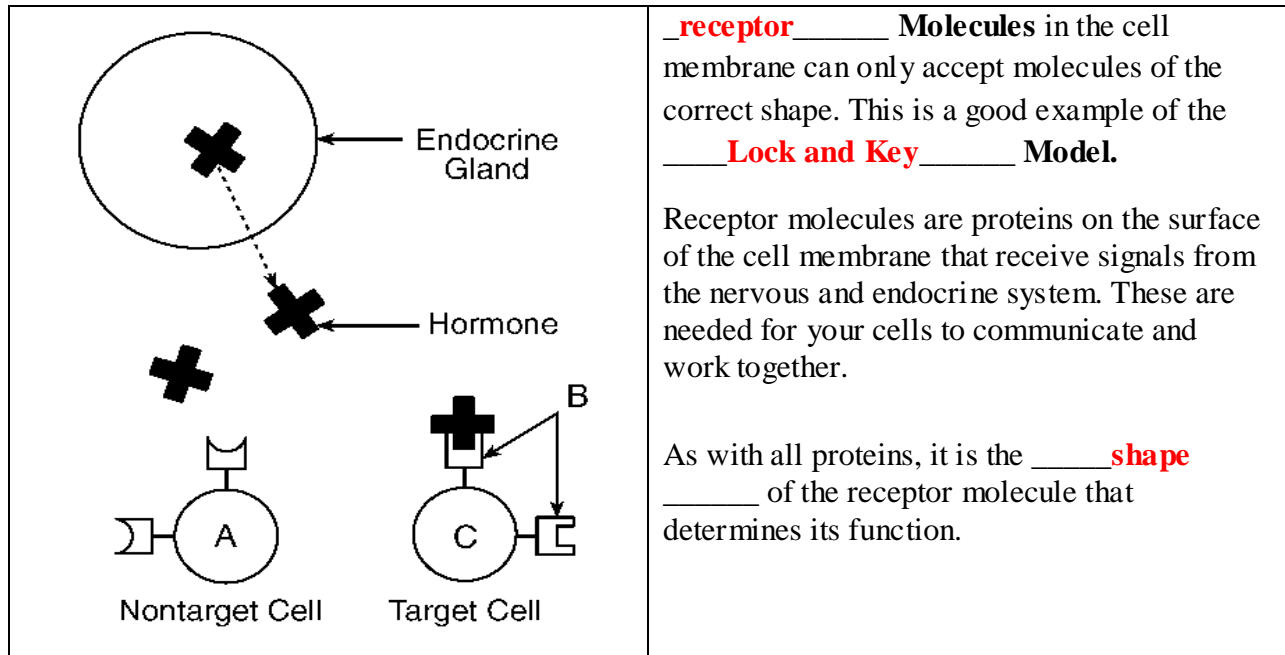
1. **pH**: the optimum (best) in most living things is close to 7 (neutral).
2. **Temperature**: the best is 37 C in most living things ... heating up the enzyme causes it to **denature** or change its shape so it no longer fits with its **substrate**
3. The addition of more enzyme or substrate tends to **increase** the speed or rate of reaction.

The two primary methods of communication between cells are **nerve impulses** and **hormones**. If nerve or hormone signals are altered, this changes cellular communication and affects the organism's stability.



Neurons or **nerve** cells may communicate with other nerve cells or **muscles**.





Central Dogma of Biology

DNA makes → **RNA** → codes for amino acids → makes **proteins**

The organelles present in single-celled organisms often act in the same manner as the tissues and systems found in **multicellular** organisms.

Single-celled organisms perform all of the life processes needed to maintain homeostasis, by using specialized **organelles**.