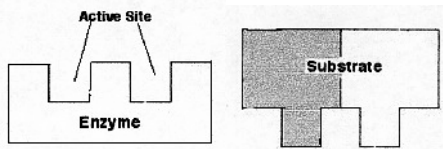


**Objective 2** The student will demonstrate an understanding of the organization of living systems.

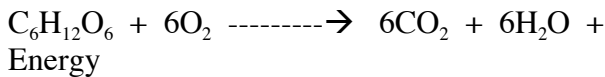
**1. Investigate and identify cellular processes**

a.) Osmosis is the movement of water through a biological membrane. Water moves but not the sugar or salt. Water moves toward the high salt or sugar content.

b.) Enzymes speed up reactions. The enzyme contains the hole for the substrate to fit into.

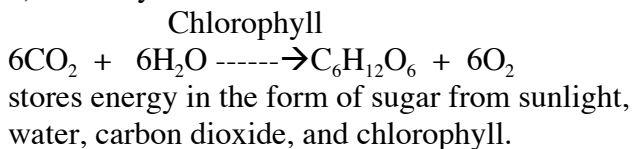


c.) Cellular respiration releases energy from food in the form of ATP.



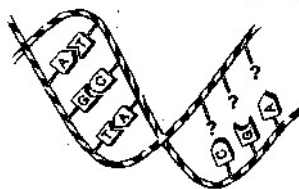
It contains Glycolysis, Krebs Cycle, and the ETS.

d.) Photosynthesis:



**2. Describe components of deoxyribonucleic acid (DNA)**

Nucleotides make up all nucleic acids. The bases are A, T, C, and G are found in DNA. RNA contains A, G, C, and U. A combines with T or U, and C with G. DNA is a double stranded molecule. RNA is single



stranded.

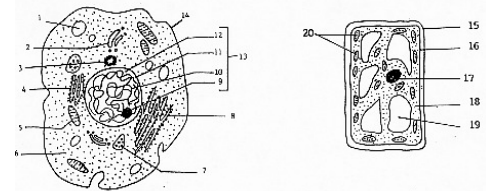
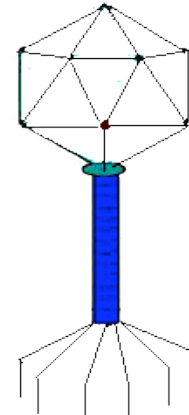
**3. Explain replication, transcription, and translation**

DNA replication: DNA splits in half and each base picks up its complement. A –T and C-G.  
 Transcription: DNA produces mRNA in the nucleus. A-U and C-G. No T in RNA. mRNA is made up of 3 base segments called codons. They code for amino acids.

**Objective 3** The student will demonstrate an understanding of the interdependence of organisms and the environment.

**1. Compare the structure and functions of viruses to cells**

The virus contains a protein coat and a nucleic acid core. It is not a cell.



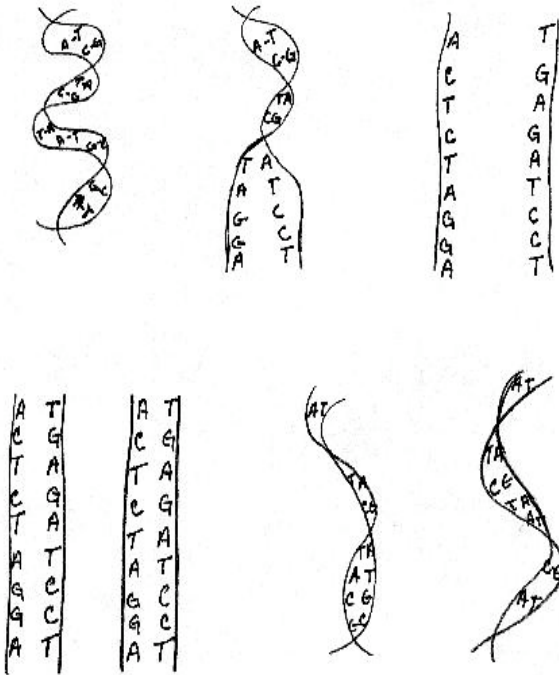
**2. Identify and describe the role of bacteria in maintaining health**

Bacteria can become pathogenic (disease causing) if it finds its way into other organisms. Diphtheria, Strep throat, Botulism, scarlet fever are all diseases caused by bacteria. Not all bacteria are pathogenic. Many are useful in decaying dead material, making foods taste better, and help plants make fertilizer from atmospheric nitrogen.

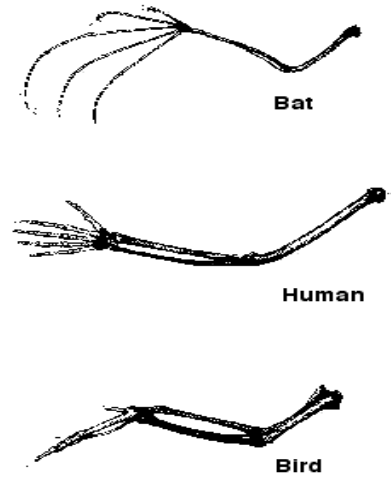
**3. Identify evidence in change in species using fossils**

Evolution refers to change. These changes can be seen is examining fossils (remains of organisms since long gone), DNA similarities, Structural similarities, similarities in their embryos, and similarities in the

Translation: Occurs on the ribosomes. The tRNA will bring the amino acids to produce the protein. The chart substitutes for the tRNA.



origin of their limbs (homologous organs).



**4. Identify and illustrate how changes in DNA cause mutations**

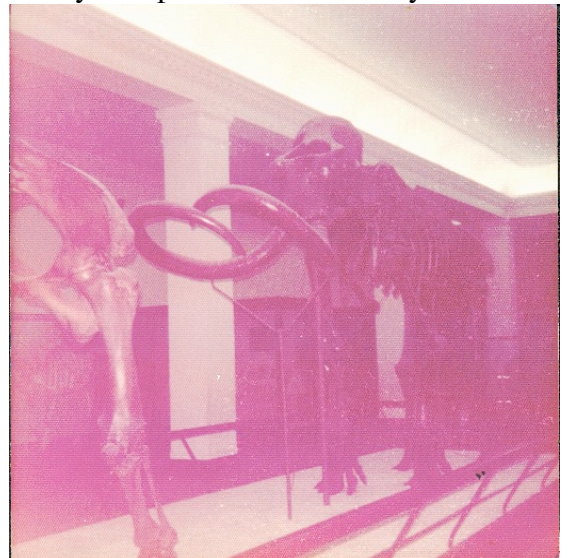
Mutations: point mutation: ATCGGG  
ATGGGG

Insertion: Adding a base AAGGTC  
AAGGGTC

Deletion: Removing a base AAGGCG  
AAGCG

**4. Illustrate the results of natural selection in speciation**

Be able to recognize that changes in the frequencies of a population's genes shows evolution. Understand that evolution can only occur in a population of organisms and not in individual organisms. Natural selection deals with the population's ability to reproduce successfully.



**Codon Chart**

<b>1st Base</b>	<b>A</b>	Lysine Lysine Asparagine Asparagine	Arginine Arginine Serine Serine	Methionine Isoleucine Isoleucine	Threonine	<b>3rd Base</b>
	<b>G</b>	Glutamic acid Glutamic acid Aspartic acid Aspartic acid	Glycine	Valine	Alanine	<b>A G U C</b>
	<b>U</b>	Stop codon Stop codon Tyrosine Tyrosine	Stop codon Tryptophan Cysteine Cysteine	Leucine Leucine Phenylalanine Phenylalanine	Serine	<b>A G U C</b>
	<b>C</b>	Glutamine Glutamine Histidine Histidine	Arginine	Leucine	Proline	<b>A G U C</b>
		<b>A</b>	<b>G</b>	<b>U</b>	<b>C</b>	
		<b>2nd Base</b>				

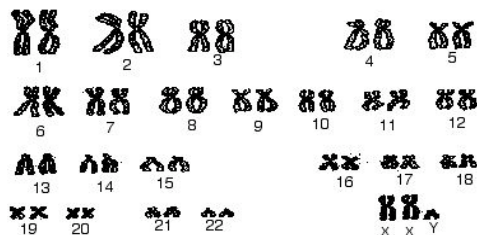
**5. Compare genetic variations observed in plants and animals**

Punnett square:

Parents: Bb x Bb

	<b>B</b>	<b>b</b>
<b>B</b>	<b>BB</b>	<b>Bb</b>
<b>b</b>	<b>Bb</b>	<b>bb</b>

Karyotype:

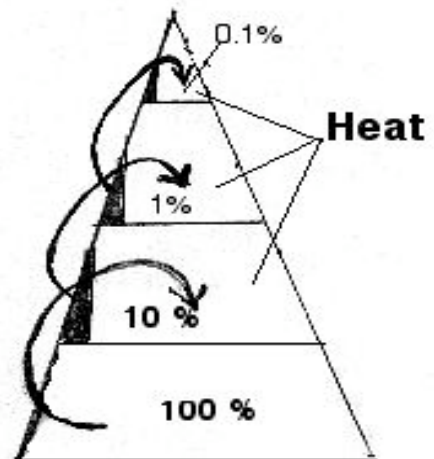


Two X chromosomes instead of one.

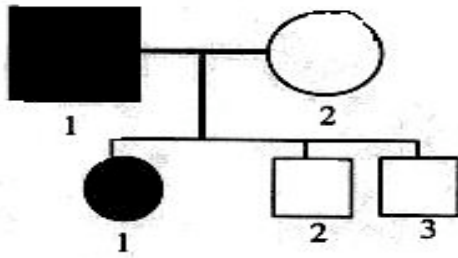
Pedigree

**5. Analyze the flow of matter and energy through different trophic levels**

Energy is transferred from one trophic level to another at a rate of 10 %.



□ = Total Energy  
 ■ = Useable Energy



Males are square and females are circles. Dark shade means the traits are recessive (bb).

**6. Identify characteristics of kingdoms**

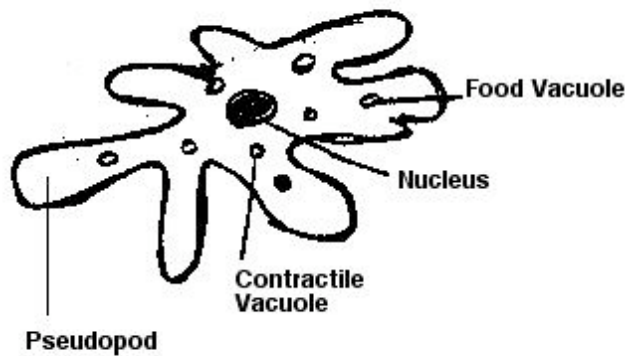
**Bacteria:** single celled, cell wall, no nucleus (prokaryotic), heterotrophic some autotrophic.

**Protista:** single celled, no cell wall, eukaryotic, flagella, cilia,

**Fungi:** cell wall, eukaryotic, heterotrophic, no cilia or flagella.

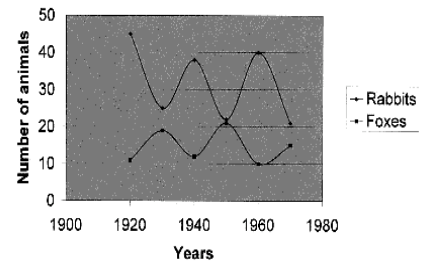
**Animal:** multicelled, heterotrophic, no cell wall.

**Plant:** multicelled, autotrophic, cell wall.



**6. Interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism**

**Predator Prey Relationship**



The predator population depends upon how many prey there are to eat. The graph shows how each population changes in relations to each other.

**7. Interpret the functions of systems in organisms**

Circulatory: heart, blood vessels, blood

Digestive: esophagus, stomach, liver, small intestine, large intestine anus

Respiratory: lungs

Excretory: Kidney, bladder, urethra

Endocrine: thyroid, pancreas, pituitary, adrenal glands, hormones

Reproductive: testes, ovaries, uterus, sperm and egg

Skeletal: Bones, ligaments and joints

**7. Investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids**

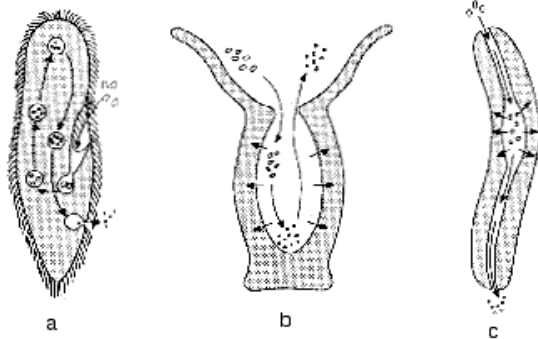
In reading a food web the arrows show the direction in which the energy is flowing. The arrow always points to the organism eating the organism it is coming from. If more than one arrow is leaving an organism that means more than one organism is using it for food. The producers are always at the

Muscle: Muscles (cardiac, smooth, and skeletal) tendons.

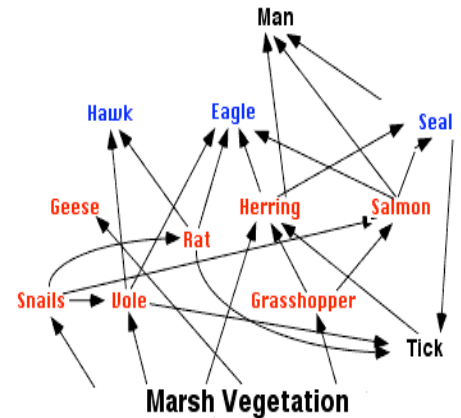
Integumentary: skin.

Nervous: brain, neurons, spinal cord, eye, and ears.

Immune system: antibodies, B and T cells immunity (passive and active).



bottom of the web.



### 8. Compare the interrelationships of organ systems to each other and to the body as a whole

All systems interact with each other. Circulatory carries oxygen, food, wastes, hormones, from cells to the organs or cells that need them or will eliminate them from the body. The nervous system coordinates all the systems by sending messages to all systems. The digestive system supplies food to all cells after it digest it. Respiratory system supplies oxygen to the blood and take carbon dioxide out of the body. The kidney will maintain water balance in the body while removing liquid waste. The skin protects the body from germs and drying out. The immune system protects the body from foreign invaders (antigens). The muscular system will help move materials from place to place since this type of tissue is found in most all of the bodies organs.

### 8. Evaluate the significance of structural and physiological adaptations of plants to their environments

Most land plants need roots, stems, and leaves to survive. Each part of the plant contains certain adaptations to help them survive. Leaves contain a waxy layer to prevent water loss. Their stomata (holes in the leaf) allow water and gases to enter and leave the leaf. The stem and roots contain vascular tissue to transport water and food to each of its cells. The xylem transports water and the phloem food. The flower allows the plants to reproduce and spread their seeds to ensure their survival. Many of the fruits are designed in a way to help spread the seeds around the environment.