INTERNATIONAL LEADERSHIP CHARTER HIGH SCHOOL
BRONX, NEW YORK

Living Environment Summer Recovery Packet
June 2023

Name:_____ **Teacher: Mrs. Manaei**

1. Scientific Investigation:

A. Steps to the Scientific Method

1. **Make observations/Do research:** to determine what problem you want to address
2. **Develop a Research Question:** what specifically do you want to determine?
3. **Develop a hypothesis**: based on research from a variety of sources
   a. **scientific journals:** are the best place to locate *current* findings on the newest technologies
   b. **encyclopedias**: are a good place to find information on extinct species or historical theories
   c. **state/local agencies:** can help with local policies or local research (example: can help research the effects of pesticides on the squirrel population)
4. **Conduct a Controlled Experiment**- testing the hypothesis and collecting data and observations
5. **Interpret and Analyze Data:** using tables and graphs
6. **Draw Conclusions**- including improvements for future experiments
7. **Communicate Results:** so others can build on the experiment

B. Terms: *Word Bank: experiment, variables, hypothesis, constants, control, independent variable, dependent variable*

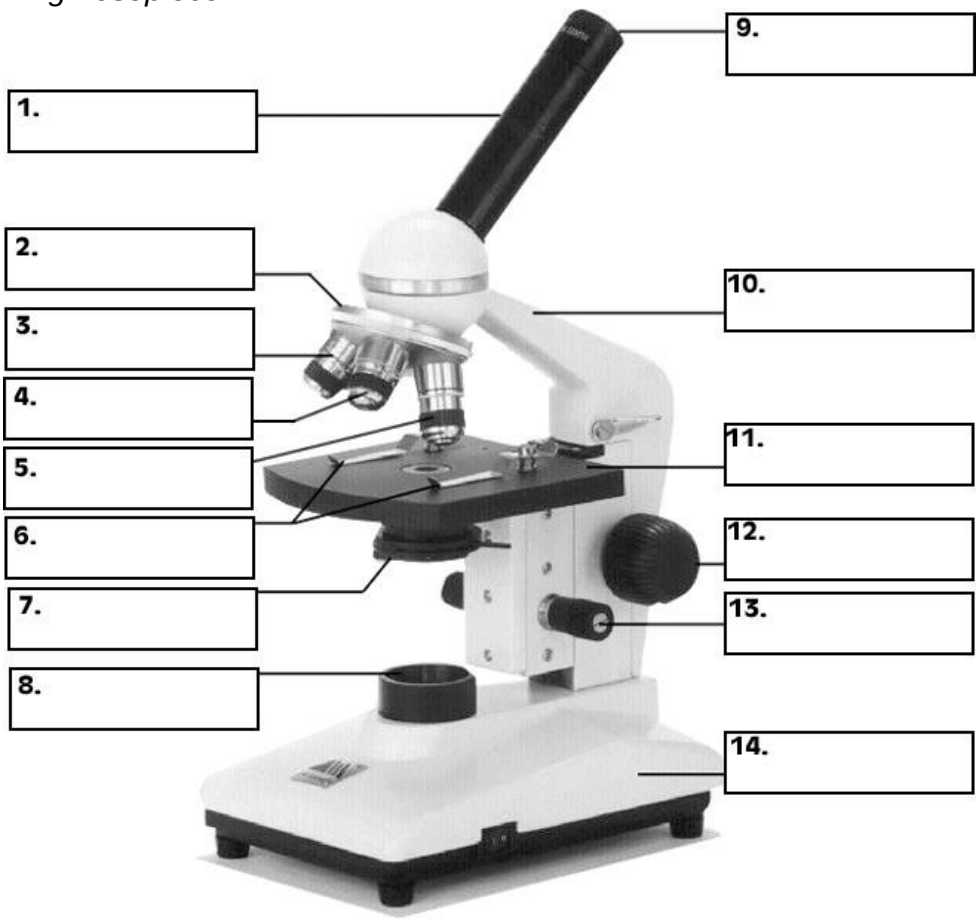
1. _____- is an educated guess/prediction; usually in "IF...THEN" form.

2. _____- are the factors that are measured in an experiment.
3. _____- is the variable that you purposely change...variable “I” change.
4. _____- is the variable that changes as a result of changing the IV.
5. _____- is the baseline measurement that you compare your data to.
6. _____- the thing(s) that are purposely kept the same in the experiment.
7. _____- is a structured way to test a hypothesis.

C. Scientific Tools - Identify the tool used for each of the following tasks: *Word Bank: beaker, graduated cylinder, balance, light microscope, electron microscope*

1. _____- used for measuring mass
2. _____- used for examining extremely small specimens
3. _____- used for examining small specimens, was used to discover cells
4. _____- used for measuring precise volumes of liquids
5. _____- less accurate tool for measuring volume

D. Microscope – Fill in the names of the parts of the microscope. *Word bank: objective lens, ocular lens, diaphragm, fine focus, course focus, stage, barrel, base, stage clips, lamp, arm, revolving nosepiece*



Total Magnification

Ocular Lens x Objective Lens

Example:

Ocular – 10x
Objective – 100x

Total = 10 x 100 = 1,000

1. _____- used to make BIG changes in focus
2. _____ -adjusts the amount of light
3. _____- changes the magnification
4. _____- holds down the slide
5. _____- what you look through
6. Draw a picture demonstrating how to properly put on a coverslip to avoid bubbles.

II. Characteristics of Living Things

A. List the 7 Themes of Biology: *Word Bank: cells, metabolism, homeostasis, reproduce, heredity, evolution, interdependence*

1. _____- smallest unit of all life
2. _____- get and use energy in order to carry out life functions
3. _____- organisms rely on each other to survive
4. _____- either asexually or sexually

5. _____**-** maintain a constant internal environment, ex. body temperature
6. _____**-** pass on traits to offspring
7. _____**-** populations of organisms change over time

B. Biological terms in order from smallest to largest

Cell→ tissue→ organ→ organ system→ organism→ population→species→ community→ ecosystem→ biosphere

1. _____: the smallest unit of life
2. _____: a group of cells that carry out a similar function
3. _____: a group of tissues that carry out a specialized function in the body
4. _____: a group of organs that work together to perform body functions
5. _____: a single living thing
6. _____: a group of organisms of the same species that live in the same area and can interbreed
7. _____: a group of organisms that look similar and can produce fertile offspring
8. _____: a group of different species that live in the same habitat and interact with on another
9. _____: a community of organisms and their non-living environment
10. _____: all of the world and it's atmosphere that support life

III. Life at the Molecular Level

A. IInorganic Compounds~ *(Typically DO NOT contain carbon)*

1. **Water**: *Word Bank: hydrogen bonding, floats, acids, body temperature, capillary action, water, polar, 7, 4, 14, 0, cohesion, solvent, adhesion, bases, high heat capacity, homeostasis, surface tension)*

a. Water molecules have an unevenly distributed charge, this means that the molecule is _____.

b. _____ is the attraction between the positive end of one water molecule and the negative end of another water molecule.

c. Many of the unique properties of water are caused by hydrogen bonding

~_____is the movement of water up thin tubes, due to_____which means that water molecules 'stick' to each other and_____which means that water molecules can 'stick' to other substances.

~ The property that helps bugs stand on water is called_____.

~ Water expands when it freezes which makes ice_____.

~ Water has a_____which means it takes a lot of energy to raise or lower its temperature. This is important because it helps organisms maintain_____by keeping a constant _____.

d. Because water is a polar molecule, it is called the universal _____ which means that it can dissolve many substances.

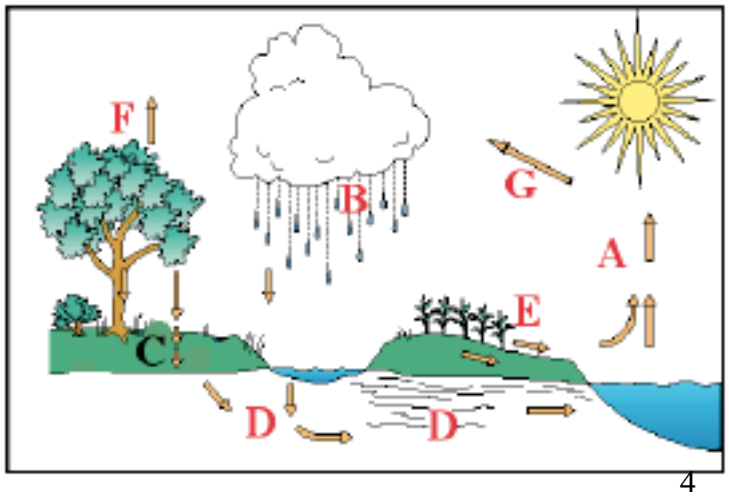
e. Cells are mostly_____, therefore much of your entire body is made of water.

~**The pH scale** is from 0-14._____range 0-6._____range 8-14. A neutral solution has a pH of_____.

2. The Water Cycle : Fill in the blanks with letters from the diagram.

a. water falls to the ground in the form of **precipitation** (letter_____)

b. it percolates through the soil to make **ground water** (letter_____)



c. water that doesn't go into the ground is called **run off** (letter_____)

d. water is taken into plants through the roots by **capillary action**

e. transpiration is the process of releasing water vapor into the atmosphere from plant leaves. (letter____)

f. evaporation puts water from oceans and lakes into the atmosphere. (letter_____)

g. water in the atmosphere forms droplets in clouds by **condensation**. (letter_____)

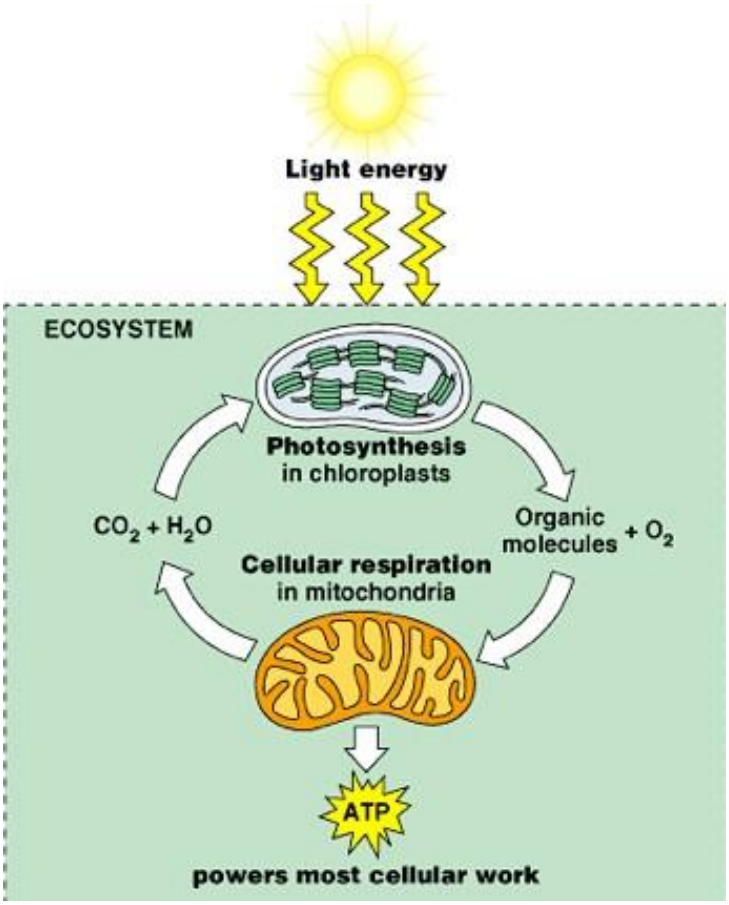
3. The Carbon Dioxide/Oxygen Cycle: Word Bank: heterotrophs, CO2, water, O2, glucose, chloroplasts, mitochondria, photosynthesis, chemical, respiration, autotrophs, solar

h. _____ use organelles called_____in their leaves to collect_____energy.

i. _____ occurs so plants can make_____to use for energy

j. photosynthesis converts_____energy into_____energy.

k. photosynthesis uses_____,_____and_____energy to form _____ &_____.



l. animals can not make their own food therefore they are called _____.

m.all organisms use organelles called _____ to perform a process called _____ which breaks down food molecules to produce ATP for energy.

n. respiration uses_____and _____ to produce_____and _____.

o. the gas made by respiration is_____; the gas taken in by photosynthesis is _____.

i. the gas taken in by respiration is _____; the gas produced by photosynthesis is_____.

***B. Organic Compounds**:* There are_____(number) different organic compounds.

All organic molecules contain_____and are necessary for_____!!!!

1. Carbohydrates Word Bank: *monosaccharides, built, glucose, broken down*

a. Carbohydrates are_____to store energy in plants and are _____to be used as cellular energy to accomplish the characteristics of life.

b._____ are the building blocks of carbohydrates, example _____

2. Lipids Word Bank: fat, cuticle, oil, store, wax, insulate

a. lipids are organic compounds that include include_____,_____, and_____.

b. lipids are used to_____energy in animals

c. leaves have a protective lipid layer called the_____that prevents water loss.

d. lipids like those in whale blubber and human fat help _____ organisms, protecting them and keeping them warm

3. Proteins: Word Bank: unchanged, amino acids, active sites, peptide, enzymes, speed up, substrate

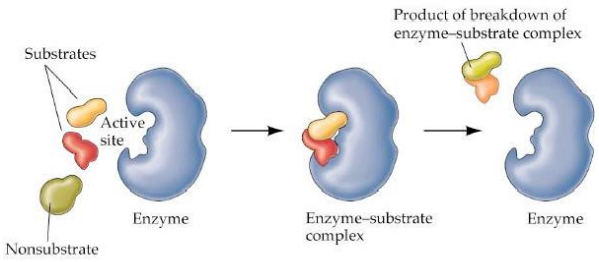
a. Proteins are made up of_____joined together by _____ bonds.

b._____ are a special group of proteins that _____ reactions.

c.Enzymes have_____with specific shapes that allow them to interact with only one type of_____.

d. Enzymes are_____during reactions.

e. Circle the substrates. **Box in** the enzyme AFTER the reaction. Draw a **Triangle** around the products.



4. Nucleic Acids: *Word Bank*: adenine, cytosine, guanine, thymine, hydrogen bond, uracil, replication, sugar, ribose, Watson & Crick, nucleotides, Rosalind Franklin, double helix, genetic, deoxyribose, phosphate, DNA, RNA, nitrogen base

a. The two types of nucleic acids are _____ and _____.

b. The building block of a nucleic acid is a _____, which is made of a _____, a _____, and a _____.

c. _____ is common to **all** living things and it stores genetic information.

d. In DNA, _____ bonds with _____ and _____ bonds with _____.

e. The nitrogen bases are held together by _____.

f. The shape of a DNA molecule is a _____, discovered by _____.

g. _____ took X-ray photographs of DNA that helped determine DNA's structure.

h. _____ is a process that makes an exact copy of DNA.

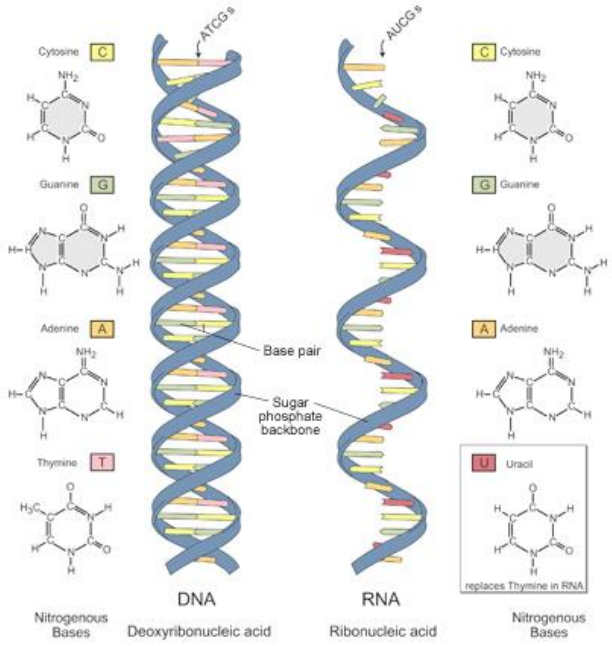
i. The sugar in DNA is _____, but the sugar in RNA is _____.

j. In DNA adenine bonds with _____, but in RNA it bonds with _____.

k. _____ is single stranded, and _____ is double stranded.

l. _____ is copied by _____ which becomes the pattern for making proteins.

m. _____ engineering involves inserting foreign DNA into host DNA to make recombinant DNA.


Cytosine C
Guanine G
Adenine A
Thymine T
ATCG's
AUCG's
Base pair
Sugar phosphate backbone
C Cytosine
G Guanine
A Adenine
U Uracil
replaces Thymine in RNA
DNA
Deoxyribonucleic acid
RNA
Ribonucleic acid
Nitrogenous Bases
Nitrogenous Bases

IV. Life at the Cellular Level

A. The Parts of the Cell Theory

1.

2.

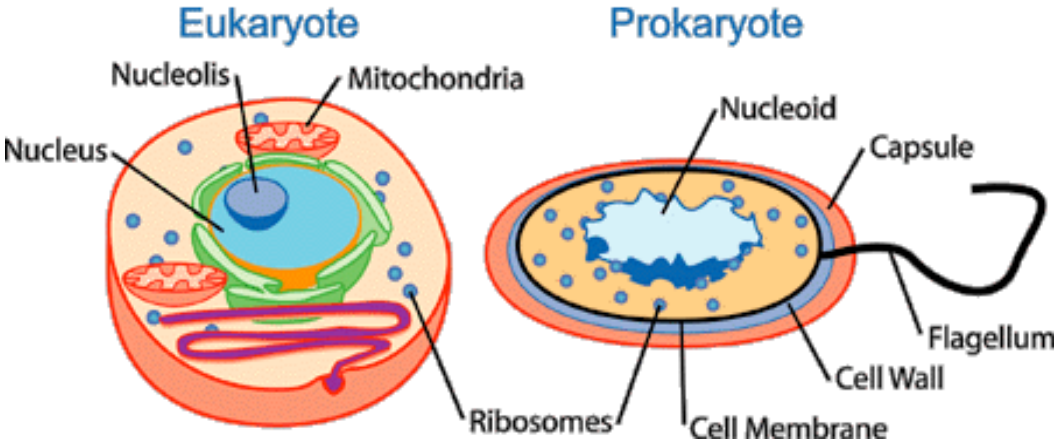
3.

B. Development of the Cell Theory Word Bank: Hooke, Leeuwenhoek, Schleiden, Schwann, Virchow

1. _____- first to observe living microorganisms through a microscope
2. _____- observed cork and named cells
3. _____- studied plant cells
4. _____- studied animal cells
5. _____- concluded that all cells come from preexisting cells

C. Types of Cells Word Bank: prokaryotes, eukaryotes, both

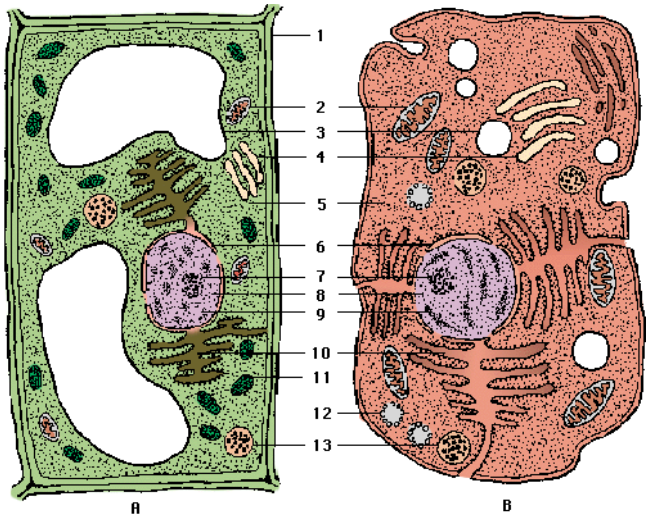
1. _____- have a nucleus
2. _____- have organelles
3. _____- includes the kingdom Eubacteria and Archaebacteria
4. _____- do not have organelles (mini-organs)
5. _____- includes Protists, Fungi, Plants, and Animals
6. _____- have DNA, (HINT: ALL kingdoms have this in common)
7. _____- go through mitosis
8. _____- go through binary fission
9. _____- have ribosomes to synthesize (make) proteins



D. Cellular Organelles: *Word Bank*: nucleus, mitochondria, vacuole, ribosomes, golgi body or apparatus, endoplasmic reticulum, nucleolus, centriole, cell wall, cytoplasm, chloroplast, lysosomes, cell membrane

1. _____ - command center of the cell; DNA in the form of chromosomes is here
2. _____ - small organelle in the nucleus that makes ribosomes
3. _____ - the site of protein synthesis in prokayrotes and eukaryotes
4. _____ - transport system of the cell
5. _____ - collects, packages, and distributes proteins
6. _____ - contains digestive enzymes to break down old cell parts
7. _____ - storage tank of the cell
8. _____ - organelle that conducts 'respiration' for the cell
9. _____ - the powerhouse of the cell
10. _____ - organelle that conducts 'photosynthesis' for plant cells
11. _____ - assists in cell division in animal cells only
12. _____ - the jelly-like material in which organelles float inside a cell
13. _____ - made of cellulose (plants) or chitin (fungi); boundary outside of the cell membrane in some cells
14. _____ - encloses cell, controls what gets into and out of the cell
15. _____ - numerous in heart muscle cells because of need for energy
16. _____ numerous cells that produces large quantities of proteins

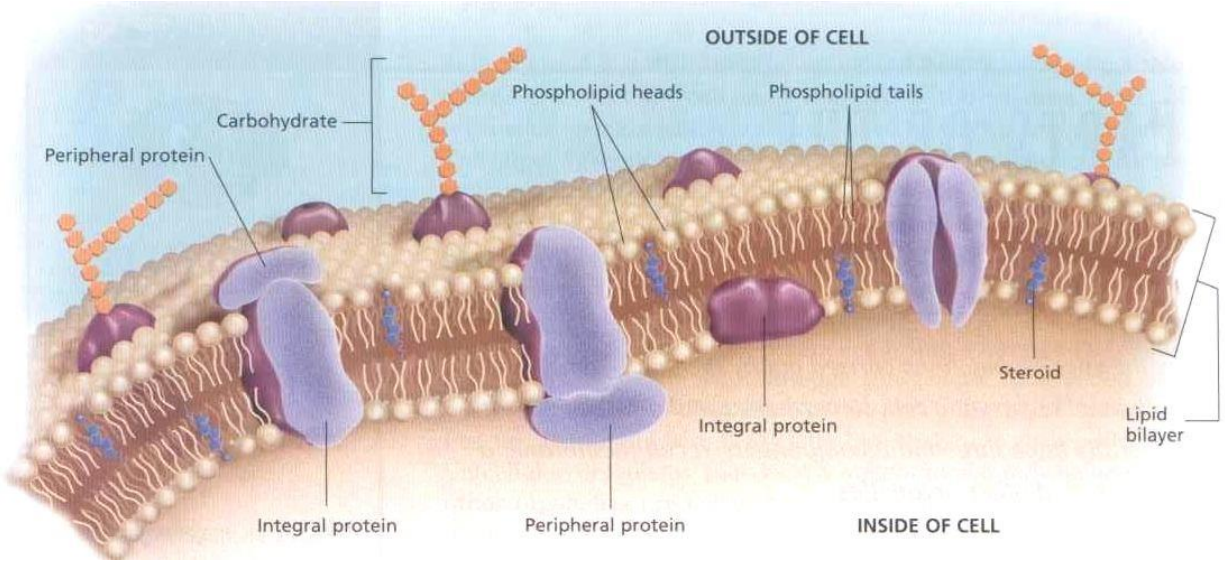
E. Differences between plant and animal cells (complete the table)



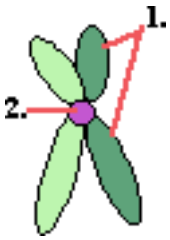
	Plant (A)	**Animal (B)**
Shape		
Unique Parts		

F. The Fluid Mosaic Model and Movement through the Cell Membrane: *Word Bank*: diffusion, proteins, cell membrane, active transport, endocytosis, exocytosis, phospholipids, energy, low, high, carbohydrates, water, facilitated diffusion, pinocytosis, osmosis, phagocytosis

1. The cell membrane is composed of _____, _____, and _____.
2. The Fluid Mosaic Model describes the _____.
3. Passive transport is also called _____ and it doesn't require _____.
4. Passive transport moves molecules move from areas of _____ to _____ concentration.
5. _____ - diffusion where carrier proteins help molecules across the membrane.
6. _____ is a type of diffusion involving only the movement of water molecules.
7. The type of transport that requires energy is _____.
8. The movement that requires energy moves molecules from _____ to _____ concentrations.
9. Active transport that moves substances into the cell is called _____.
10. Moving solid particles into the cell is called _____.
11. Moving liquids into the cell is called is called _____.
12. Active transport that moves substances out of the cell is called _____.
13. Molecules are transported across the cell membrane by carrier _____.



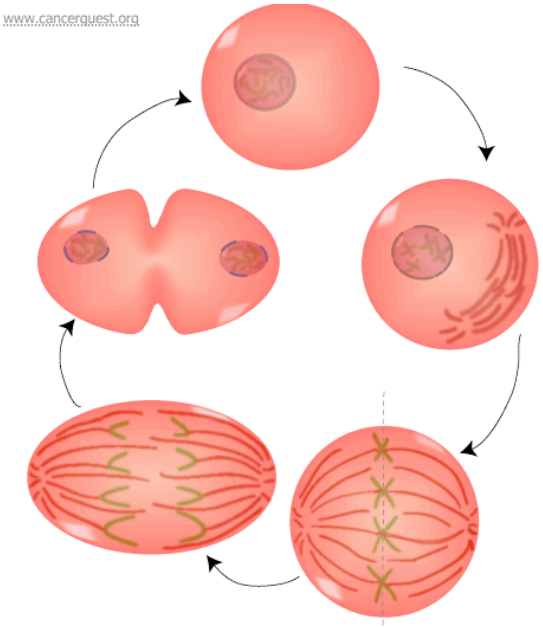
V. Cell Division



A. Mitosis (*Word Bank*: nucleus, replicated, interphase, prophase, metaphase, anaphase, telophase, cytokinesis, centromere, chromatids, chromatin, centrioles, spindle fibers, plate, furrow)

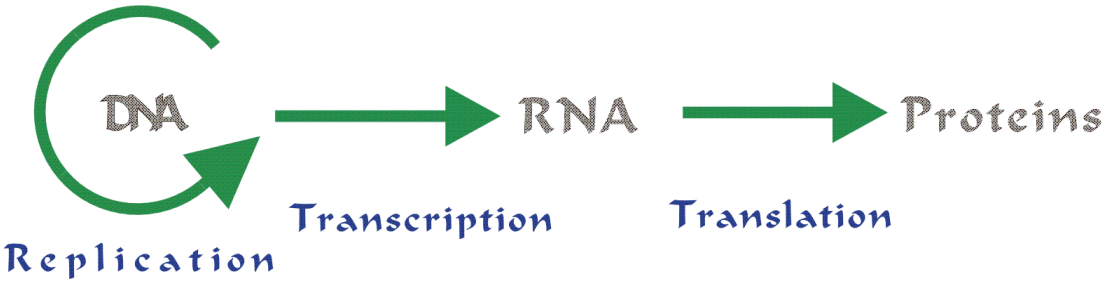
1. A chromosome is made of two identical parts called _____.
2. The parts of a chromosome are held together by a _____.
3. Only animal cells have _____ to help with chromosome movement.
4. During _____ sister chromatids are separated at the _____ and are pulled to opposite ends of the cell.
5. DNA is _____ during _____ so each cell will have the same information
6. Chromosomes line up along the equator of the cell in _____.
7. Loose or uncoiled chromosomes are actually DNA in the form of _____.
8. During _____ spindle fibers shorten which pulls chromosomes to the poles.
9. After the nucleus divides, _____ occurs: the division of the cytoplasm
10. In plant cells only, a cell _____ forms during cytokinesis.
11. In animal cells only, a cell _____ forms during cytokinesis.
12. _____ are attached to chromosomes at the centromere
13. _____ - chromosomes become visible
14. _____ - nuclear membrane forms around each chromosome set
15. _____ - nuclear membrane begins to disappear
16. _____ - two daughter cells are formed

17. **Label** each phase of mitosis in the diagram at the right.



B. Meiosis Word Bank: gametes, 1, the same, 46, 23, eggs, sperm, zygote, homologous, diploid, half, 2, haploid, prophase, fertilization,

1. Meiosis is a type of cell division that makes sex cells or _____.
2. The two types of sex cells are _____ and _____.
3. Mitosis consists of _____ division(s), while meiosis consists of _____ division(s).
4. Mitosis makes cells with _____ number of chromosomes as the parent cell, but meiosis produces cells with _____ the number of chromosomes as the parent cell.
5. A human's body cells have _____ chromosomes; sex cells or gametes have _____.
6. For every chromosome your mother gave you, there is a _____ chromosome from your father with information regarding the same trait(s).
7. When a cell has a full complement of homologous chromosomes from each parent (2 complete sets of chromosomes), the cell is said to be _____.
8. Sex cells have only ONE set of chromosomes, they are called _____.
9. When an egg and a sperm combine during _____, the _____ that is formed has the normal diploid number of chromosomes.
10. _____ chromosomes exchange information during _____ which adds to diversity.



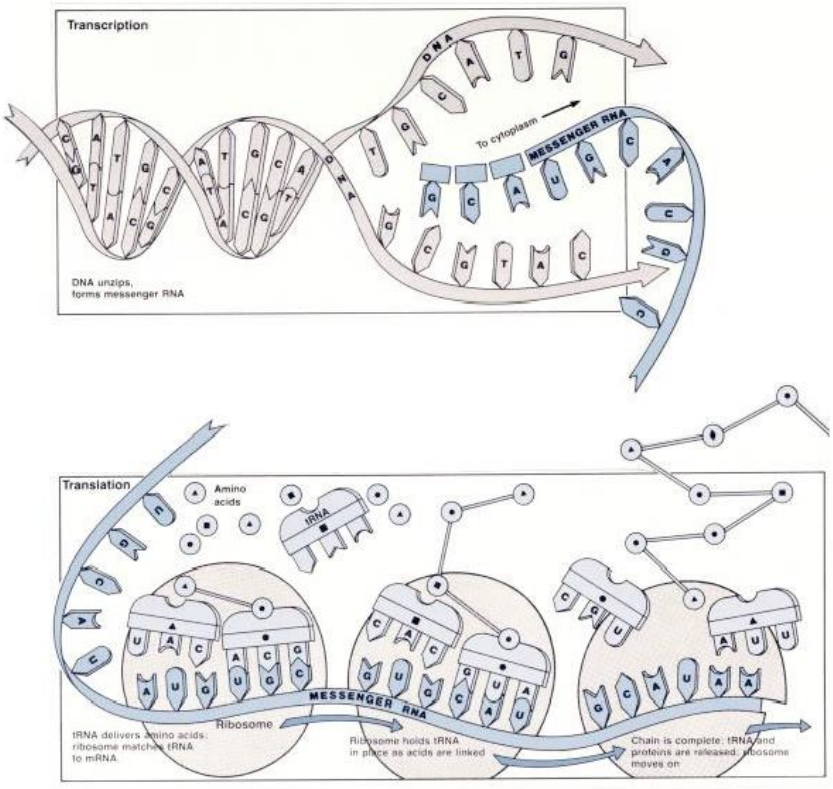
C. Making Proteins Word Bank: translation, diffusion, transcription, proteins, mRNA, amino acid, DNA, peptide, tRNA, codon, nitrogen bases, cytoplasm, ribosome, nucleus, anticodon

1. Almost everything in a living organism is made of or made by _____.
2. The process of protein synthesis is consist of _____ and _____.
3. During _____, the genetic code is copied from _____ to _____.

4. Because DNA can't leave the_____, the message is carried out to the _____ by_____.
5. Once the message from DNA is copied, the_____leaves the nucleus and travels to a_____in the_____.
6. A sequence of 3 bases on mRNA is called a(n)_____, but 3 bases on a tRNA molecule are called a(n)_____.
7. Each codon is matched with an_____and the _____ transfers the_____to the ribosome.
8. Each_____is linked together by_____bonds to form_____.
9. Another name actually making proteins is_____.
10. The sequence of_____on_____carry the genetic code.

D. Transcription and Translation: *Use a codon chart to transcribe and translate the following DNA sequence.*GGCCATTTCGATTTGAGC)

1. mRNA _____
2. amino acids _____
3. This protein is made of_____amino acids. (give the number of amino acids)



E. DNA Technology*:* Word Bank: DNA sequence, genes, fingerprinting, identical, fraternal, collaborative, same

1. DNA_____is used to identity crime suspects (such as murder and rape).
2. Using gel electrophoresis, scientists can determine an individual's DNA fingerprint. No two people have the_____fingerprint, except for _____ twins.
3. Human Genome project is considered a_____effort because 13 countries worked on it.
4. The objective of the Human Genome Project was to understand the human _____.
5. Scientists wanted to determine the sequence of bases to ultimately find the _____ responsible for certain diseases and human traits.

VI. Genetics

A. Vocabulary

Word Bank: phenotype, gene, heredity, genetics, genome, recessive, dominant, Gregor Mendel, trait, genotype, alleles, homozygous, heterozygous

1. _____- two **different** alleles, a hybrid (Tt)
2. _____- is the passing of characteristics from parent to offspring
3. _____- is the **type** of **genes** or alleles present in an organism's genome
4. _____- form of gene that always shows even in the presence of recessive allele.
5. _____- all of the genes in an organism
6. _____- are different forms of the same gene (ex: tall vs. short)
7. _____- two alleles of the **same** form that make up a genotype, pure breed (TT or tt)
8. _____ is the Father of Modern Genetics
9. _____- form of a gene **only** expressed in a homozygous state
10. _____- is an inherited characteristic
11. _____- is an organism's **physical** appearance
12. _____- is the study of heredity
13. _____- is a segment of DNA located on a chromosome that

codes for a particular protein

B. Mendelian Genetics: Word Bank: monohybrid, dihybrid, independent assortment, segregation, Punnett square, P, F1, F2, incomplete dominance, codominance, sex-linked traits

1. _____- table used to diagram the probability of getting certain genotypes
2. A_____cross looks at only **one** trait
3. A_____cross looks at **two** traits at a time
4. The first generation of a 'cross' is the_____or parental generation
5. The offspring of the_____generation is the F1 generation
6. The offspring of the_____generation is the F2 generation
7. The Law of_____states that each gene is inherited separately from others if they are on different chromosomes
8. The Law of_____states the 2 alleles for each trait separate as gametes form
9. _____ is blending of traits; red flowers + white flowers = pink
10. _____- both alleles are expressed equally, as in blood typing (A+B = AB)
11. _____- controlled by genes on sex chromosomes and are often more common in males than in females; colorblindness, hemophilia

C. Mutations*~ there are 2 major types 'gene' and 'chromosomal'*

1. Gene Mutations Word Bank: gene, point, frameshift, mutagens, UV light, chemicals

a. A_____mutation is a change in one or more nucleotide bases of DNA.

b. Mutations are caused by_____like_____or _____

c. A_____mutation is when 1 nucleotide base in DNA is changed

d. A_____mutation occurs if 1 or more nucleotides in DNA are added or deleted; this causes the codon sequence to be shifted.

~ if the original DNA is ATAACGCCTATT...

~ then the number of codons is _____

~ then the mRNA sequence would be _____

~ if the original DNA were replicated and the "G" was deleted...

~ then the DNA sequence would be _____

~ then the number of complete codons would be _____

~ then the mRNA sequence would be _____

~ if the original DNA is replicated and "C" was added to the beginning...

~ then the DNA sequence would be _____

~ then the number of complete codons would be _____

~ then the mRNA sequence would be _____

2. Chromosomal Mutations Word Bank: duplication, inversion, insertion, deletion, translocation, nondisjunction, polyploidy, haploid, triploid, diploid, chromosomal

a. A_____mutation occurs if there is a change in the number or structure of a single chromosome or whole sets of chromosomes

b. _____- chromosomes don't separate during meiosis

c. _____- chromosome pieces are moved onto another chromosome

d. _____- chromosome segment is inserted in reverse order

e. _____- a segment of a chromosome is repeated

f. _____ - segment of a chromosome is removed

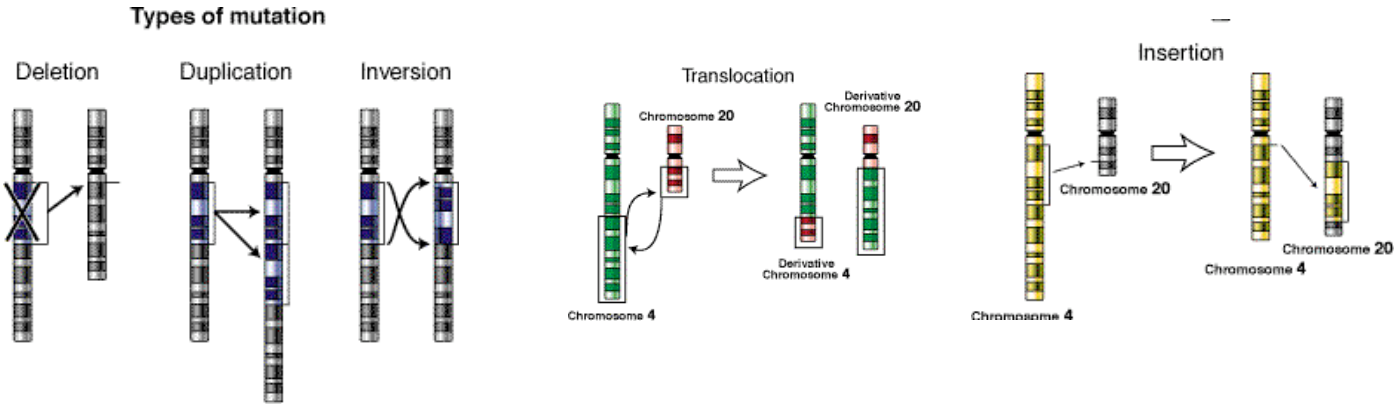
g. _____ - segment of chromosome is inserted into another

h. _____- whole extra sets of chromosomes in the same cell

i. In plants and animals, sex cells are_____which means that they have half the number of chromosomes that a body cell has

j. _____- a cell with 2 sets of chromosomes (1 from mother; 1 from father)

k. _____- a cell with 3 sets of chromosomes



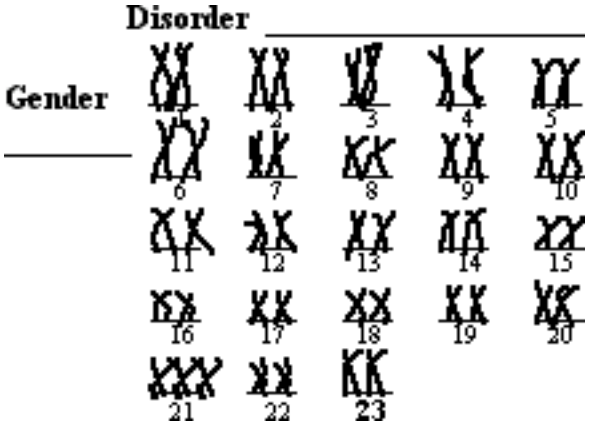
D. Genetic Disorders*:* Word Bank: 21st, karyotype, trisomy, chromosomes, Monosomy

i. Only a_____detects mutations affecting the number of _____

ii. Down Syndrome is_____on the_____chromosome pair

iii. _____ occurs when there is an extra copy of a chromosome in a diploid cell

iv. Turner Syndrome is caused by only have one sex chromosomes, one X. pair. This condition is called a_____.



VII. Taxonomy- is the naming and organization of organisms developed by **Carolus Linneaus,** based on structural similarities

A. Classification*:* Complete the table by arranging the terms largest (1) to smallest (8) (**use these term**s: Domain, Genus, Kingdom, Species, Phylum, Class, Family, Order)

*

	Classification Level		**Trick to Remember**
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	
7.		7.	good
8.		8.	

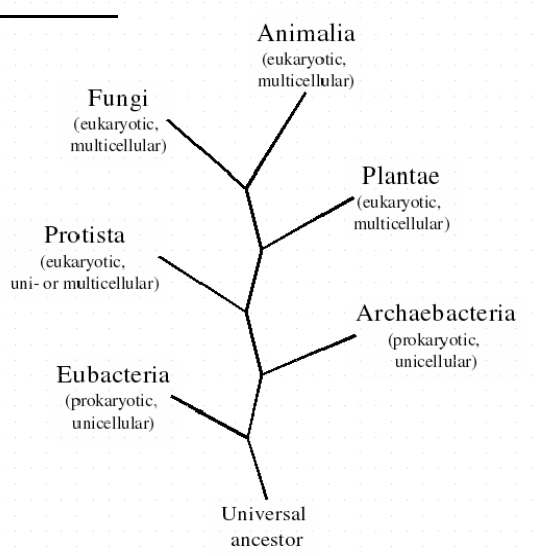
B. Naming Organisms: Word Bank: genus, Linneaus, species, different, the same, binomial nomenclature, kingdom

1. _____, or '2 name naming' was developed by _____
2. An organism's scientific name is made of its_____then its _____
3. If 2 organisms are in the same genus, they must be in_____family
4. *Clostridium tetani* and *Clostridium botulinum* are two types of bacteria from the Eubacteria_____. They are in_____species, but they are in_____genus
5. The **Class** of Mammals includes organisms such as rabbits and elephants which are in_____**Phylum** but_____**Species**
6. Only organisms that interbreed and produce fertile offspring are in the same _____.

Giraffe –

Scientific Name =

Giraffa camelopardalis
(genus) (species)

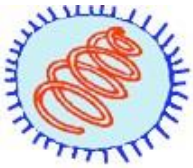


C. Kingdoms (complete the chart using the terms: eukaryotic, unicellular, multicellular, autotroph, heterotroph, prokaryotic

Kingdom	***Cell Type***	***Cell Structure***	***Number of cells***	***Nutrition***	***Examples***
Eubacteria		*Cell wall (Peptidoglycan)*		*Autotroph or heterotroph*	*All common bacteria*
Archeabacteria		*Cell wall*	*Unicellular*	*Autotroph or heterotroph*	*Extremophiles*
Protista	*Eukaryotic*	*Mixed*	*Uni or Multicellular*	*Autotroph or Heterotroph*	*Ameoba, Paramecium*
Fungi		*Cell wall (chitin)*	*Uni or Multicellular*		*Mushrooms, yeast*
Plantae		*Cell Wall (cellulose)*			*Grass, Flowers*
Animalia		*No cell wall*			*Cats, Jellyfish*

D. Viruses, agents of disease Word Bank: virus, host, capsid, antibodies, DNA, against, cell, living, nonliving


ADENO VIRUS

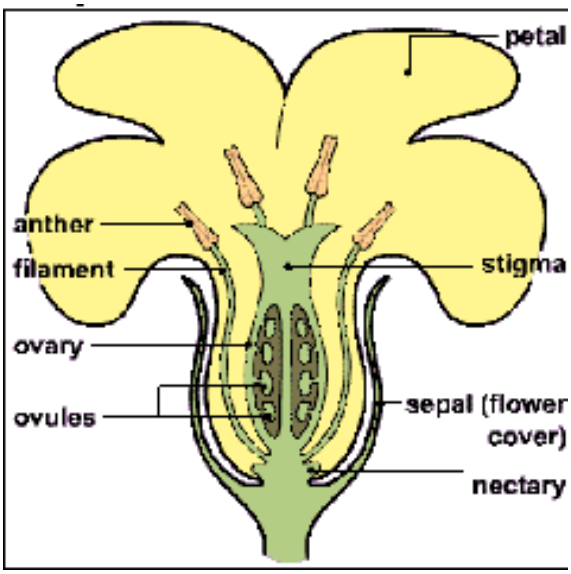

INFLUENZA VIRUS


TOBACCO MOSAIC VIRUS (TMV)


BACTERIOPHAGE

1. Viruses are considered _____ because they can not perform the characteristics of life without a _____
2. Viruses are made of only 2 organic compounds, _____ and a _____ made of protein.
3. A virus infects a cell by injecting _____ into a cell.
4. The cold, the flu and HIV are caused by a _____.
5. Antibiotics are typically used to fight bacterial infections. The word antibiotic literally means _____ life. Because viruses are considered _____, antibiotics don't work against viruses.
6. Vaccines are used to help organisms make _____ to build immunity. Vaccines are made from destroyed or weakened forms of a _____.

E. Sexual Reproduction in Plants: Word Bank: sperm, meiosis, plants, mitosis, eggs, wind, insects, birds, pollination, sexual, asexual, stamen, pistil



1. ONLY the most complex kingdoms, like animals and _____ regularly use _____ reproduction which requires 2 distinct gametes called _____ and _____
2. Body cells of a plant are made by _____, while sex cells are made by _____
3. In _____, the _____ is located inside a pollen grain which will fertilize an egg
4. The female part of a flower that contains ovules or _____ is called the _____
5. Pollen is located on the anther or _____, which is the male part of a flower.
6. _____ occurs when pollen from the _____ is deposited on the pistil, which can happen by _____, _____, and _____

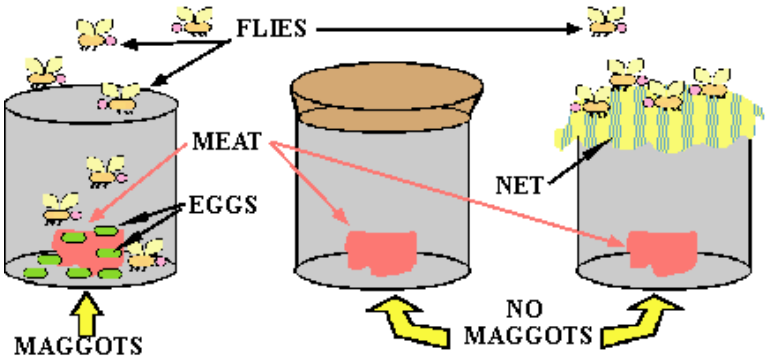
VIII. Evolution- the **theory** that there is a gradual change in characteristics over time.

A. Origin of Life – Scientists Hypotheses

1. Disproving Spontaneous Generation (*Word Bank:* air, sealed, open, bacteria, gauze, spontaneously*)*

a. Through the early 1800s, people believed organisms could _____ develop, an idea know as spontaneous generation.

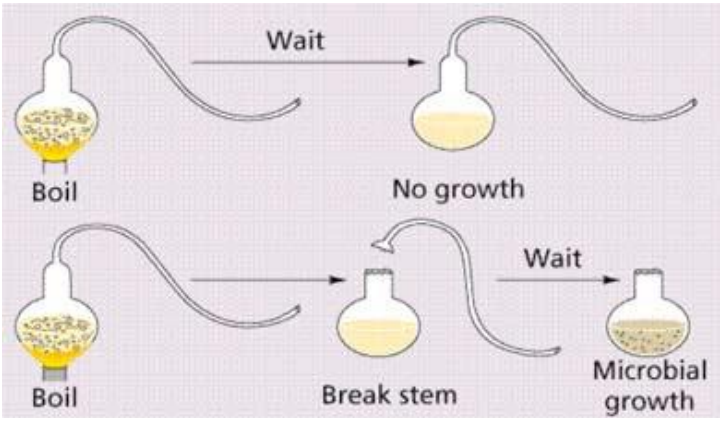
b. In 1668, many believed maggots spontaneous generated from rotting meat. Francis Redi's experiment disproved this by experimenting with meat in_____jars, _____ jars and jars covered with_____.



c. It was also believed that bacteria spontaneous generated in broth. Lazzaro Spallanzani removed the_____from a flask,_____the broth and sealed the flask. No bacteria generated without exposure to the air.

d. Some people still supported spontaneous generation but thought that air was a _____ force, necessary for it to occur.

e. In 1859, Louis Pasteur completely disproved spontaneous generation by using a special flask that allow_____in but captured bacteria before it could get to the broth. No_____grew in the flask after boiling = no spontaneous generation.



2. First Life *(Word Bank:* eukaryotes, prokaryotic, variety, self-replicating, organic, photosynthesis, oxygen)

a. Earth's atmosphere had to be very hot and with little oxygen for the first _____ molecules to first form.

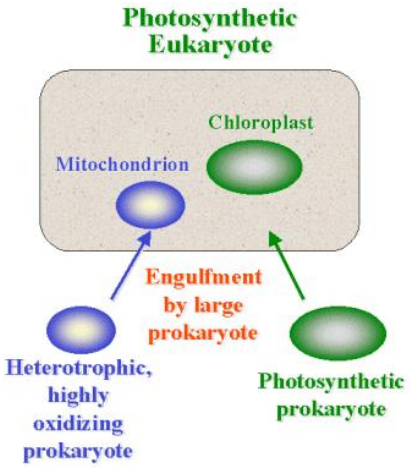
b. Organic molecules clumped together for form_____structures that later evolved into cells.

c. _____ cells were the first to evolve.

d. When cells gained the ability to do _____, they used up carbon dioxide and put more_____into the atmosphere.

e. With more oxygen in the atmosphere, a wider _____ of organisms evolved on land.

6. Some cells engulfed each other leading to the formation of more complex cells that we now call _____.



B. Early Theorists

1. Lamarck Word Bank: Inheritance of Acquired Traits, Law of Use and Disuse

a. _____- if you don't use it, you lose it

b. Lamarck believed that giraffe's long necks were a result of being stretched because they were trying to reach tall trees, and the one's who didn't stretch died out

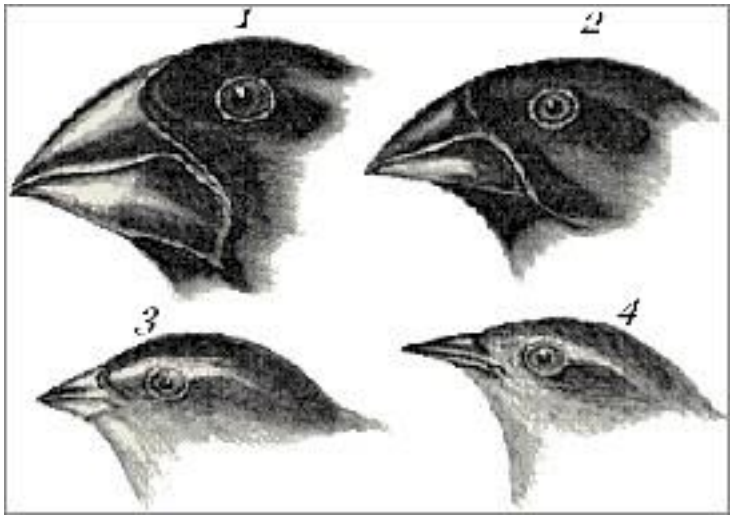
c._____- was his belief that if a characteristic occurs and is beneficial to an organism's survival, then it will be passed on; ex. if a toe gets cut off and it's helpful, then that trait gets passed on to offspring.

d. **NO evidence** to support this theory so it was ***thrown out***

2. Charles Darwin Word Bank: The Origin of Species, finches, Galapagos Islands, Natural Selection)

a. _____-
only the organisms that are best suited to their environments will survive

b. The_____
were a cluster of islands that had different food sources. Because of this, the_____had different beaks to help eat the food.



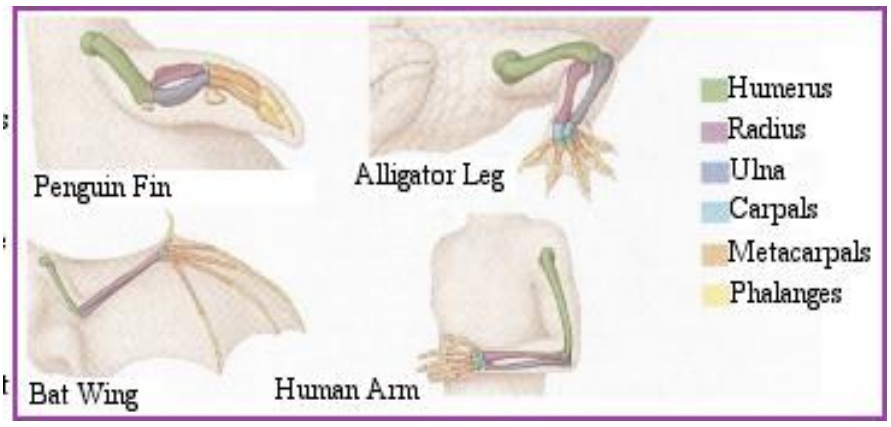
c. _____ was his book that compiled his evidence for evolution

C. Rates of Evolution Word Bank: gradualism, punctuated equilibrium)

1._____ - organisms evolve as a result of small adaptive changes *over time*
2. _____- short periods of rapid change followed by long periods of little or no change.

D. Evidence of Common Ancestry *(*appendix, younger, older, homologous structures, fish, vestigial organs, common ancestors, rabbits, DNA sequence, absolute, relative, gorillas, embryology)

1. a bat's wing, whale's flipper, and human arm have the same number, type, and arrangement of bones; considered to have a common evolutionary origin.



2. The presence of the same number & type of bone in the wing of a bat and the arm and hand of a human suggests that a bat and a human must share

_____

3. similar amino acid sequences in proteins of horses and humans provides evidence of similar origin, this is the most **specific** way to compare organisms.

4. The fact that the DNA of humans and that of monkey species are 99% similar suggests that they probably share_____.

5. The most specific way to provide evidence of common ancestry is by using _____.

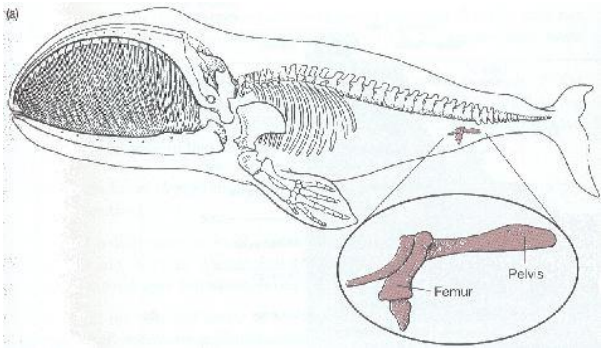
6. _____- embryos of different organisms (chicken, human, rabbit) look similar at certain early stages, which means the same genes are working at those times.

7. Use the diagram to the right, the embryological development of the stages in the green box suggest that _____and_____are more closely related because they look alike

8._____- are structures that have no apparent use; the____in humans may be a remnant of a digestive organ still found in other organisms and the pelvis and femur in a whale may be remnants ofwhen whale ancestors had legs.

9. According to relative dating of fossils: the deeper under ground the fossil is, the _____ it is.

1O._____ dating uses radioactive isotopes to determine an estimated age for fossils.

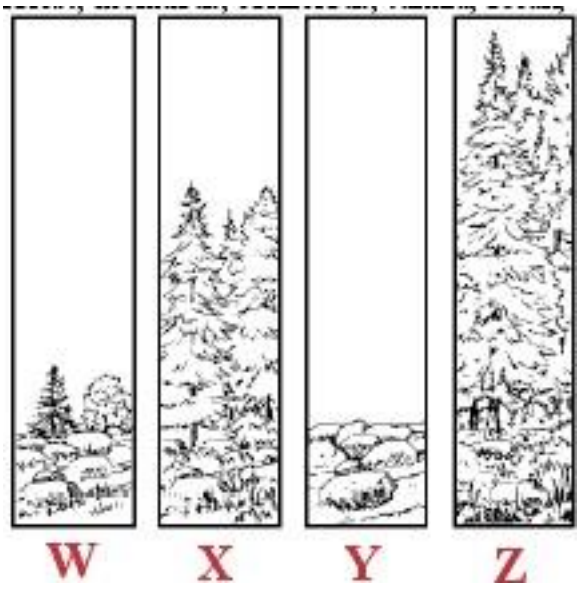


IX. Ecology - the study of organisms and their interactions with the environment

A. Ecological Succession desert, rain forest, deciduous, coniferous, tundra, ocean, grassland, freshwater, climax community, primary succession)

1. **Ecological succession** is the sequential replacement of one ecological community with another. Succession is complete when a stable, **climax community** isestablished.

Succession often begins after all life in a climax community is destroyed by fire. The result of this fire could be represented in the pictures to the right by letter_____.



2. **Primary succession** occurs as plants such as mosses and grasses begin to grow on bare surfaces. This could be represented by picture____.

3. **Secondary succession** occurs as other, larger plants and animals begin to grow. This could be associated with picture_____.

4. Large hardwood trees and large plants are associated with a **climax community**. This would be letter_____.

5. Place the letters (W-Z) from the diagram to the right in order from barren land to climax community. _____

B. Biomes **:** Word Bank: desert, rain forest, deciduous, coniferous, tundra, ocean, grassland, freshwater, savannah

1. A **biome** is a geographic area characterized by specific types of plants and animals

2. Biomes are typically named for the type of vegetation, so biomes that primarily have varieties of grasses are called_____biomes, but pine trees (with cones) are usually in a_____biome.

3. Two of the coldest biomes are the_____and tiaga.

4. A biome that has a thick canopy of trees and plants is a_____.

5. In the_____, the amount of precipitation exceeds the amount of evaporation.

6. _____ biomes are **aquatic** and include lakes and rivers. The organisms in these biomes are sensitive to even the smallest environmental changes.

7. _____ forests have trees that produce cones.

8. The_____aquatic biome has varying salinity (salt levels) and temperature zones.

9. Lions can easily stalk their prey in_____biomes because the vegetation is the same color as their fur, which serves as camoflauge.

10. _____ biomes have little vegetation. The few plants that can survive here have shallow root systems that collect rain water as soon as it falls.

11. _____ trees have thin needle-like leaves instead of broad leaves with a lot of surface area.

12. _____ trees have broad leaves that **change color** and **fall off** in the fall.

13. In **VA**, most of the trees lose their leaves in the fall. The biome is a _____ Forest.

C. Ecology Vocab:

Word Bank: consumer, autotrophic, biotic, abiotic, increase, decrease, species, carnivore, omnivore, herbivore, scavengers, decomposers, producer, population, heterotrophic, community, energy, ecosystem, biosphere

1. A_____is an organism at the beginning of a food chain; produce their own food
2. Organisms, like plants, that can make their own food are_____.
3. Organisms that feed off of other organisms are_____.
4. A_____is an organism that eats producers or other organisms for energy.
5. A nonliving part of the environment is a(n)_____factor.
6. A living part of the environment is a (n)_____factor.
7. A consumer that eats only producers is called a (n)_____.
8. A consumer that eats both plants and animals is called a (n)_____.
9. A_____is a group of organisms that can interbreed and produce fertile offspring.
10. Many populations of different organisms living together is a(n)_____.
11. A group of individuals of a species that lives together and interbreeds is a(n) _____.
12. The community of organisms in an area including abiotic factors is a(n) _____.
13. The Earth represents a(n)_____.
14. _____ is transferred through an ecosystem by eating or consuming food.
15. _____eat things that are already dead (ex. Vulture)

16._____ break down decaying organisms and nutrients are put back into the soil by bacteria and fungi like mushrooms)

17. [A hunter <---- a fox <---- a rabbit <---- grass or plants] In food webs or food chains, the arrow ALWAYS points to the direction that_____flows.

18. [A hunter <---- a fox <---- a rabbit <---- grass] In this food chain, the rabbit is a _____, the fox is a_____, and the grass is a _____.

19. [A hunter <---- a fox <---- a rabbit <---- grass] In this example, if the rabbit population increased,then the fox population would probably_____.

D. Relationships*:* Word Bank: commensalism, mutualism, parasitism, symbiosis, predation, water, sunlight, extinction, limiting factors, competition for food, pollution, disease, climate

1. _____- one organism is harmed while the other benefits
2. _____- both organisms benefit
4. _____- buffalo and a bird that picks insects off the buffalo
5. _____- organisms living together
6. Some wasps inject eggs into other organism. As the eggs develop into larvae, they use the host for nutrients. The host dies as the wasp larvae develop. When one organism benefits and the other is harmed the relationship is called_____.
7. Anemones release poisonous chemicals from their tentacles that paralyze prey. Clown fish are not affected by the poison & find protection from predators by living near anemones. This is called_____because the fish don't harm or benefit the anemone.
8. Things that limit the size of populations are called_____.
9. On the rain forest floor, a limiting factor for plants would be availability of_____.
10. In the desert, a limiting factor for both plants and animals would be availability of _____.
11. Hunting is encouraged for deer populations because they live in such close proximity to each other that_____is a limiting factor.
12. Only 3,000 manatee *Trichechus manatus* are left, and most of them are in the ocean around Florida. Because there is little genetic diversity, a disease that reduces fertility might cause _____

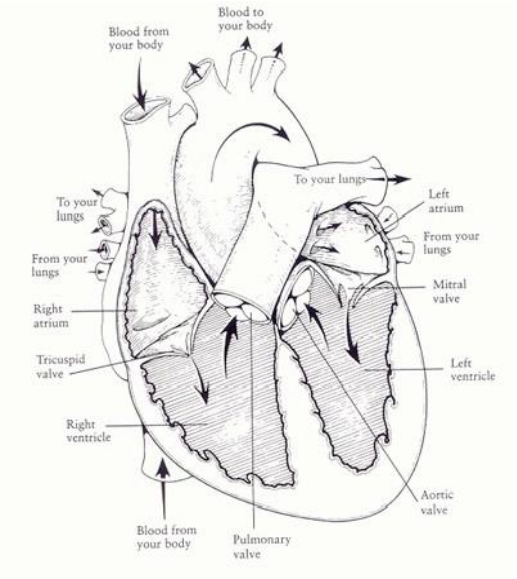
.

X. Body Systems

A. Circulatory System

1. The circulatory system (heart, arteries, veins, blood) is important for carrying **oxygen to cells** and **carbon dioxide away from cells**

2. Blood is considered a tissue because, white & red blood cells work together performing specific functions.



B. Digestive System

1. The digestive system **breaks down food into organic molecules** that can be used by cells in cellular respiration to produce ATP energy.
2. The digestive system also removes solid wastes from the body. The _____ in cells perform a similar function.

C. Excretory System

1. The excretory system removes liquid wastes from the body and helps regulate the amount of water in the body.
2. The kidneys, bladder, ureters (carry urine from the kidneys to bladder) and urethra (actually carry urine from the bladder out of the body) are main components of the excretory system

D. Immune System: Word Bank: skin, vaccine, antibodies, pathogen

1. The body's first line of defense is the_____.
2. _____ are made by your body to fight specific pathogenic organisms or viruses.
3. If you have_____for a certain pathogen, you may be immune and won't get sick.
4. A_____is any organism or agent (virus) that causes illness.
5. Antibodies are made to help your body build immunity against a specific pathogen.
6. A_____can be made by using dead or weakened viruses that are injected into the body.

E. Musculatory System

1. The muscles operate the body.
2. Muscle cells use a lot of energy and often contain many _____ (cell part important for producing usable energy).

F. Nervous System

1. The nervous system consists of the brain, nerves, spinal cord.
2. The nervous system controls the all the functions of the body. It's role is similar to the _____ in a cell.

G. Respiratory System

1. The main organ of the respiratory system is the lungs.
2. The respiratory system allows oxygen to enter the blood and carbon dioxide to leave the blood.

H. Skeletal System

1. A skeletal system supports the body and protects the critical organs of the body (brain, heart, lungs, etc.)