AP Biology Summer Assignment

In order to be successful in AP Biology you will need to be proficient with all the material previously taught in Biology class. This summer assignment will help you review all the concepts you need to know. If you did not take Biology prior to registering for this class, you will need to make sure that you KNOW and UNDERSTAND all the topics covered in this assignment before the school year starts. You are expected to know this information before coming to AP Biology. AP Biology will dive deeper into these topics so if you do NOT know the BASIC information you will STRUGGLE with the content in this class. Remember that AP Biology is a college level course. Be aware that once you are in the class it is VERY hard to get out of it. This is a very rigorous course and there will be several homework assignments due each week. So, you are going to need to have good time management and be able to spend at least 2 hours each day for you to study and do homework.

Your Summer Assignment is worth 100 points and it is due the first week of school. Please download the packet and turn it in via Google Classroom. You will be tested on this material during the second week of school.

If you have any questions or concerns, please e-mail me at Tracy.Gilner@henry.k12.ga.us

Signature Page

I understand that it is my responsibility to complete the AP Biology Winter assignment before the start of the school year. I am aware that I need to be proficient with all the information covered in this packet and I will be tested on this information during the first week of school. I also understand that once I am in the course I will not be able to get out of it just because I think the class is too hard or is too much work.

_____ _____

Student name (please print) Date

Name_____ **Period**_____

AP Biology Summer Assignment

- Students will design and/or evaluate a scientific investigation using evidence of scientific thinking and/or problem solving.

List and describe the steps of the Scientific Method.

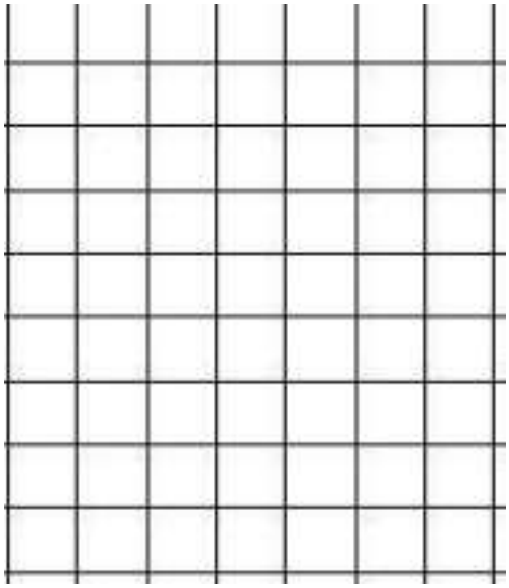
1. _____
2. _____
3. _____
4. _____
5. _____

Why do many experiments make use of a **control group?** _____
What are the characteristics of a good experiment? _____
What is an **independent variable**? _____
What is the **dependent variable**? _____

You have measured the rate at which a fish breaths at various temperatures by counting the rate at which its gills open. The data is below. Graph this data. Label the title, x, and y axis on the graph (use units)

Breathing rate (number of breaths/min) vs. Temperature

19 breaths/min at 5 ◦C
25 breaths /min at 10 ◦C
30 breaths /min at 20 ◦C
34 breaths /min at 30 ◦C
37 breaths /min at 35 ◦C



What is the independent variable?
What is the dependent variable?

What happens to breathing rate with increase in Temperature?

What would be a good control for this experiment?

Why would it be a bad idea to do this?

How do you think the breathing rate was measured?

What do you think would happen if you raised the temperature even more?

- Students will interpret and analyze data to make predictions and/or defend conclusions. Interpret graphs.

Which axis has the independent variable? _____
Which axis has the dependent variable? _____

- Students will describe how scientific inferences are made from observations and identify examples from biology.
- Students will explain the development of a theory and recognize the differences between theories and laws.

Define the following terms.

Hypothesis_____
Theory_____
Law_____
How is a theory developed? _____
_____

- Students will identify ways in which a scientific claim is evaluated

What happens if new information is discovered, or new evidence presented that is different from what is already known?
_____
_____

- Students will identify and/or describe the basic molecular structure of carbohydrates, lipids, proteins, and/or nucleic acids.
- Students will describe the primary functions of carbohydrates, lipids, proteins, and/or nucleic acids in organisms.

Macromolecules (Draw the Monomer)	**Function**	**Subunits**
Carbohydrates		
Proteins		
Lipids		
Nucleic Acids		

Complete the following chart on Macromolecules **Complete the following chart on Macromolecules:**

Specific Molecule	**Function**	**Type of Macromolecule**
Starch		
Cellulose		
Insulin		

Glycogen		
Glucose		
Enzymes		
Hemoglobin		
Fats		
DNA		
RNA		

- Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

Pertaining to the properties of water, explain what is meant by the following terms:

Hydrogen Bonding: _____
Polarity_____
Cohesion: _____
Adhesion: _____
Ability to moderate temperature: _____
Expansion upon freezing_____
Universal solvent_____

If water sank when it froze, what would happen to the world's lakes, oceans, and climate?

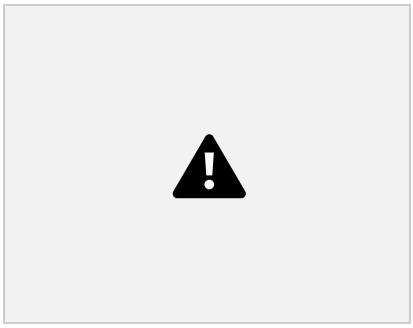
Draw a picture of several water molecules showing how the hydrogen bonds interact with the O and H:

- Students will explain how enzymes speed up the rate of a biochemical reaction by lowering the reaction's activation energy.
- Students will identify and/or describe the effect of environmental factors on enzyme activity. • Items referring to the factors that affect enzyme activity are limited to concentration, pH, and temperature.

What is the function of **enzymes** in cells? (Or, what is a **catalyst**?) _____
_____
Define activation energy_____
Draw 3 different graphs showing how the rate of reaction (y axis) is affected by temperature, pH, and substrate concentration (Make sure to label the title, x, and y axis with units):

How do extreme pH and temperature extremes affect enzymes? (What is **denature**?) _____
_____

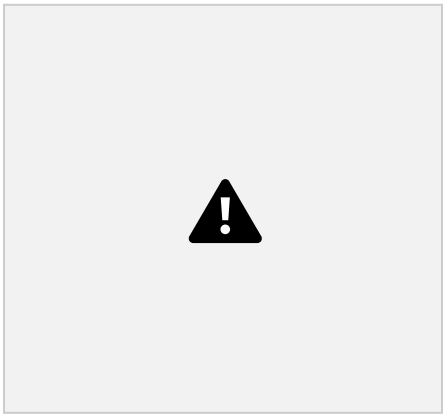
Label the activation energy and the line that uses a catalyst on the graph



- Students will compare and/or contrast the structure and function of the compound microscope, dissecting microscope, scanning electron microscope, and/or the transmission electron microscope.

What is a **compound microscope**? _____
What is a **dissecting microscope**? _____
What is a **scanning electron microscope**? _____
What is the **transmission electron microscope**? _____

Label the microscope diagram and describe the function of each structure



	STRUCTURE	FUNCTION
A		

B		
C		
D		

E		
F		
G		
H		
I		
J		
K		
L		

• Students will describe and/or explain the cell theory. What are the 3 parts to the **cell theory**?

1. _____
2._____
_ 3.
_____

Why is the term "cell theory" appropriate? (Why is the cell theory a theory?) _____
_____

• Students will compare and/or contrast the structures found in prokaryotic cells and in eukaryotic cells.

What are prokaryotic cells? _____
What are eukaryotic cells? _____

Complete the table with the STRUCTURES found in prokaryotic and eukaryotic cells. Use the structures in the following chart.

Prokaryotic	Eukaryotic

• Students will describe how structures in cells are directly related to their function in the cell. •
Students will compare and/or contrast the structures found in plant cells and in animal cells.

Complete the following Chart using the two illustrations below:

Cell Part and Letter	Structure Description w/ Drawing	Function	Letter or Number
Nucleus			
Nuclear Envelope			

Nucleolus			
Plasma (Cell) Membrane			
Cell wall			
Mitochondria			
Endoplasmic Reticulum			
Central Vacuole			
Vesicle			
Lysosomes			
Chloroplasts			

Golgi Apparatus			
Microtubules / Microfilaments Cytoskeleton			
Ribosomes			
Cytoplasm			
Cilia / Flagella			

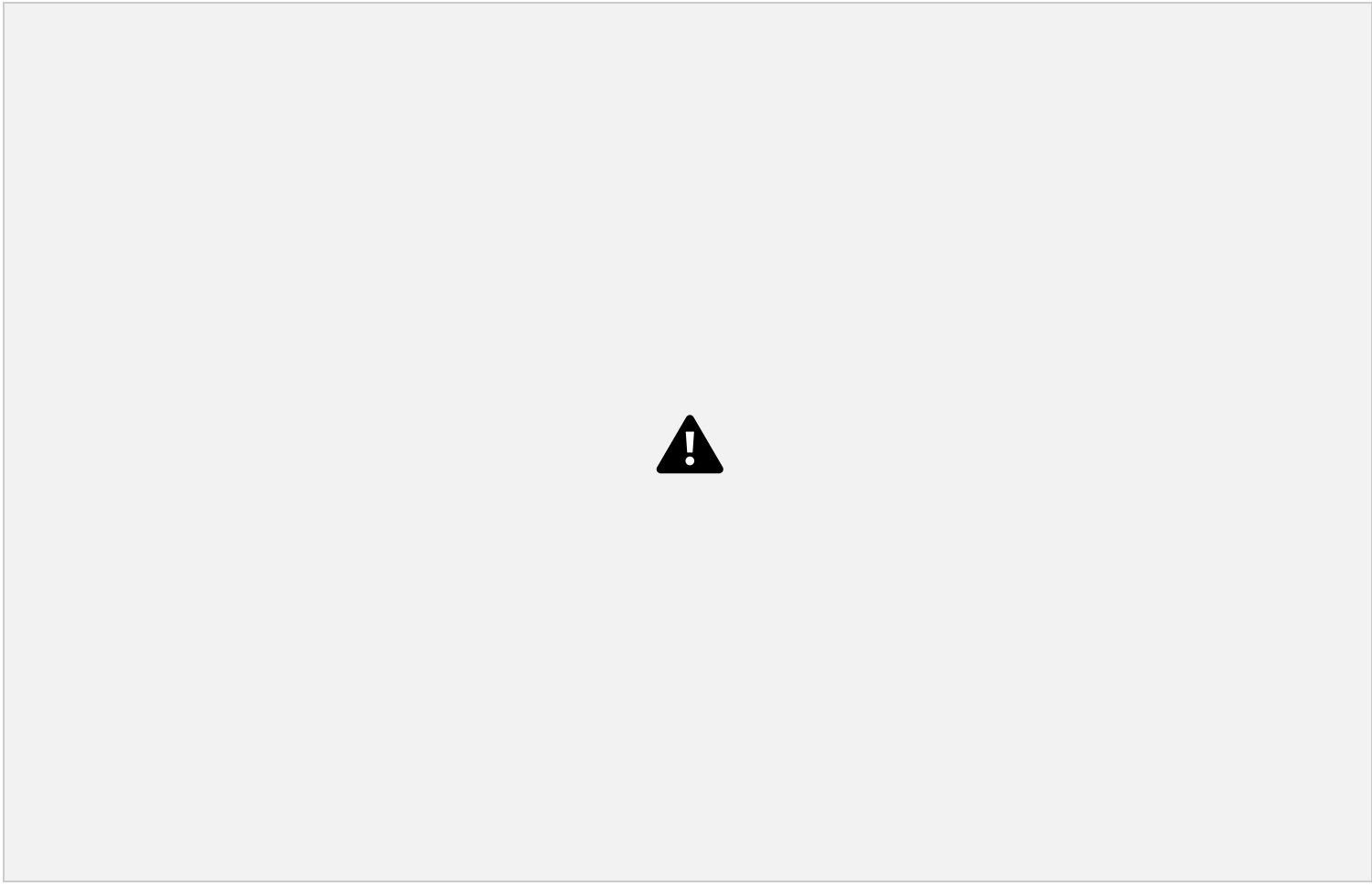
What does the term “membrane bound organelles mean?” What cell <u>type</u> are they found in? _____
_____ *Put the following in order from smallest to largest (1-4):*

Organ systems Cells Organs Tissues

_____ _____ _____ _____

• <u>Students will explain the role of the cell membrane during active and passive transport</u>.

What is the function of the **cell membrane**?



If the dark molecule is starch, where is the starch concentration greatest (left or right)? _____ If the white molecule is water, where is the water concentration greatest at first? _____ In osmosis, water moves from an area of _____ to an area of _____ concentration. (higher/lower) If the dark molecules could move, in what direction would they move? _____ Why? _____ In diffusion, molecules move from an area of _____ to an area of _____ concentration. (higher/lower) What is **osmotic pressure**? _____

Which way **wate**r will move in each of the following situations?

a. Salt inside the cell 65% and outside the cell 40%. _____

b. Sugar inside the cell 27% and outside 80%. _____

What is **homeostasis**? _____

How do cells maintain homeostasis? Consider *pH, temperature, blood glucose, water balance*

_____

Define the following terms:

Hypotonic: _____

Hypertonic: _____

Isotonic: _____

Endocytosis: _____

Exocytosis: _____

Comparison of active and passive transport

	PASSIVE TRANPORT	**ACTIVE TRANSPORT**
Requires energy?		

Low to high concentration or high to low concentration?		
Examples		

- Students will explain how the products of photosynthesis are used as reactants for cellular respiration and vice versa.
- Students will explain how photosynthesis stores energy and cellular respiration releases energy. • Students will identify the reactants, products and/or the basic function of photosynthesis. • Students will identify the reactants, products and/or the basic functions of aerobic and anaerobic cellular respiration.
- Students will connect the role of adenosine triphosphate (ATP) to energy transfers within the cell.

What are the reactants and products for each of these?

Process	**Reactant**	**Product**	**Found in?**
Photosynthesis			
Cellular Respiration			

How do factors such as pH, temperature, light and food availability affect these reactions?_____ _____ Label the equation as photosynthesis or cellular respiration and label the following molecules in these equations (*water, glucose, oxygen, carbon dioxide*)

A)

B)

Which reaction(s) requires or stores energy? _____
Which reaction(s) release energy (ATP)? _____
Which reaction releases the most energy? _____
Why? _____ Which reaction requires chlorophyll? _____ What is the purpose of the chlorophyll? _____ Which reaction requires light? _____ What is the light used for? _____ Which organisms carry out process A? _____
Which organisms carry out process B? _____
Which organisms carry out process C? _____
Which process uses chloroplasts in eukaryotes? _____
Which process uses mitochondria in eukaryotes? _____
What are the reactants of photosynthesis? _____ What are the products of photosynthesis? _____ What are the

reactants of cellular respiration? _____ What are the products of cellular respiration? _____ How are **photosynthesis** and **cellular respiration** related? _____

_____

Draw a diagram explaining how photosynthesis and cellular respiration are related:

What is ATP? _____

Where is it found and how is it made? _____

_____

Draw and ATP molecule and show how and where energy is release:

- Students will differentiate the processes of mitosis and meiosis.
- Students will explain how mitosis forms new cells and its role in maintaining chromosome number during asexual reproduction.
- Students will describe the process of meiosis, including independent assortment and crossing over. •

Students will explain how meiosis results in the formation of haploid gametes or spores.

Complete the following table below comparing and contrasting Mitosis and Meiosis

Mitosis	Meiosis

- Students will describe the role of mitosis in asexual reproduction, and/or the role of meiosis in sexual reproduction, including how these processes may contribute to or limit genetic variation.

How does meiosis contribute to genetic variation? _____

How does mitosis limit genetic variation? _____

- Students will describe specific events occurring in each of the stages of the cell cycle and/or phases of mitosis.

Describe the 5 Stages of the cell cycle

Stage	Description

Draw the stages of mitosis, and label each stage. Briefly explain what is occurring in each stage of mitosis.

Prophase	Metaphase	Anaphase	Telophase

Draw the stages of meiosis, and label each stage. Briefly explain what is occurring in each stage of meiosis.

Prophase I	Metaphase I	Anaphase I	Telophase I
Prophase II	Metaphase II	Anaphase II	Telophase II

Describe the 3 mechanisms that lead to genetic variations which occur during meiosis

1. Crossing over –

2. Independent Assortment –

3. Random Fertilization -

- Students will explain how cancer (uncontrolled cell growth) may result from mutations that affect the proteins that regulate the cell cycle.

Define Mutation -
What is **cancer**?
What are some causes of cancer? _____. How/why does cancer kill? _____

- Students will use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.

Define the law of segregation_____
Define the law of independent assortment_____ How do the laws of segregation and independent assortment impact genetic variability?___ _____
_____
Define:
Haploid –

Diploid –

Gametes –

Spores – Genetic Variation –

Nondisjunction –

What genetic disorders result from nondisjunction?

- Students will identify, analyze, and/or predict inheritance patterns caused by various modes of inheritance.

Term	Definition
Dominant	
Recessive	
Heterozygous	
Homozygous	
Genotype	
Phenotype	

Codominance	

Incomplete Dominance	
Multiple Alleles	
Sex-linked	
Polygenetic	

In humans, brown eyes (B) are dominant over blue (b)*. A brown-eyed man marries a blue-eyed woman and they have three children, two of whom are brown-eyed and one of whom is blue-eyed. Draw the Punnett square that illustrates this marriage. What is the man's genotype? What are the genotypes of the children? Dad's genotype: Mom's genotype: Children's Genotypes:

If you have type A blood, what are your possible genotypes? _____
If you have type B blood, what are your possible genotypes? _____
If you have type AB blood, what are your possible genotypes? _____
If you have type O blood, what are your possible genotypes? _____

Could two individuals with type A blood ever produce offspring with Type O? Explain with Punnett square.	Could two individuals with type O every produce offspring with Type A? Explain with Punnett square.

Two newborn babies were accidentally mixed up at the hospital. Determine the possible genotypes of both parents and babies, then determine which baby belongs to each of the parents.

Individual	Blood Type (Phenotype)	Possible Genotypes	Baby 1 or 2
Baby 1	A		
Baby 2	B		
Mrs. White	B		
Mr. White	AB		
Mrs. Smith	B		
Mr. Smith	B		

SpongeBob loves growing flowers for his pal Sandy! Her favorite flowers, Poofkins, are found in red, blue, and purple. Use the information provided and your knowledge of incomplete dominance to complete each section below.

1. Write the correct genotype for each color if R represents a red gene and B represents a blue gene. Red - _____ Blue - _____ Purple - _____

2. What would happen if SpongeBob crossed a Poofkin with red flowers with a Poofkin with blue flowers. Complete the Punnett square to determine the chances of each flower color.

(a) Give the genotypes and phenotypes for the offspring.

(b) How many of the plants would have red flowers? _____%

(c) How many of the plants would have purple flowers? _____ %

(d) How many of the plants would have blue flowers? _____ %

3. What would happen if SpongeBob crossed two Poofkins with purple flowers?

Complete the Punnett square to show the probability for each flower color.

(a) Give the genotypes and phenotypes for the offspring.

(b) How many of the plants would have red flowers? _____%

(c) How many of the plants would have purple flowers? _____ %

(d) How many of the plants would have blue flowers? _____ %

Set up a punnett square using the following information:
Dominate allele for black fur in guinea pigs = B
· Recessive allele for white fur in guinea pigs =b ·
Dominate allele for rough fur in guinea pigs =R ·
Recessive allele for smooth fur in guinea pigs = r

· Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr) Using the punnett square:

A. What is the probability of producing guinea pigs with black, rough fur?

Possible genotype(s)? B. What is the probability of producing guinea pigs with black, smooth fur?

Possible genotype(s)?

C. What is the probability of producing guinea pigs with white, rough fur?

Possible genotype(s)?

D. What is the probability of producing guinea pigs with white, smooth fur?

Possible genotype(s)?

• Students will describe the process of DNA replication and/or its role in the transmission and conservation of genetic information.

DNA is made up of nucleotides.

Draw a picture of the nucleotide and label three main parts.

What bonds hold DNA's bases together?

What are the 4 bases of DNA, and how are these bases paired? _____

_____

What is the purpose of DNA Replication?

What stage of the cell cycle does DNA replication occur?

Describe the process of DNA replication using the following terms (Helicase, DNA polymerase, Ligase, RNA Primase, semiconservative replication)

- Students will describe gene and chromosomal mutations in the DNA sequence.

What is a mutation?

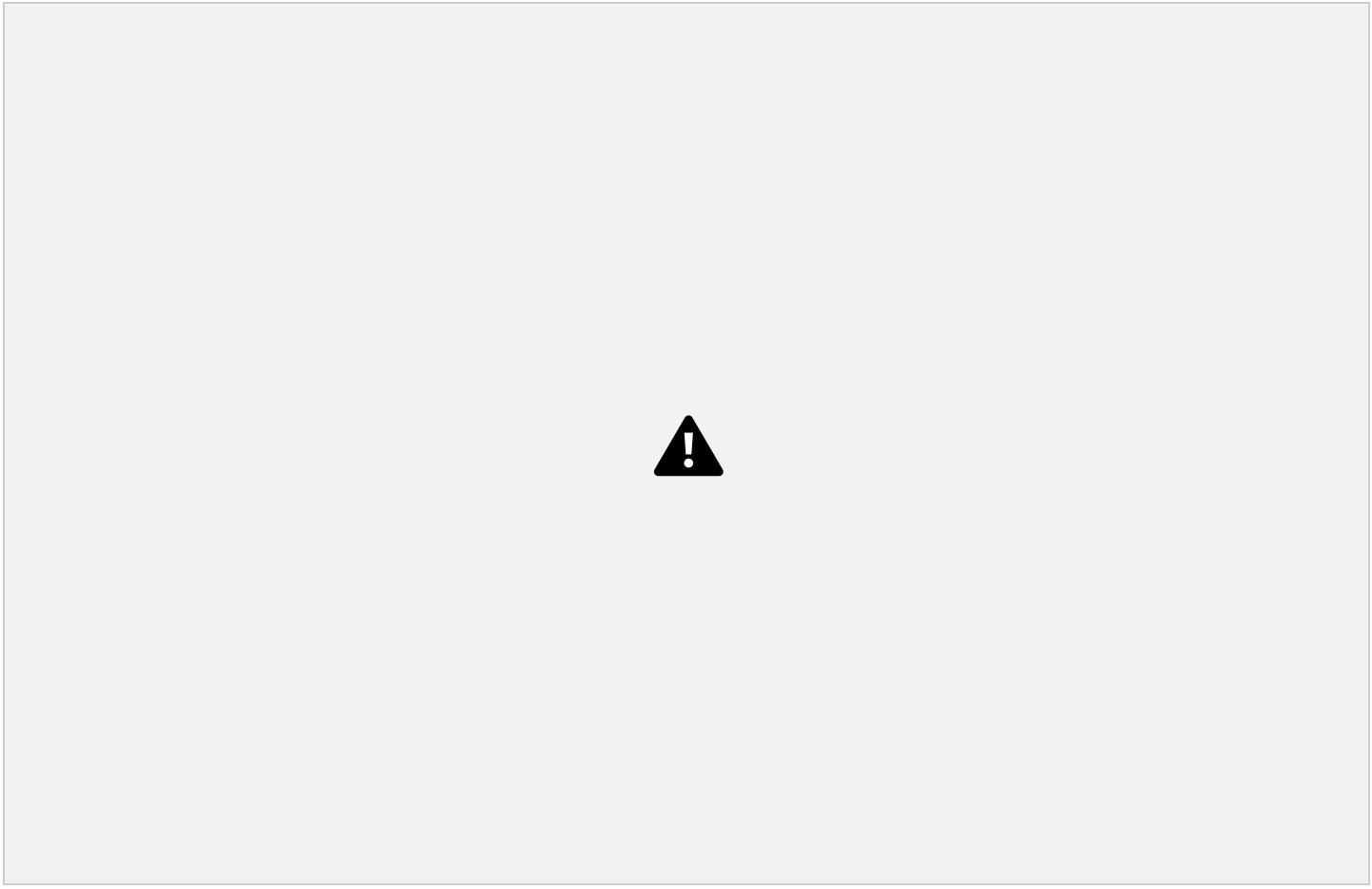
How do they happen?

- Students will explain how gene and chromosomal mutations may or may not result in a phenotypic change.

Not all changes in DNA result in a phenotype mutation. Explain when changes in DNA do and don't affect phenotypes.

Mutations in which cells will affect the offspring?

- Students will explain the basic processes of transcription and/or translation, and their roles in the expression of genes.



• Students will explain that the basic components of DNA are universal in organisms.

Why do you think all life has the same DNA?

• Students will explain and/or describe how mutation and genetic recombination increase genetic variation. In which ways can mutation and genetic recombination increase genetic variation?_____

_____

_____

_____

• Students will explain how similarities in the genetic codes of organisms are due to common ancestry and the process of inheritance.

How can you explain how genetic similarities are due to common ancestry? Where do we get our DNA from?

_____

• Students will evaluate examples and/or explain the possible impact of biotechnology on the individual, society, and/or the environment.

What is biotechnology? _____ _____

What are some examples of biotechnology? _____

Define Genetic Engineering:

Give 3 examples of genetic engineering and the positive and negative effects of each

Genetic Engineering	Positive	Negative

- Students will describe scientific explanations of the origin of life on Earth.
- Students will identify situations or conditions contributing to the origin of life on Earth.

For each of the scientists below, describe the experiments they performed and the results that contributed to the understanding of how life began.

Scientist(s)	Experiment/Model	Results/Conclusions
Francesco Redi		
Louis Pasteur		
Oparin and Haldane		
Miller and Urey		
Louis Lerman		

What were the conditions like on early Earth? _____

_____

What gases made up the atmosphere on early Earth? _____

Which nucleic acid is thought to have emerged first? _____

Describe the theory of how the first life forms originally form?

Define endosymbiosis:

How did endosymbiosis occur?

_____ How did cyanobacteria aid in the development of life? _____

_____

- Students will identify evidence and/or explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observable evolutionary change.

What is evolution?_____

What is meant by the term theory?_____

How do we know that evolution is a theory?_____

What could cause scientists to change the theory?

Define Natural Selection

Complete the following chart describing the research or experiments that each of the following scientists contributed to developing the theory of evolution:

Scientist	**Contribution to the Theory of Evolution**
Darwin	
Lamarck	
Lyell	
Malthus	
Mendel	
Wallace	

There is much evidence to support the theory of evolution. Complete the chart below describing how the following evidence is used, and how it supports the theory of evolution.

Evidence	**What does it mean?**	**How does it support Evolution?**
Fossil record		
Comparative anatomy		
Comparative embryology		
Biogeography		
Molecular biology		

Observable evolutionary change		

Explain each of the following pictures in terms of evidence of evolution.

What do we call structures like this? (different organisms with similar structures?) ___

What does this mean from an evolutionary perspective?

_____

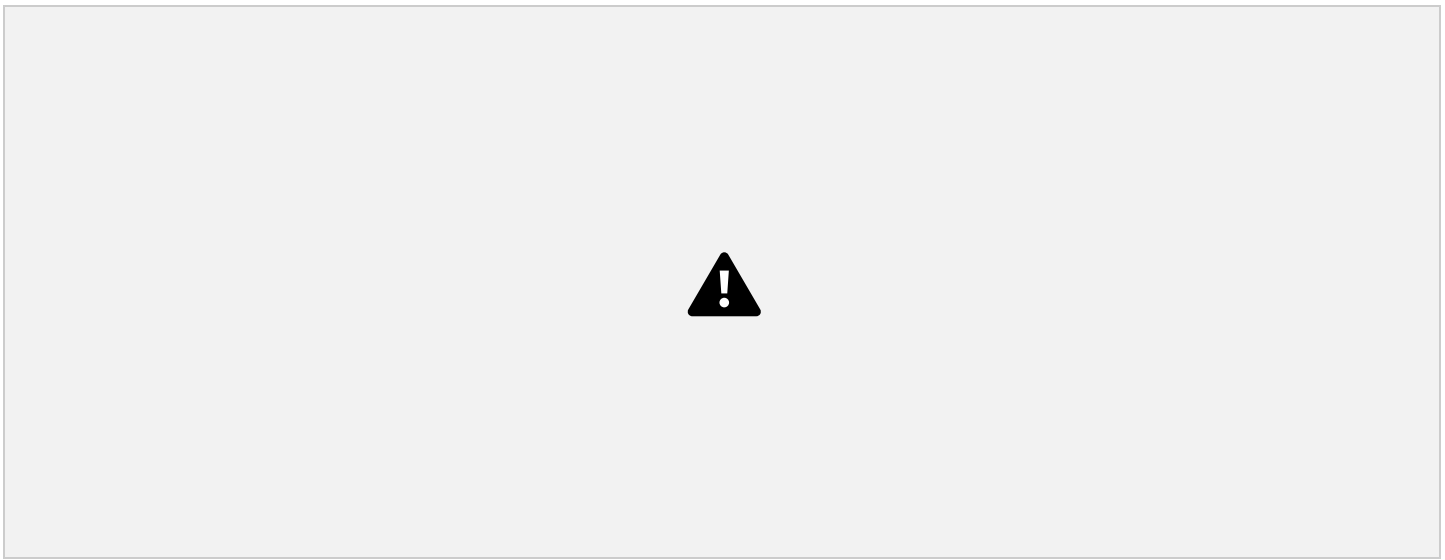
_____

_____

_____

_____

____



• Students will identify examples of and basic trends in hominid evolution from early ancestors to modern humans. • Items referring to the development of language or the manufacturing of tools will relate this development to changes in the skull or brain size.

What is a hominid? _____

What evidence is available to support the trends in hominid evolution?

Explain how each of the following structures have changed throughout hominid evolution:

1. Bipedalism
2. Cranial capacity
3. Skull Shape
4. Jaw
5. Teeth

Who were the Australopithecines? Describe their importance in human evolution.

Who are the *Homo sapiens?* Describe their importance in human evolution.

_____

What does an increased cranium (skull) indicate about the size of the hominid brain? _____

_____

- Students will classify organisms based on the distinguishing characteristics of the domains and/or kingdoms of living organisms.
- Students will identify and/or describe how and/or why organisms are hierarchically classified based on evolutionary relationships.
- Students will identify and/or explain the reasons for changes in how organisms are classified.

How is taxonomy useful?

What are the 3 Domains? _____ _____ _____
What are the 6 kingdoms? _____ _____ _____
_____ _____ _____

The classification system has changed many times over the century. Why does it continuously being updated?
Describe why scientists classify organism based on evolutionary relationships.

The chart below shows the classification of three organisms. Certain categories are not shown.

Organism *A*	**Organism *B***	**Organism *C***
Animalia	Animalia	Animalia
Insecta	Mammalia	Mammalia
Diptera	Carnivora	Carnivora
Musca domestica	*Canis lupus*	*Felis domestica*

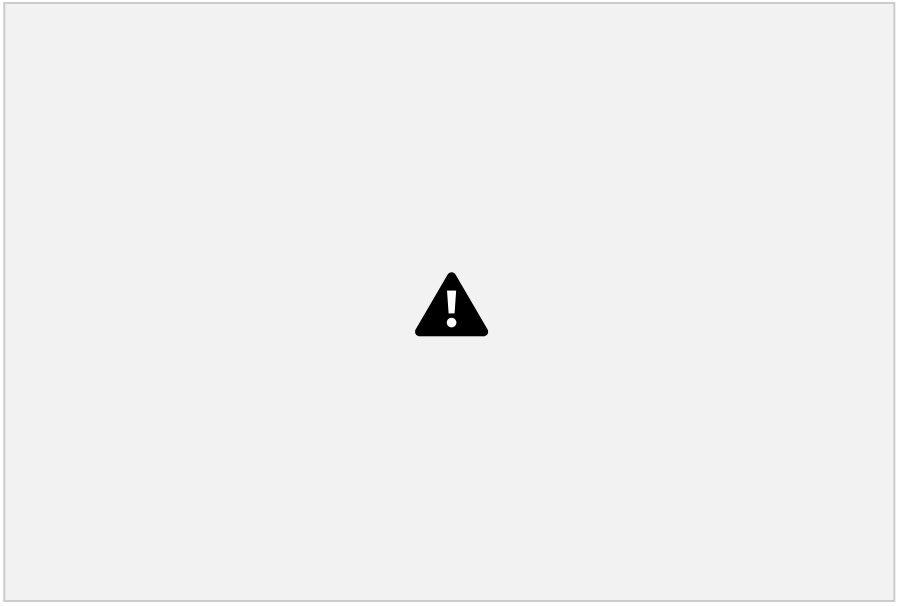
Which two organisms are most closely related?_____

The scientific name for dog is *Canis familiaris*. The scientific name for wolf is *Canis lupus*. Which classification groups do dogs and wolves have in common? How can you tell they are similar organisms just by looking at their scientific names?

_____

What is phylogeny? _____

Answer the following questions based on the cladogram below:



After which animals did mammary glands develop? _____
What animal does not have jaws? _____
Which animals have lungs? _____
Which animals are probably predators? _____
After which animal did protection from the elements arise? _____
What other animals would come after the chimp? _____
Which animals would come before the hagfish? _____

Complete the following chart. List at least two organisms from each category and 3 defining characteristics:

Classification	**Organisms Included**	**Characteristics**
Domain **Archaea**	1. 2.	1. 2. 3.
Domain **Bacteria**	1. 2.	1. 2. 3.
Domain **Eukarya**	1. 2.	1. 2. 3.
Kingdom **Protista**	1. 2.	1. 2. 3.
Kingdom **Fungi**	1. 2.	1. 2. 3.
Kingdom **Plantae**	1. 2.	1. 2. 3.

Kingdom **Animalia**	1. 2.	1. 2. 3.

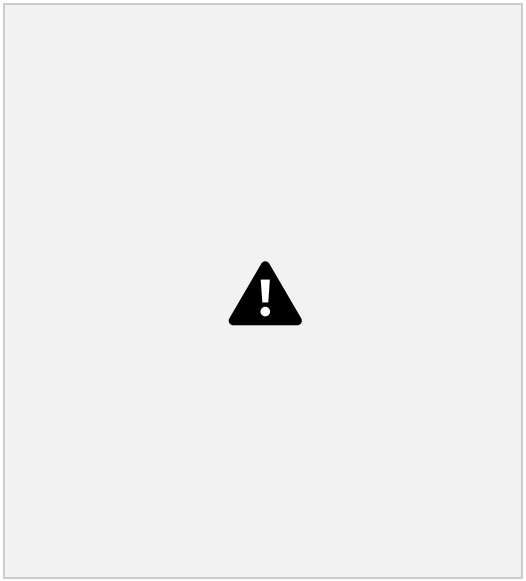
- Students will explain and/or describe the conditions required for natural selection that result in differential reproductive success.

Describe Darwin's theory of natural selection:

Explain how the following terms relate to natural selection:

1. Overproduction of offspring:
2. Inherited variation: 3. Struggle to survive:
4. Competition:
5. Inherited traits
6. Mutations:

Explain how changes in the environment play a role in natural selection.



What would cause the different beaks in these birds?

_____

Explain survival of the fittest._____

_____

- Students will explain and/or describe the scientific mechanisms, such as genetic drift, gene flow, and nonrandom mating, resulting in evolutionary change.

Complete the following table

	Definition	How it impacts evolutionary change
Genetic Drift		
Gene Flow		
Nonrandom mating		

• Relate the structure of each of the major plant organs and tissues to physiological processes.

Complete the following chart on Plant structure and function:

	Organ, Tissue, or Structure	Description	Function
Roots			
Stems			
Leaves			
Flowers			
Fruits			
Cones			
Meristematic			
Ground			
Dermal			
Vascular			
Cambium			
Guard Cells			
Phloem			

Seed			
Stomata			
Xylem			

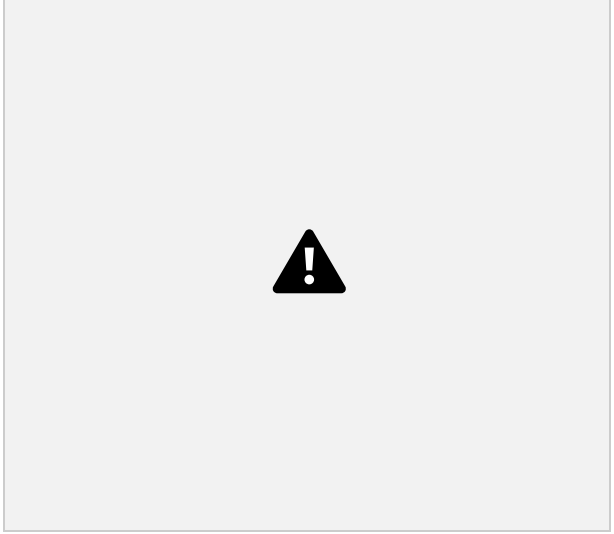
- Explain the functional role of the following processes in plants - transpiration, photosynthesis, cell respiration, and reproduction

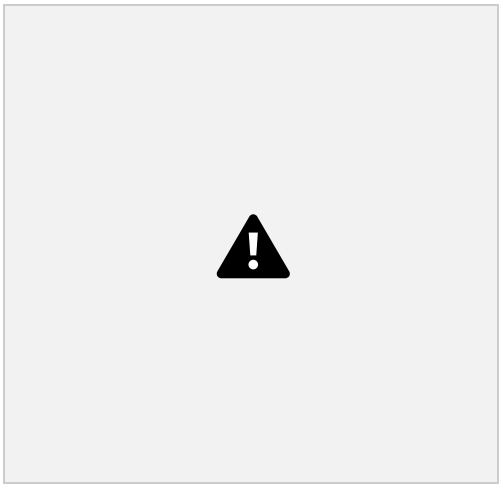
Why do plants go through transpiration?

Describe the process of transpiration of water through plants. (Use the terms cohesion, adhesion, and evaporation.

- Students will identify the major parts of the brain on diagrams.

Identify the following structures on both pictures: **cerebrum, cerebellum, pons, medulla oblongata, brain stem, frontal lobe, parietal lobe, occipital lobe, and temporal lobe**.





- Students will identify factors that affect blood flow and/or describe how these factors affect blood flow through the cardiovascular system.

What is the **cardiovascular system**? _____

For the following factors, identify the effect it would have on blood through the cardiovascular system: **Blood Pressure**: _____ **Blood Volume**: _____ **Resistance in the cardiovascular system:** _____ **Cardiovascular Disease:** _____ What are some examples of cardiovascular disease? _____ **Exercise**: _____ **Smoking:** _____

- Students will identify and/or explain the basic functions of the human immune system, including specific and nonspecific immune responses.

What does the **immune system** do? _____

Identify and explain the **nonspecific immune** responses (1st and 2nd line of defense):

Identify and explain the **specific immune** responses:

_____

_____

Define the following terms:

T-Cells: _____ **B-Cells:** _____

Memory Cells: _____

Macrophage: _____

Antibody: _____

Pathogen: _____

Inflammatory Response:

Vaccination:

Vaccine:

Allergy:

Immunity:

Aids:

HIV:

Describe how the HIV virus infects a white blood cell, uses reverse transcriptase, and creates new proteins. What are the results of the infection to the cell and the body?

- Students will describe how the human immune system responds to vaccines and/or antibiotics.

How do the **vaccines** that you receive as a baby protect you as an adult? _____
_____

What do **antibiotics** do? _____
Do antibiotics work on viruses? Why or why not?

What type of **pathogens** do antibiotics work on? _____

- Students will explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspective of both individual and public health.

Some people live in areas that can literally make them sick. What type of conditions do you suspect could make a typical person ill? _____
_____

Select 3 genetic disorders (One must be sickle cell) and describe how it affects humans.

1.

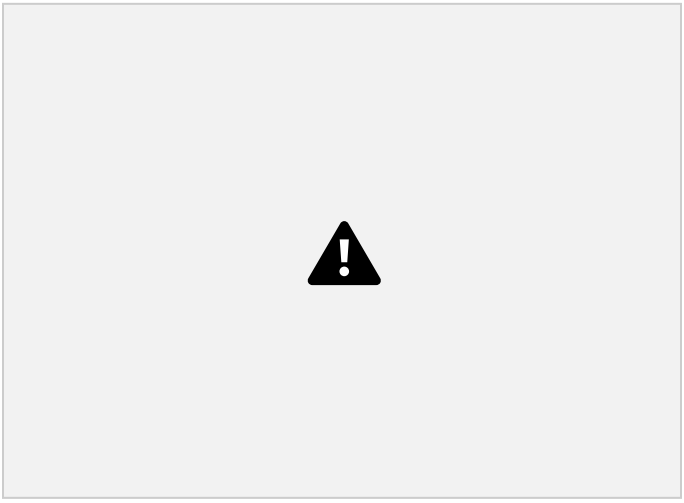
2.

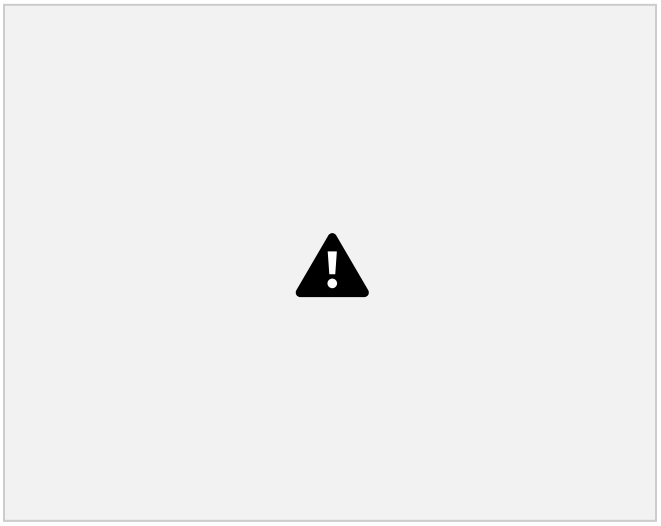
3.

• Students will identify and/or describe the basic anatomy and physiology of the human reproductive system. • Items referring to the male human reproductive system are limited to the seminal vesicle, prostate gland, vas deferens, urethra, epididymis, scrotum, penis, and testes.

• Items referring to the female human reproductive system are limited to the ovaries, oviduct (fallopian tube), uterus, cervix, and vagina.

Label the following structures with a number. Under each illustration, identify the basic function of each structure.





Structure	Function
1.	
2.	

3.	
4.	
5.	
6.	
7.	
8.	

9.	
10.	
11.	
12.	

Explain the overall process of human development from the fertilization to the end of the third trimester and birth.

Stage	Process
Fertilization	
1st Trimester	
2nd Trimester	
3rd Trimester	
Birth	

Explain how the following structures aid in the development of a fetus:

Structure	Function
Placenta	
Umbilical cord	
Amniotic sac	
Amniotic Fluid	

Explain the roles of the following hormones in the reproductive systems:

Hormone	Function
Estrogen	
Progesterone	
Testosterone	

- Students will use data and information about population dynamics, abiotic factors, and/or biotic factors to explain and/or analyze a change in carrying capacity and its effect on population size in an ecosystem.

What are the differences between **living and non-living things**?

List and define the 8 characteristics of life:

What are the ways that living things get energy to live? _____
What are some of the ways that living things use energy? _____
Define the following terms:
Biotic

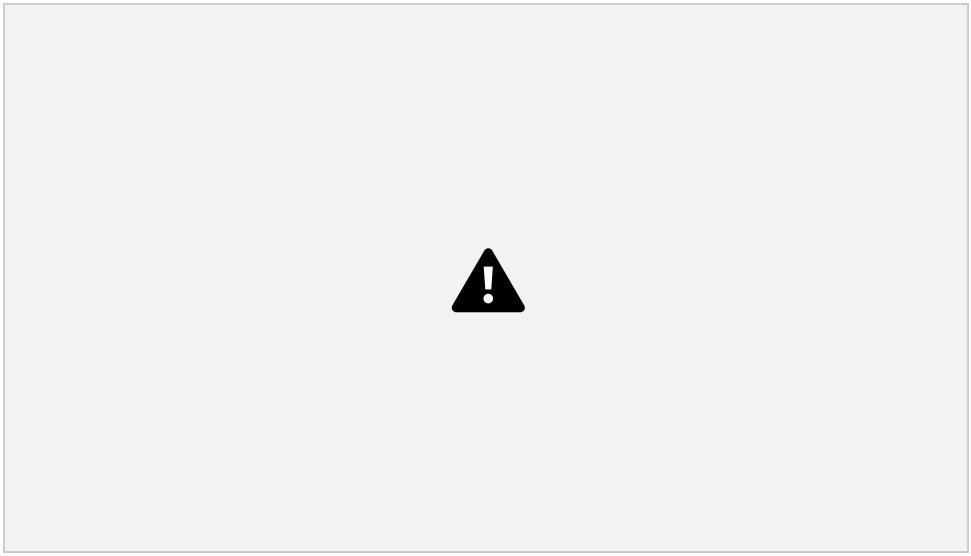
Abiotic
Population

Immigration
Emigration

Limiting Factor
Carrying capacity
Birth rate
Death rate
Graph the following data (make sure to label the title, x, and y axis with units)
Title:

DATA TABLE	
Year	Deer Population
1905	4,000
1910	9,000
1915	25,000
1920	65,000
1924	100,000
1925	100,000

1926	100,000



What is the carrying capacity of the deer population?

In what year did the deer population reach its carrying capacity?

- Students will describe the potential changes to an ecosystem resulting from seasonal variations, climate changes, and/or succession.

What is succession? _____

What is primary succession?

What is secondary succession?

Draw succession in a forest and label the organisms and stages from pioneer species to the climax community

How do seasonal variations affect an ecosystem? _____
_____

- Students will identify positive and/or negative consequences that result from a reduction in biodiversity. Define

Biodiversity:_____

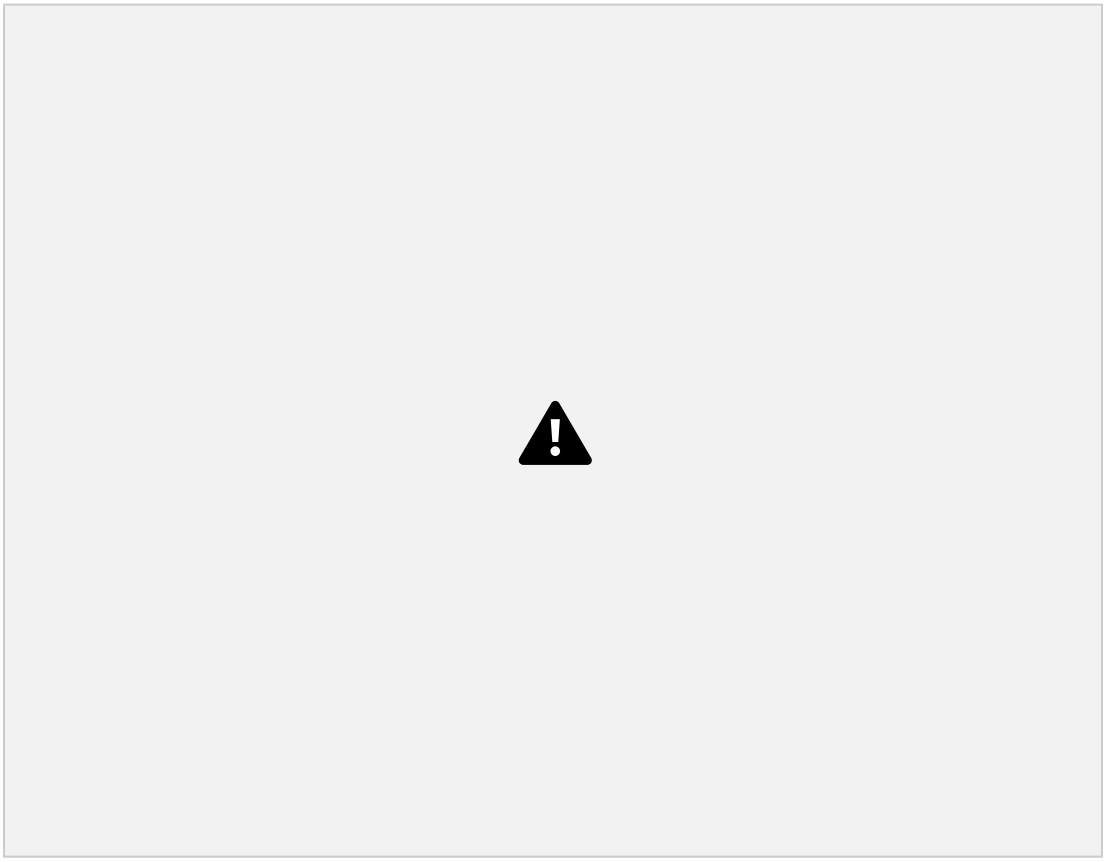
Benefits of reduction in Biodiversity Negative Consequences of reduction in Biodiversity

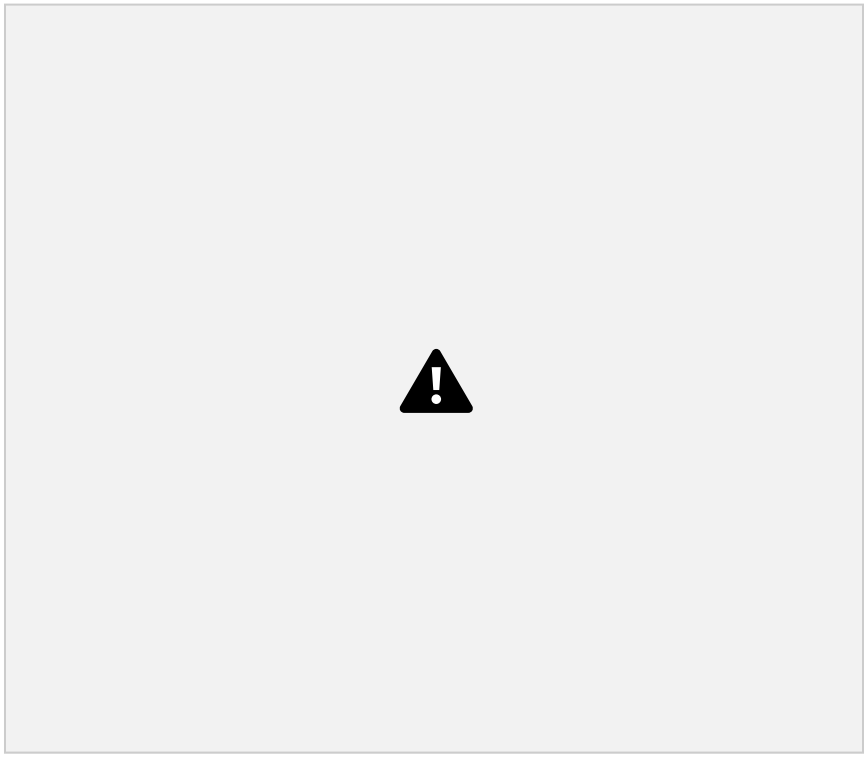
What is an invasive species? _____
How do human activities lead to a loss in biodiversity?
_____
Explain what climate change is, and how this impacts biodiversity _____
_____

- Students will describe the energy pathways through the different trophic levels of a food web or energy pyramid.

Define food web _____
Define Energy pyramid_____
How does energy move through a food web _____
Explain why energy is lost as you move up the energy pyramid

Label the energy pyramid showing the percentage of energy being lost as you move up each level. Label trophic levels.





Using the food web above:

1. Name the autotroph in this diagram.

2. Identify two primary consumers in this diagram.

3. Identify two secondary consumers in this diagram.

4. Explain what would happen to the population of snakes if the mice were removed.

5. Identify which animals are at the top of the food chain.

6. Identify a herbivore

7. Identify a carnivore

8. Identify an omnivore

Explain the role of plants in this food web, and include in your response why it is at the bottom of the web.

What would happen if all the predators were removed from a food web?

What would happen if all of the autotrophs were removed from a food web?

- Students will explain that different types of organisms exist within aquatic systems due to chemistry, geography, light, depth, salinity, and/or temperature.

How do biological materials respond to **acids and bases**? _____

What is a **buffer**? _____ Explain how organisms living in aquatic environments are limited by both biotic, and abiotic factors.

At what pH are most aquatic organisms able to function efficiently at?

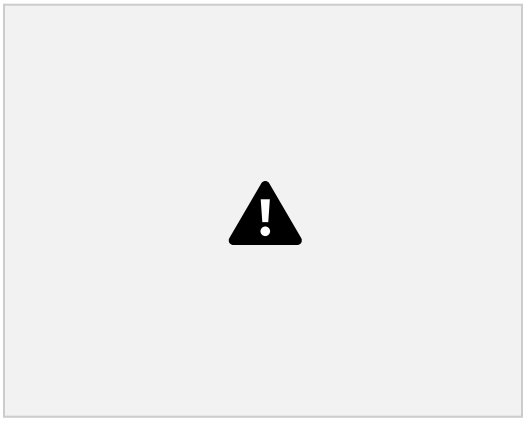
Do most organisms survive better in a higher or lower O2 concentration?

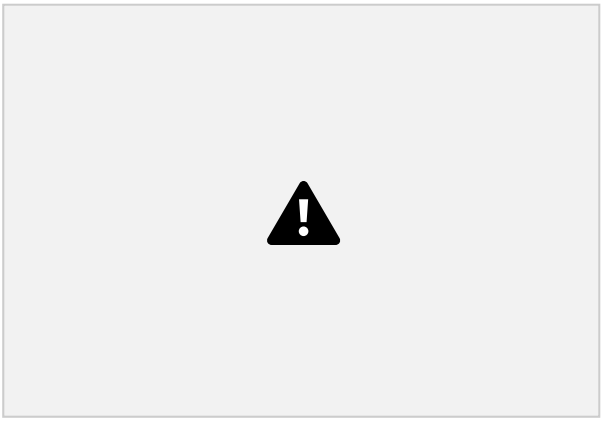
At what depth in the ocean are aquatic plants able to produce the most sugars using photosynthesis? If salt concentrations increase too much in the ocean (such as the Dead Sea) what will happen to the aquatic life? Explain why.

• <u>Students will analyze the movement of matter through different biogeochemical cycles.</u>

Identify and describe each of the numbers below. Identify the biogeochemical cycle.

A B





A-

Cycle:_B- Cycle:

Step	Cycle A	Cycle B
1		
2		
3		
4		
5		

Explain how energy moves through an ecosystem.

Describe how energy is never lost or gained, just transferred.

- Students will predict how the actions of humans may impact environmental systems and/or affect sustainability and evaluate possible environmental impacts resulting from the use of renewable and/or nonrenewable resources.

What is the difference between renewable and nonrenewable resources? _____
_____
_

Complete the chart below while considering the environment:

	Pro's	**Con's**	**Examples**
Renewable Resources			
Nonrenewable Resources			

How have humans impacted the Earth? _____
_____

What is sustainability?

What effect do humans have on sustainability?

- Students will discuss the need for adequate monitoring of environmental parameters when making policy decisions.

Why is it important for humans to monitor the environment?