Review Sheet
Scientific Method and Characteristics of Life

In the following situation, identify the hypothesis, independent variable, dependent variable, the control and constants.

After studying about recycling, members of John's biology class investigated the effect of various recycled products on plant growth. John's lab group compared the effect of different aged grass compost on bean plants. Because decomposition is necessary to release the nutrients, the group hypothesized that older grass compost would produce taller bean plants. Three flats of bean plants (25 plants/ flat) were grown for 5 days. The plants were fertilized as follows: (a) Flat A: 450 g of three-month-old compost, (b) Flat B: 450 g of six-month-old compost, and (c) Flat C: 0 g compost. The plants received the same amount of sunlight and water each day. At the end of the 30 days the group recorded the height of the plants (cm).

Hypothesis: _____
_____

IV: _____

DV: _____

control: _____

constants: _____

In the following situations, identify the hypothesis, independent variable, dependent variable, the control and experimental group.

1. The addition of the chemical calcium chloride (CaCl) to water will increase its temperature.

Hypothesis: If _____, then _____.

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

2. Watering a plant with salt water will kill the plant.

Hypothesis: If _____, then _____.

Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

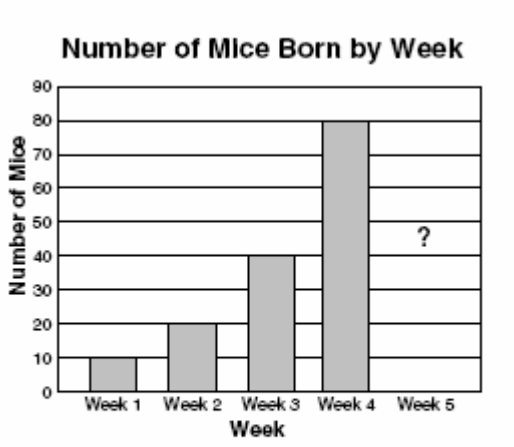
3. A person that takes a vitamin supplement has better memory retention.

Hypothesis: If _____, then _____.

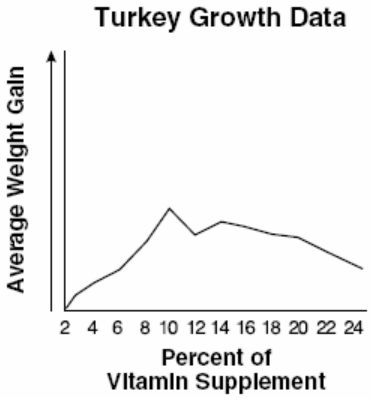
Independent Variable: _____ Dependent Variable: _____

Control Group: _____ Experimental Group: _____

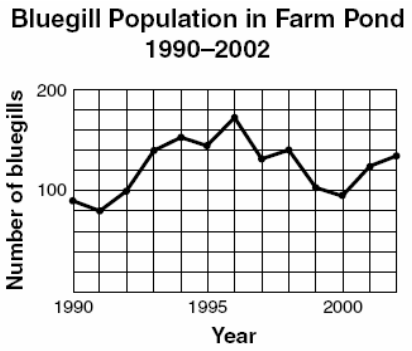
Graphs: Look at the Graphs below and answer the questions that follow.



According to the graph, how many mice will be born in week 5 if the trend continues?



A study on a poultry farm was conducted to determine the percentage of vitamin supplement necessary to add to the feed of turkeys in order to maximize their growth. According to this data, what percentage of vitamin supplement should be added to the turkeys' diet?



In which year was there likely an abundance of bluegill food?

In which year was there likely an increase in bluegill predators?

Characteristics of Life

Define the main characteristics of Life below.

1. Cellular Organization

2. Metabolism

3. Homeostasis

4. Reproduction

5. Heredity

6. Responsiveness to the Environment

Identify the following situations as one of the 6 characteristics of life.

a) a cell divides

b) a giraffe eats the leaves off of a tree

c) when looking thru a microscope at a sample of elephant skin, you see thousands of cells

d) a human being gets goose bumps and shivers when it's cold outside

e) a plant captures the sun's rays to make glucose

f) a sperm and an egg meet to create an embryo

g) A rabbit's fur turns white in the winter and brown in the summer

Review Sheet
Biochemistry & Water

Define: Define the following words

Monomer: _____

Polymer: _____

Carbohydrate: _____

Protein: _____

Nucleic Acid: _____

Lipid: _____

Identify: Place the following characteristics and diagrams into one of the four categories of organic compounds.

Monomer: nucleotide

Monomer: monosaccharide

DNA & RNA

Monomer: fatty acid

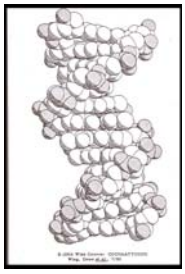
glucose, fructose & sucrose

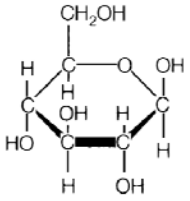
enzymes, hemoglobin & actin

Monomer: amino acid

steroids, waxes & phospholipids

make up the cell membrane





Found in the nucleus of cells

Made at the ribosome of the cell

sugars

fats

Lots are found in muscle cells

Carbohydrate	Lipid

Nucleic Acid	Protein

pH: Use the charts below to answer the following questions.

Test Paper Results

Chart A

pH	Red Litmus	Blue Litmus	pH Paper
Acid - pH2	red	red	red
Acid - pH4	red	red	orange
Acid - pH6	red	red	yellow
Base - pH8	blue	blue	green
Base - pH10	blue	blue	blue

Chart B

Substance	Red Litmus	Blue Litmus	pH Paper
Water	red	blue	yellow-green
Apples	red	red	red-orange
Beans	red	red	yellow
Milk	red	blue	yellow
Shrimp	red	blue	yellow-green

Chart A shows how changes in pH cause testing paper to change color. Chart B shows how testing papers reacted with several experimental substances. Which of these has a pH of about 3?

Field Data

Pond	pH of Pond Water	Number of Duckweed Plants
A	6	150
B	12	300
C	8	500
D	4	80

Which pond is the most acidic?

Which pond is the most basic?

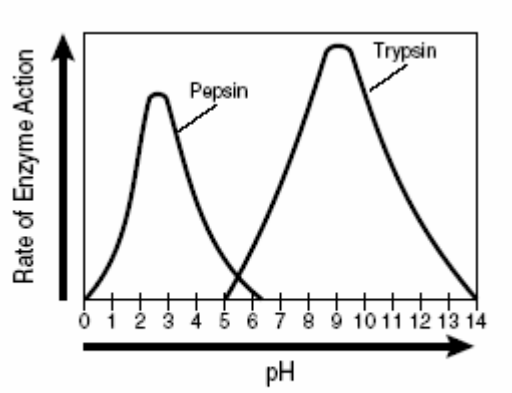
Which pond is closest to neutral?

In the experiment above, what is the dependent variable?

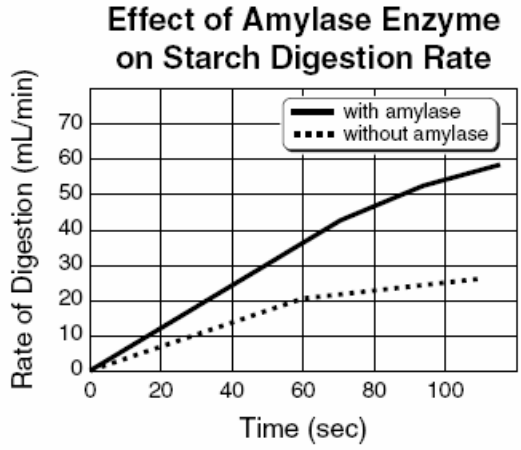
what is the independent variable?

What conclusions can you draw about the effects of pH on duckweed growth?

Enzyme Activity graphs: Use the graphs below to answer the following questions



This graph shows that —



Which enzyme above works well in acidic conditions?

Which enzyme above works well in basic conditions?

What is optimal pH for pepsin?

What is the optimal pH for trypsin?

What is the substrate of amylase?

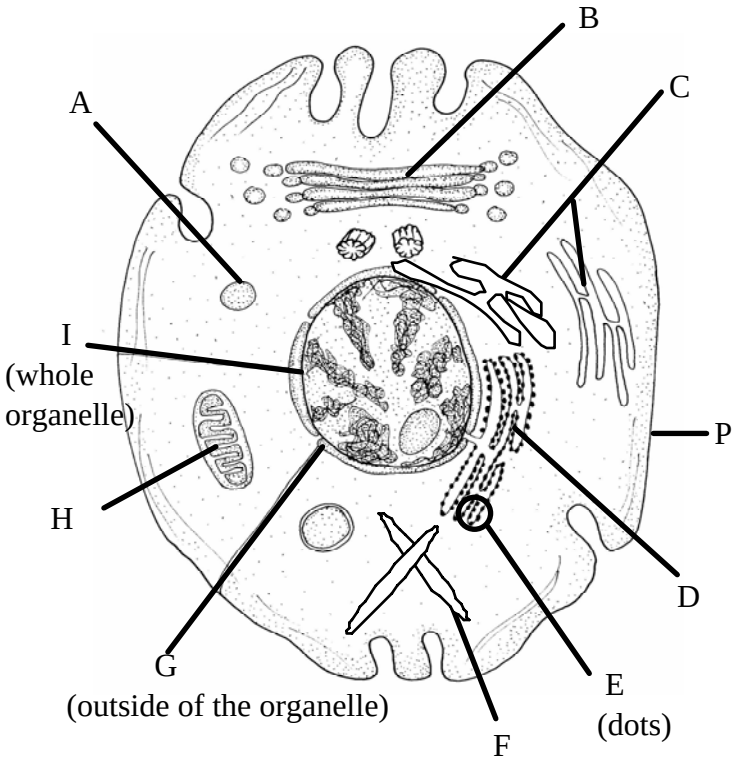
What is the product of amylase?

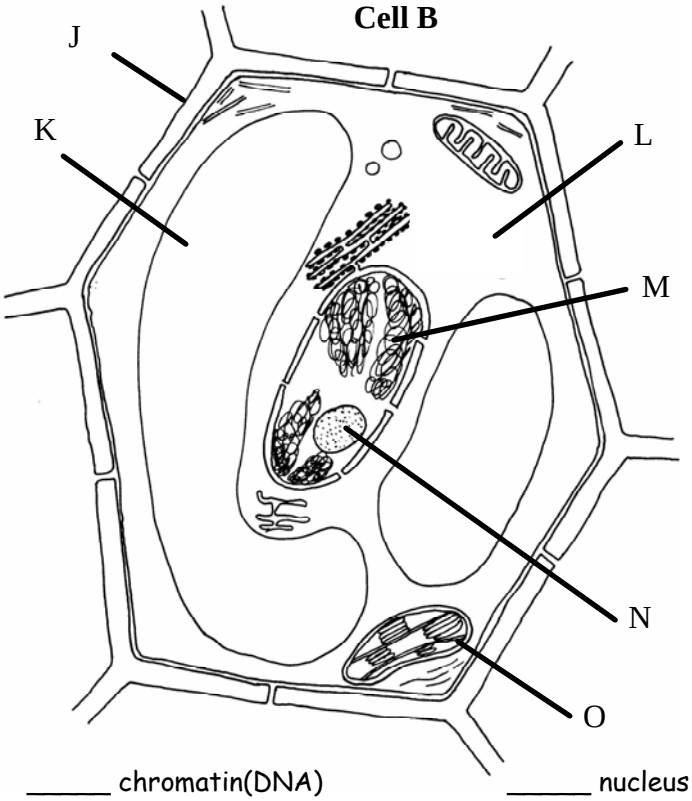
What does the graph indicate about adding amylase to a starch solution?

Review Sheet
Cell Parts and Types of Transport

Label the parts of the plant and animal cell below.

Type of Cell: _____ Type of Cell: _____





_____ cytoplasm _____ cell wall _____ chromatin(DNA) _____ nucleus

_____ cell membrane _____ golgi body _____ chloroplast _____ vacuole

_____ nuclear membrane _____ mitochondria _____ cytoskeleton ____ lysosome

_____ nucleolus _____ rough ER _____smooth ER ____ ribosome

The "tail" of a cell that allows it to move form place to place is called a _____.

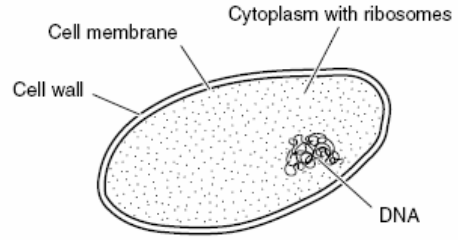
The tiny hairs on the outside of a cell that allow it to move form place to place are called _____.

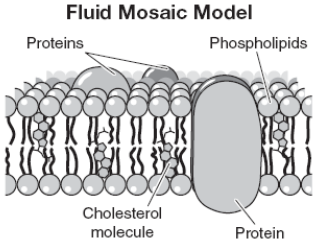
A cell that has a nucleus is known as an _____.

The cell to the right is known as a _____
because it does NOT have a _____.

An organism that is a prokaryote is a _____
cell.

The organelle shown to the right is the _____.
It is made of _____ and _____.





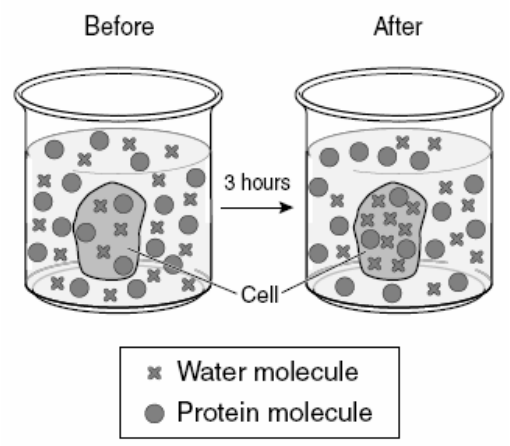
Cell Transport: In the boxes below, indicate what direction the water move in and what will happen to the cell.

Hypertonic Solution	Hypotonic Solution	Isotonic Solution
Direction water moves:	Direction water moves:	Direction water moves:
A cell in a hypertonic solution will...	A cell in a hypotonic solution will...	A cell in a isotonic solution will...

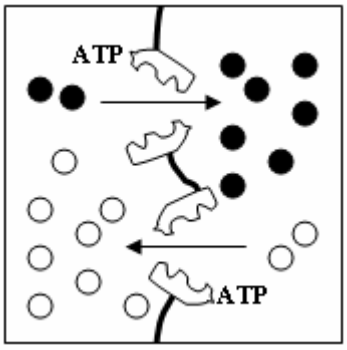
a. In the picture to the right, are the water molecules moving into or out of the cell?

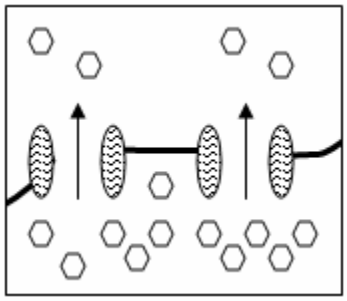
b. What type of solution is the cell in?

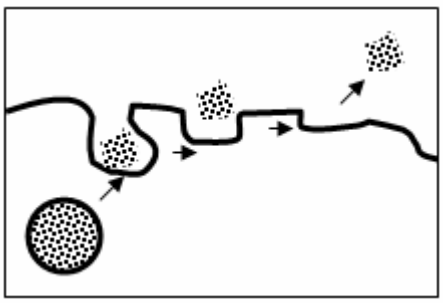
c. What will eventually happen to the cell?

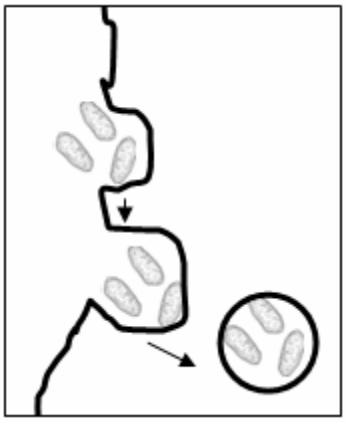


Identify the types of transport below: exocytosis, endocytosis, facilitated diffusion and active transport.

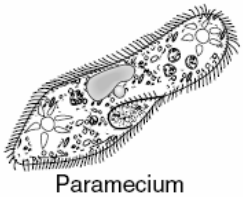


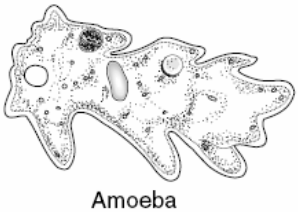


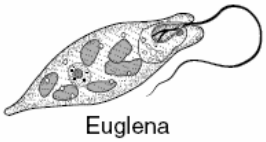




How do the following cells move below?


Paramecium


Amoeba


Euglena

Photosynthesis & Respiration and food chains & webs

What is the equation for photosynthesis?

What are the reactants? What are the products?

What is the energy in photosynthesis? _____

Where in the cell does photosynthesis occur? _____

What is the equation for respiration?

What are the reactants? What are the products?

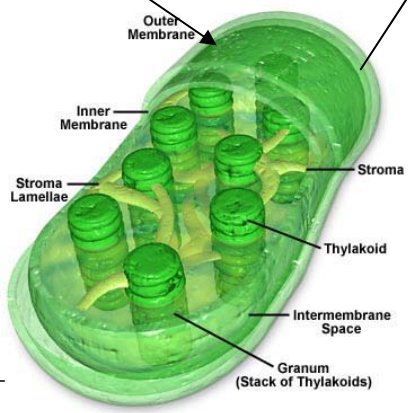
What is the energy in respiration? _____

Where in the cell does respiration take place? _____

Fill in the cycle below.

1.____sunight_____
(energy to photosynthesis)

2._____
(what is this organelle?)



3._____ and _____
(products of respiration)

4._____ and _____
(products of photosynthesis)

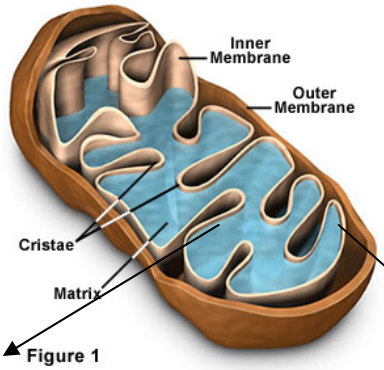
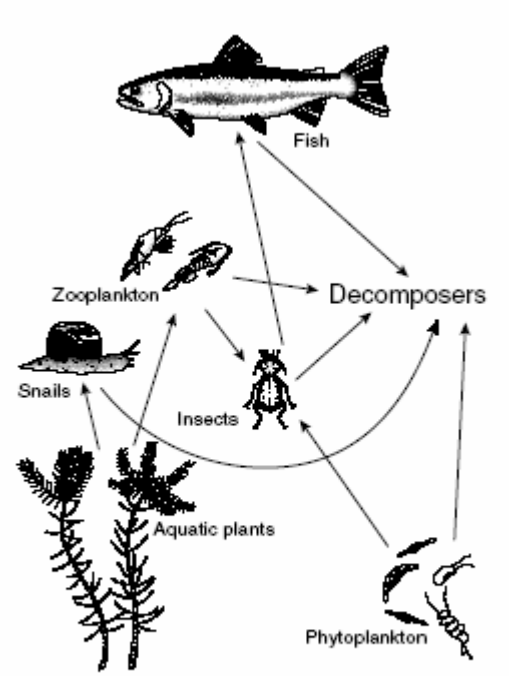


Figure 1

5._____ATP_____
(energy made from respiration)

6._____
(what is this organelle?)

Food Webs



Energy is transferred from insects to fish in this system by —

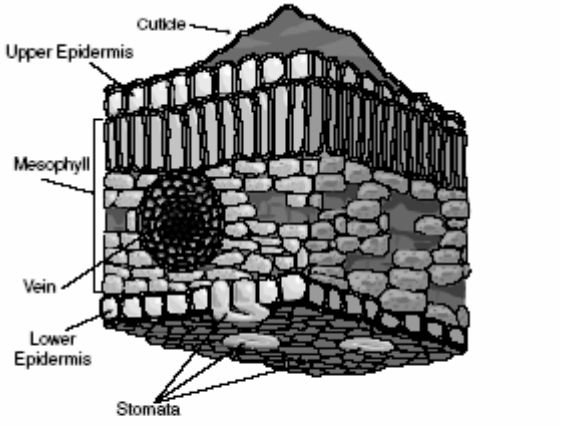
Give an example of a carnivore from the food web above.

Give an example of a producer from the food web above.

Give an example of a herbivore from the food web above.

What is an example of a decomposer?

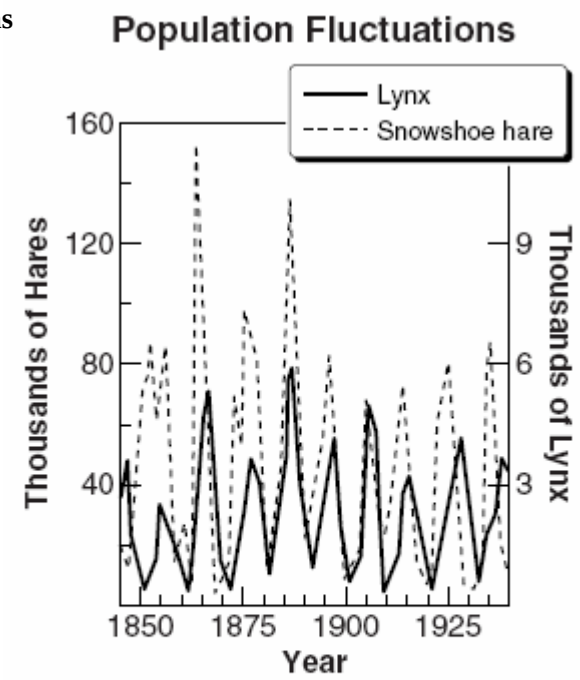
Is the food web above aquatic or terrestrial?



Which area of the leaf is most responsible for protecting the leaf from the drying effects of the air?

What part of the leaf is responsible for bringing water to the cells?

Ecology Graphs



In the graph above, which is the predator?

In the graph above which is the prey?

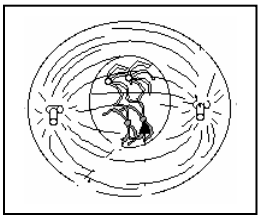
How do the lynx & hare affects each other?

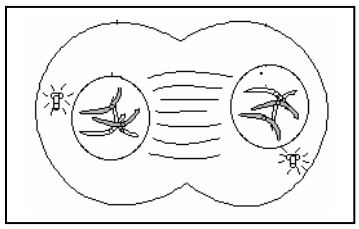
If a predator of the lynx were introduced to this population, how would this affect the hare numbers?

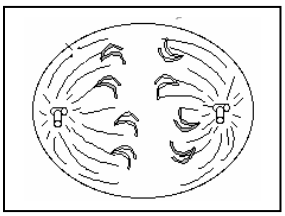
What is the carrying capacity for the sheep population above?

Review Sheet
Cell cycle, mitosis, meiosis, DNA, protein synthesis

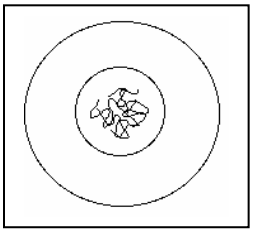
Identify the following stages of mitosis and indicate the correct order.

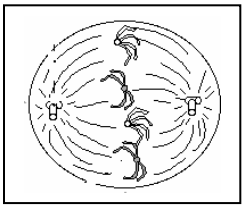






A. _____ B. _____ C. _____





D._____ E. _____

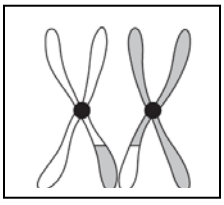
1. What order should the phase above be in? _____ → _____ → _____ → _____ → _____

2. What type of cells does mitosis occur in? _____ What does mitosis produce? _____

3. The Cell cycle is made of two stages: _____ and cell division. Interphase consists of 3 phases: _____, _____ and _____. During the _____ phase DNA is copied.

4. What type of cells does meiosis occur in? _____ What does meiosis produce? _____

5. Look at the picture to the right. What is the term for this process?



b. In what phase of meiosis does the following occur?

c. What does this process cause in the gametes?

6. If a gamete of an organism has 6 chromosomes, how many will its body cell have? _____

7. If a liver cell of an organism has 32 chromosomes, how many will its gametes have? _____

Mitosis vs. Meiosis

Complete the chart below by checking off which cell division has which characteristics.

Description	Mitosis	Meiosis	neither
Cell division in body cells			
Cell division in gametes			
Eukaryotic cells			
Produces haploid cells			
Produces diploid cells			
Produces 2 cells			
Produces 4 cells			
Used by bacteria to divide			

Replication/Transcription/Translation

1. DNA is copied through a process called _____. This occurs during the _____ phase of interphase before the cell is ready to_____.

2. DNA contains information to make the organic molecule _____, such as enzymes.

3. The process of making RNA from DNA is called _____ and occurs in the _____ of the cell.

4. There are 3 types of RNA: _____, _____ and _____. The _____ takes the genetic code from the nucleus to the ribosomes, which is made of _____. The _____brings amino acids to the ribosomes to build the protein. The 3 nucleotides on the mRNA make up a _____ that matches the _____on the tRNA.

5. The process of making a protein from mRNA is called _____ and occurs in the _____ of the cell.

Use the strand of DNA below to answer the following questions.

DNA strand	T	A	C	A	C	G	C	G	C	T	A	T

6. What is the complimentary DNA to the strand of DNA above? _____

7. What is the mRNA to the strand above? _____

8. Using the codon chart, what would be the sequence of amino acids from this mRNA?

_____

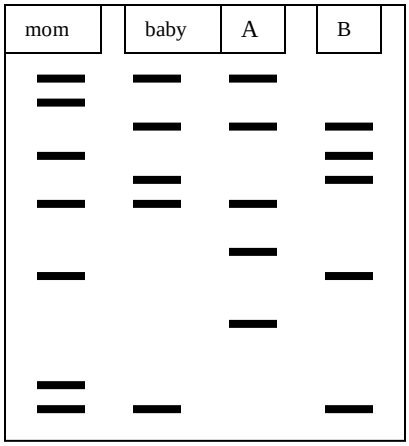
9. What amino acid must every protein begin with? _____ end with? _____

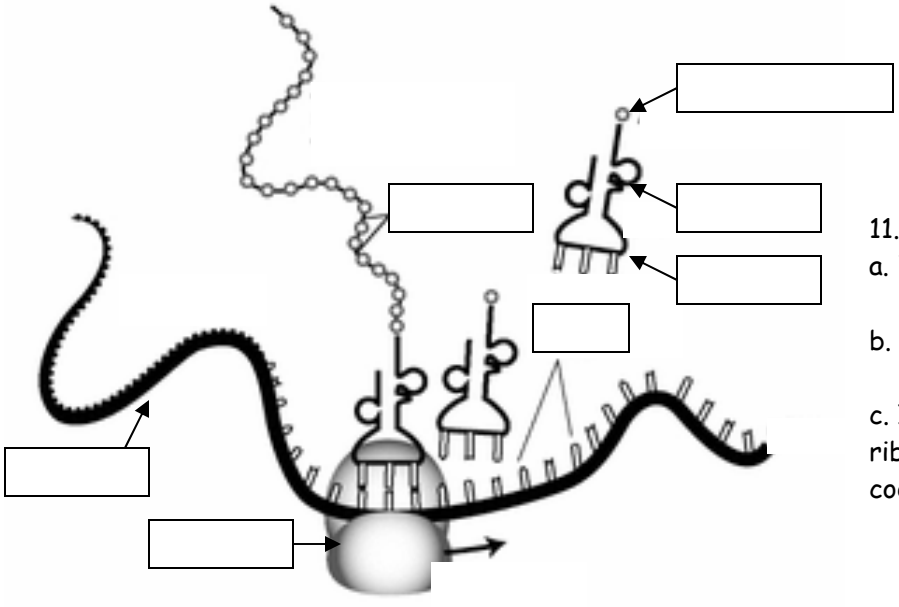
10. Look at the picture to the right.

a. The picture is an example of a (n) _____.

b. In the diagram, who is the father of the baby? _____

c. Justify your answer from part b.





11. Look at the diagram to the left.

a. What process is shown to the left?

b. Where in the cell does the process occur?

c. In the diagram to the left, label: the ribosome, mRNA, tRNA, amino acid, protein, codon, anti-codon.

Review Sheet
Genetics/Evolution

1. The "father" of genetics is _____, who was a monk and worked with pea plants.

2.

Hairline	Widow's peak (W__)	No widow's peak (ww)
Freckles	Freckles (F__)	No freckles (ff)
Blood cell type	Round blood cells (B__)	Sickle cell shape (bb)

a. Give an example of a phenotype for hairline. _____ What is its genotype? _____
b. What is the dominant trait for freckles? _____ recessive? _____
c. What is the genotype for a **carrier** of sickle cell blood? _____
d. Give an example of a heterozygote genotype for freckles _____ homozygote genotype for sickle blood _____
e. What is the genotype for a hybrid freckles, no widow's peak person? _____

3. Genes are carried on _____ and human beings have 46 of them. A change in a gene is called a _____. There are a number of types of mutations: a mutation that replaces one base for another is called a _____, a mutation that omits some of the bases is called a _____ and a mutation that adds extra bases is called an _____.

4. Each parent gives their offspring _____ copy of a gene, so their offspring has 2 genes for each trait.
What gametes are possible from the following genotype? AaBB _____
DDEE_____ ffGg_____

5. Probabilities of a genetic cross are shown in a _____, a grid used to predict possible offspring between 2 individuals.

a. If tall is dominant to short, what is the genotype for short (you pick the letter)? _____
b. If a pure tall plant is crossed with a short plant, what will be the **phenotype** of the offspring? _____
c. If a hybrid tall plant is crossed with a short plant, what will be the **phenotype** of the offspring? _____

6. A red flower when crossed with a white flower produces all pink flowers.
What kind of inheritance is this?_____

What are the phenotypes of the offspring from a pink and white flower? Use a punnett square.

7. A person with type A blood has children with a person that has type B blood. They have a type O baby. How is this possible? Use a punnett square.

8. In plants, yellow pods (Y) is dominant over green pods (y) and axial flowers (A) are dominant over terminal flowers (a). A hybrid plant for both pod color and flower position is crossed with a green, terminal plant. What are the phenotypes and chances of each phenotype in the offspring? Use a punnett square

Evolution

1. The "father" of evolution is _____, who sailed aboard the HMS Beagle and studied the animals located on the _____, a series of islands off the coast of South America.

2. Darwin's idea of evolution is called _____ _____, which is known as survival of the fittest. The 5 points to natural selection are:

1.

2.

3.

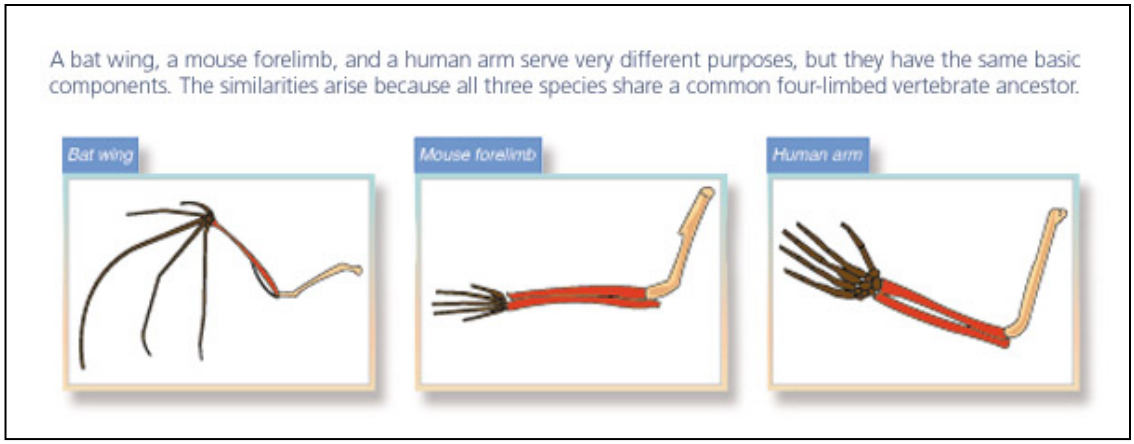
4.

5.

3. A structure that shows a common ancestor is known as a _____ structure. A structure that does not show a common ancestor is known as an _____ structure.

The bat wing, mouse forelimb and human arm are examples of _____ structures.

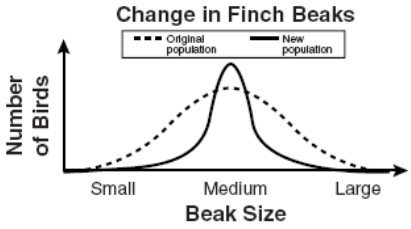
A bat wing and a fly wing would be examples of _____ structures- they serve the same purpose but they do not show a common ancestor.

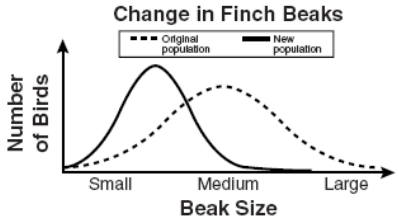


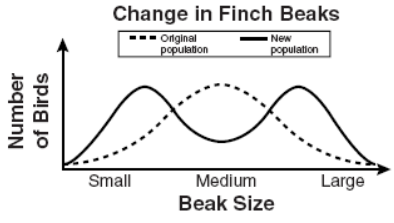
4. A particular type of homologous structure is known as a _____ structure, such as the hip bones of snakes.

5. Identify the 3 types of graphs below and the situation that accurately describes them.

A. _____ B. _____ C. _____







_____: Small sized beaks are favored
_____: Small & large beaks are favored
_____: Medium sized beaks are favored

What is the term for a graph that shows normal distribution (the dotted line in each of the graphs above)?

Review Sheet
Classification, Taxonomy & Kingdoms

1. Place the following characteristics in the proper Kingdoms. Those that are used more than once have the number of time sit will be used in parentheses ().

Yeast	eukaryotes(4)	prokaryotes	only heterotrophs(2)	moss
Mushroom	protozoan	dicot	algae	tree
Amphibian	jellyfish	only autotrophs	mold	reptile
conifer	only unicellular	multicellular (3)	multi- & unicellular	fern
Flower	bird	fish	mammals	monocot
decomposer (2)	cellulose cell walls	insects	hetero- & autotrophs (2)	E.coli

K. Animalia	K. Plantae	K. Fungi	K. Protista	K. Archaebacteria & Eubacteria

2. The diagram below is a _____ which shows evolutionary relationships between organisms.

a. Which 2 organisms are the most related?

b. How long ago did A & D split?

c. Which organism is most related to G?

d. Which 2 organisms are the LEAST related?

e. Which 2 organisms are MORE related: D & E or E & G?

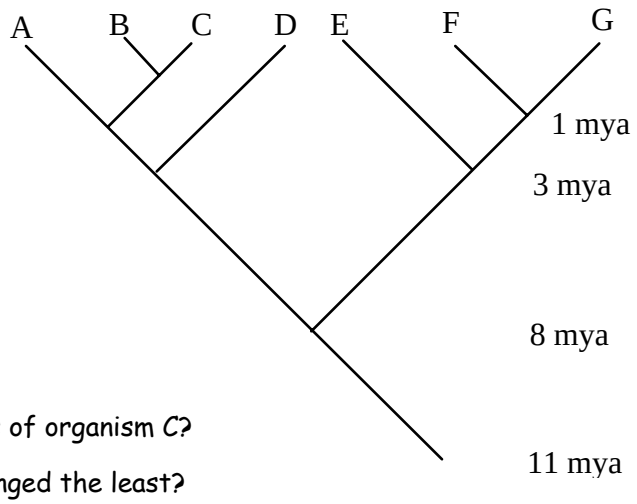
f. Which 2 organisms are LESS related: A & D or D & F?

g. Which 2 organisms split ~8 mya?

h. Which organisms would be in the same phylum as G?

i. If organism B is *Felis domesticus,* what is the most likely genus of organism C?

j. Which organism has changed the most in 11 million years? Changed the least?



3. What is the taxon hierarchy- starting with kingdom and ending with species?

Kingdom

_____

_____

_____

_____

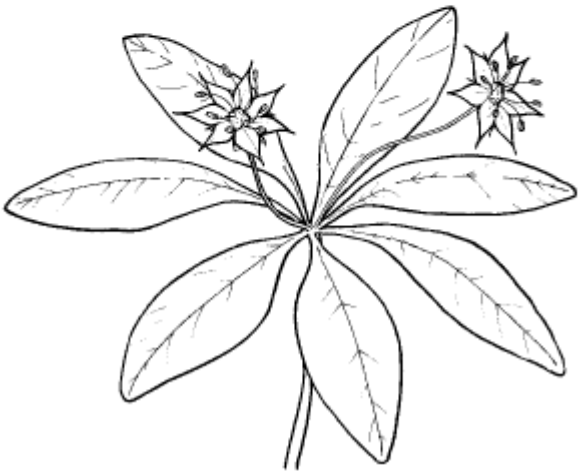
_____

Species

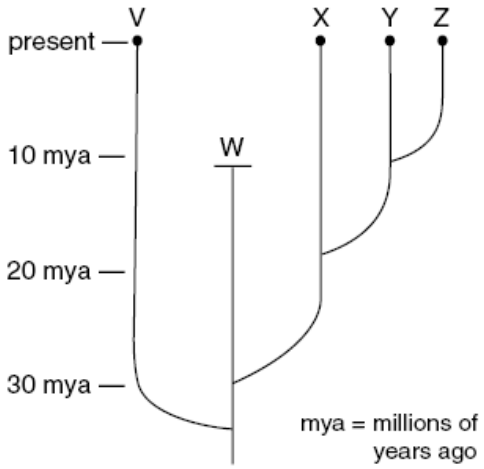
4. What is the scientific name for the flower below?

Key to White Wildflowers

1a. Five petals	Go to 2
1b. Seven petals	Starflower (*Trientalis borealis*)
2a. Petals single pieces	Go to 3
2b. Petals deeply divided	Chickweed (*Stellaria media*)
3a. Wide round petals	Common strawberry (*Fragaria virginiana*)
3b. Narrow elongated petals	Bowman's root (*Gillenia trifoliata*)



5. Which species went extinct? How long ago?



4. Which of the beetles below are most closely related? Justify your answer.