

Biology I (Davidkumar) Students

Content Practice

LESSON 2

Levels of Organization

Directions: On the line before each definition, write the letter of the term that matches it correctly. Each term is used only once.

- | | |
|---|--------------------------------|
| _____ 1. a cell that can become many different cell types | A. cell differentiation |
| _____ 2. a group of similar cells that work together to carry out a specific task | B. stem cell |
| _____ 3. a group of different organs that work together to complete a series of tasks | C. tissue |
| _____ 4. the process by which cells becomes different types of cells | D. organ |
| _____ 5. a group of organ systems that carry out all the jobs needed for their survival | E. organ system |
| _____ 6. a group of different tissues working together to perform a particular job | F. organism |

Directions: Circle the term in parentheses that correctly completes each sentence.

7. Cells work together in a (multicellular/unicellular) organism.
8. A cell in a (multicellular/unicellular) organism must carry out all the activities that are necessary to survive.
9. Different types of cells in a multicellular organism have (different/the same) chromosomes.
10. Most multicellular organisms are (eukaryotes/prokaryotes).

Key Concept Builder 

LESSON 2

Levels of Organization

Key Concept How does cellular differentiation lead to the organization within a multicellular organism?

Directions: Use the terms from the word bank to order the levels of organization from smallest to largest. Then write a definition of each term on the lines provided.

cell organ organism organ system tissue

1. _____
Definition: _____

2. _____
Definition: _____

3. _____
Definition: _____

4. _____
Definition: _____

5. _____
Definition: _____

Macromolecule Worksheet

1. What are the definitions for a monomer and polymer?

Monomer: _____

Polymer: _____

2. Complete the chart below.

ORGANIC MOLECULES } CARBOHYDRATES	LIPIDS	PROTEINS	NUCLEIC ACIDS
Monomer			
Polymer			
Function			
Elements			
Examples			

2. How many rings are in a monosaccharide? ___ Disaccharide? ___ Polysaccharide? ___
 What is the most common monosaccharide? _____
 What is the storage polysaccharide in plants? _____ In animals? _____

3. Are carbohydrates soluble in water? Yes No
 Are lipids soluble in water? Yes No

4. What two functions do nucleic acids have?

5. What are the three parts that make up a nucleotide?

___ 1) _____ 2) _____ 3) _____

6. What are the two types of sugars found in nucleic acids?

DNA _____

RNA _____

Cell Organelles Worksheet

Complete the following table by writing the name of the cell part or organelle in the right hand column that matches the structure/function in the left hand column. A cell part **may** be used more than once.

Structure/Function	Cell Part
1. Stores material within the cell	
2. Closely stacked, flattened sacs (plants only)	
3. The sites of protein synthesis	
4. Transports materials within the cell	
5. The region inside the cell except for the nucleus	
6. Organelle that manages or controls all the cell functions in a eukaryotic cell	
7. Contains chlorophyll, a green pigment that traps energy from sunlight and gives plants their green color	
8. Digests excess or worn-out cell parts, food particles and invading viruses or bacteria	
9. Small bumps located on portions of the endoplasmic reticulum	
10. Provides temporary storage of food, enzymes and waste products	
11. Firm, protective structure that gives the cell its shape in plants, fungi, most bacteria and some protists	
12. Produces a usable form of energy for the cell	
13. Packages proteins for transport out of the cell	
14. Everything inside the cell including the nucleus	
15. Site where ribosomes are made	

16. The membrane surrounding the cell	
17. Provides support for the cell, has two "subparts"	
18. Name for the collection of DNA in the nucleus of eukaryotic cells	
19. Consist of hollow tubes which provide support for the cell	
20. Small hair-like structures used for movement or sensing things	
21. Composed of a phospholipid bilayer	
22. Longer whip-like structures used for movement	

Put each of the following organelles into one of the four columns, based on their role in metabolism.

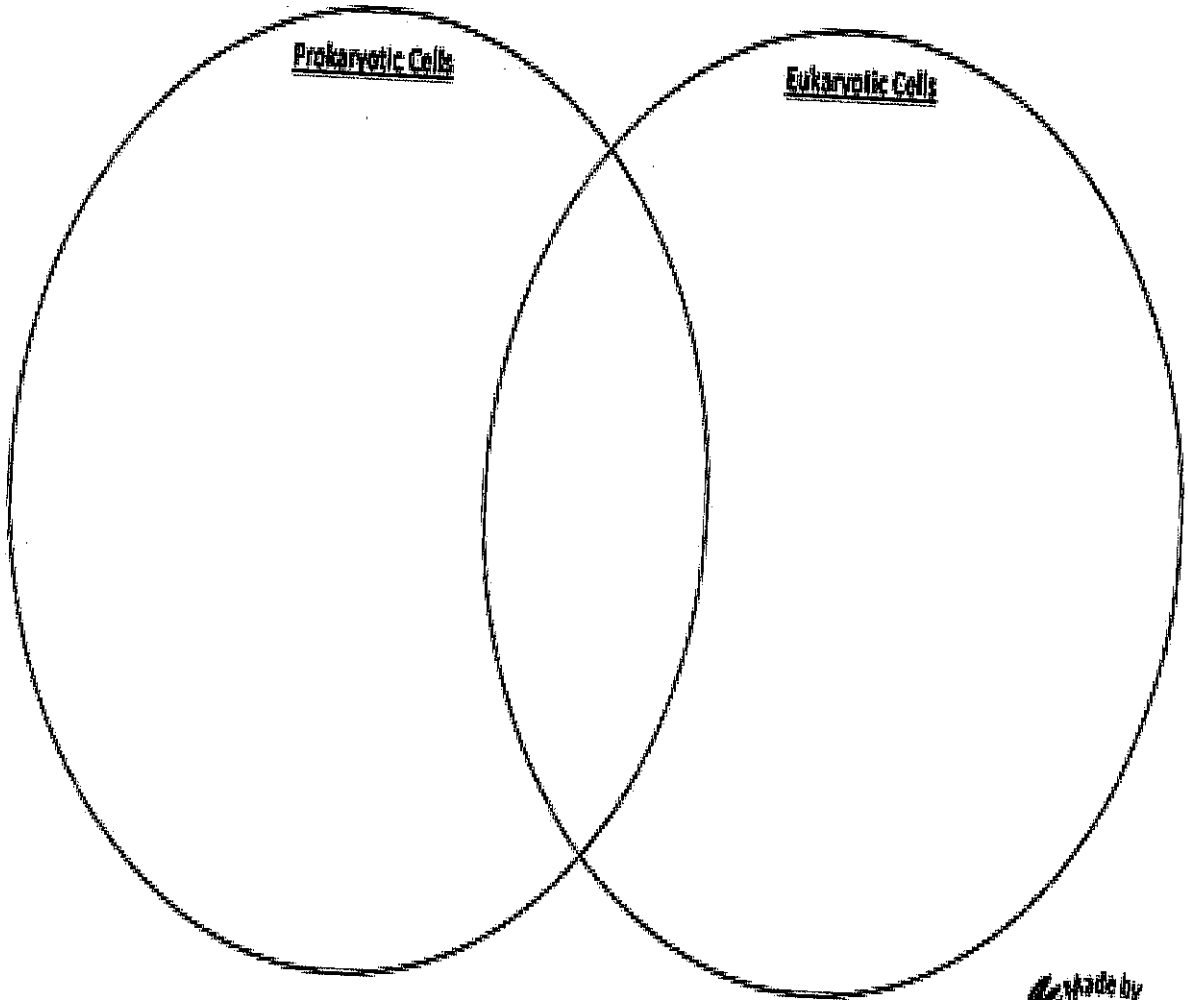
<i>Lysosomes</i>	<i>Mitochondria</i>	<i>Plasma membrane</i>	<i>Vacuoles</i>
Ingestion	Digestion	Respiration	Excretion

Put a check in the appropriate column(s) to indicate whether the following organelles are found in plant cells, animal cells or both.

Organelle	Plant Cells	Animal Cells
Cell Wall		
Vesicle		
Chloroplast		
Chromatin		
Cytoplasm		
Cytoskeleton		
Endoplasmic reticulum		
Golgi apparatus		
Lysosome		

Organelle	Plant Cells	Animal Cells
Mitochondria		
Nucleolus		
Nucleus		
Plasma membrane		
Central vacuole		
Ribosome		
Vacuole		

Make a Venn Diagram Comparing Prokaryotic and Eukaryotic Cells



Made by
Grefintec

Draw the structure of cell membrane and label the parts. Color it

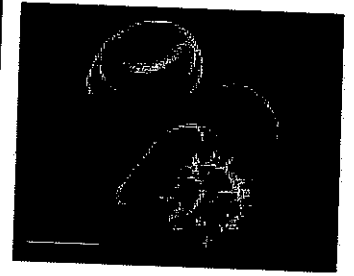
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Date: _____ Hour: _____

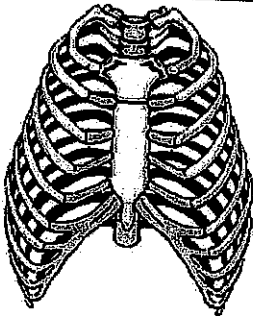
Multi-Cellular Organization Reading

CELLS: LEVEL ONE

Within a multi-cellular organism there is a division of labor. Division of labor means that the work of keeping the organism alive is divided among the different parts of the body. Each part has a specific job to do. And as each part does its special job, it works in harmony with all the other parts.



The arrangement of specialized parts within a living thing is sometimes referred to as levels of organization. Cells, of course, are the first level of organization.



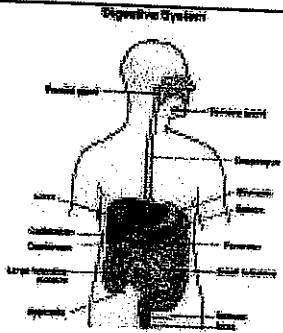
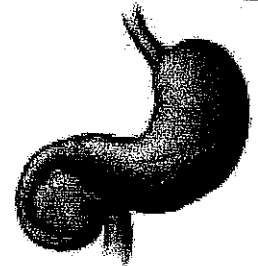
TISSUES: LEVEL TWO

In any multi-cellular organism, cells rarely work alone. Cells that are similar in structure and function are usually joined together to form tissues. Tissues are the second level of organization.

Bone cells in your body form bone tissue, a strong solid tissue that gives you shape and support. Blood cells in your body are part of blood tissue, a liquid tissue responsible for transporting food and oxygen throughout the body.

ORGANS: LEVEL THREE

Tissues are further organized in organs, the third level of organization in living things. Organs are groups of different tissues that work together. Your heart, for example, is an organ made up of muscle tissue, blood tissue, and nerve tissue. You are probably familiar with the names of many of the body organs. The brain, stomach, kidneys, and skin are some examples.



ORGAN SYSTEMS: LEVEL FOUR

Like cells and tissues, organs seldom work alone. They "cooperate" with one another and form specific organ systems. Organ systems are the fourth level of organization in living things. An organ system is a group of organs working together to perform a specific function for the organism.

ORGANISMS: LEVEL FIVE

You are an organism. Dogs, trees, and butter cups are also organisms. Even a unicellular bacterium is an organism. An organism is an entire living thing that carries out all the basic life functions. The organism is the fifth level of organization.

Cells, tissues, organs, organ systems organisms--each level of organization interacts with every other level. The smooth functioning of a complex organism is the result of all its various parts working together.



Levels of Organization

Cells: Level One

Within a multi-cellular organism there is a _____.

Division of labor means that the work of keeping the organism alive is divided among the different parts of the body. Each part has a _____ job to do.

The arrangement of specialized parts within a living this is sometimes referred to as _____. Cells of course, are the _____ level of organization.

Tissues: Level Two

In any multi-cellular organism, _____ rarely work alone. Cells that are _____ in structure and function are usually joined together to form _____. Tissues are the _____ level of organization.

Bone cells in your body form bone tissue. Blood cells in your body form blood tissue.

Organs: Level Three

Tissues are further organized into _____, the _____ level of organization in living things. Organs are groups of different tissues that work together. Your heart, for example, is made up of _____ tissue, _____ tissue, and _____ tissue. You are probably familiar with the names of many of the body organs. The brain, _____, kidneys, and _____ are some examples.

Organ Systems: Level Four

Like cells and tissues, organs seldom work _____. They "cooperate" with one another and form specific _____. Organ systems are the _____ level of organization in living things. An organ system is a _____ of organs working together to perform a specific function for the organism.

Name: _____
Date: _____ Hour: _____

An example would be your digestive system. It is made up of several organs such as your esophagus, stomach, and intestines.

Organisms: Level Five

_____ are an organism. Dogs, trees and buttercups are also organisms. Even a unicellular (one celled) bacterium is an organism. An organism is an entire _____ that carries out all the basic life functions. The organism is the _____ level of organization.

_____ → tissues → organs → _____ → _____ --
each level of organization interacts with every other level. The smooth functioning of a complex _____ is the result of all its various parts _____ together.

Photosynthesis Review Worksheet

Part A. Match the terms below with the correct description

Calvin Cycle	Chloroplast		Light reactions	Thylakoid
Chlorophyll	Photon	Photosynthesis	Dark reactions	

- a. _____ packet of solar energy
 - b. _____ portion of photosynthesis that uses sunlight to break apart water.
 - c. _____ green pigment that absorbs solar energy and is important in photosynthesis
 - d. _____ membrane-bounded organelle containing chlorophyll
 - e. _____ chloroplast part where sunlight is absorbed and the light reactions occur
 - f. _____ Reactions of photosynthesis that do not use sunlight and make glucose.
 - g. _____ cycle that produces glucose during the dark reactions of photosynthesis in plants
1. Explain the difference between autotrophs and heterotrophs in terms of whether their cells perform
photosynthesis and / or cellular respiration.
 2. Draw a molecule of ATP and ADP + P. label the adenosine and the phosphate groups, chemical bond that
would be broken if energy needed to be released.
 3. Draw a diagram of chloroplast and label the following: chloroplast membrane, thylakoid, granum (grana), stroma and location of pigments.
 4. What green colored chemical is removed from the chloroplasts in leaves causing the leaves to lose their
green color in fall? _____
 5. Write the chemical equation for the process of photosynthesis.
 6. When a leaf turns from red to brown in fall what two pigments may have been removed from the leaf?

7. Explain how temperature, intensity of light, CO₂ levels and Light Color effect the rates of photosynthesis?

8. Where does the Carbon Dioxide used in photosynthesis come from? What happens to it in photosynthesis?

9. Where do the Light reactions and Dark Reactions occur in a chloroplast? Why might they need to occur in different places?

10. Match the photopigment with its color.

<u>Pigment name</u>	<u>Color it appears</u>
_____ Chlorophyll	A. Blue
_____ Xanthophyll	B. Green
_____ Carotenoids	C. Orange
_____ Flavonoids	D. Brown

11. Relate the structure of a chloroplast to the reactions that occur in them.

Cellular Respiration Worksheet

1. _____ When living cells break down molecules, energy is
a. stored as ADP. b. released as heat. c. stored as ATP. d. Both b
and c

2. _____ In cellular respiration, the most ATP is made during _____
a. glycolysis. b. lactic acid fermentation. c. the Krebs cycle. d. Calvin
Cycle

3. _____ The breakdown of sugars to produce ATP and ethanol is known as
a. cellular respiration b. alcoholic fermentation c. lactic-acid fermentation d.
photosynthesis

4. ____ Which of the following is not formed during the Cellular Respiration?
a. CO₂ b. ATP c. Oxygen d. Glucose
5. ____ Which of the following is never part of cellular respiration?
a. Fermentation b. the Krebs cycle c. glycolysis d. the Calvin cycle
6. ____ With enough oxygen present which of the following does not occur?
a. glycolysis. b. fermentation c. aerobic respiration d. All of the above
7. ____ An important molecule generated by both lactic acid and alcoholic fermentation is
a. ATP b. NADH c. CO₂ d. NAD⁺
8. ____ Glycolysis takes place ____
a. without oxygen b. only if oxygen is present c. in all cells d. only if oxygen is absent
9. ____ Yeast cells produce alcohol and CO₂ in the process of ____
a. lactic acid fermentation b. alcoholic fermentation c. aerobic respiration d. glycolysis
10. ____ Glycolysis takes place in the ____
a. cytoplasm b. mitochondria c. chloroplast d. nucleus
11. ____ Aerobic Respiration produces ____ molecules of ATP.
a. 2 b. 19 c. 34 d. 63
12. ____ Aerobic processes require ____ in order to take place.
a. sunlight b. water c. oxygen d. carbon dioxide
13. ____ To maximize ATP production, glycolysis must be followed by
a. fermentation b. aerobic respiration c. The Calvin cycle d. photosynthesis
14. ____ When muscles are exercised extensively in the absence of sufficient oxygen, what happens?
a. lactic acid is produced b. ethanol is produced c. glucose d. oxidative respiration
15. What two organs do we store sugars in?
a. muscles and heart b. Liver and muscles c. stomach and intestines d. brain and spine
16. The light color reflected that things that we see as green colored.

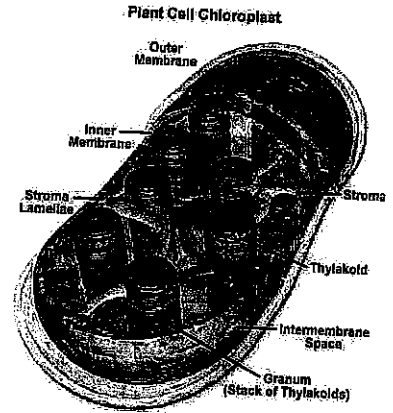
15. Write the overall reaction for cellular respiration.

16. What are the 3 phases of the cellular respiration process?
17. How do Photosynthesis and Aerobic Cellular Respiration support each other?
18. Draw and label a diagram of a mitochondria including the outer membrane, cristae and the matrix.
19. Relate the structure of a mitochondria to the reactions that it performs.

Photosynthesis: Making Energy

Chloroplasts

Photosynthesis is a process in which sunlight energy is used to make glucose. The site of photosynthesis is in the chloroplast - an organelle found in the leaves of green plants. The main functions of chloroplasts are to produce food (glucose) during photosynthesis, and to store food energy. Chloroplasts contain the pigment, *chlorophyll*. Chlorophyll absorbs most of the colors in the color spectrum, and reflects only green and yellow wavelengths of light. This is why we see leaves as green or yellow - because these colors are reflected into our eyes.



1. What is photosynthesis? _____
2. Where does photosynthesis occur? _____
3. What are chloroplasts and where are they found? _____
4. What are the two main functions of chloroplasts? _____
5. Why do most leaves appear green? _____
6. What is the primary pigment found in the chloroplast? _____

Photosynthesis

Glucose is another name for sugar. The molecular formula for glucose is $C_6H_{12}O_6$. Plants make sugar by using the energy from sunlight to transform CO_2 from the air with water from the ground into glucose. This process, called photosynthesis occurs in the chloroplast of the plant cell. During this process, oxygen (O_2) is created as a waste product and is released into the air for us to breath. The formula for photosynthesis is:



This formula says that carbon dioxide + water molecules are combined with the energy from sunlight to produce sugar and oxygen. The reactants in photosynthesis (what is used) are CO_2 , water and sun. The plant gets water from the ground through its roots. The plant collects carbon dioxide from the air. Much of the carbon dioxide comes from living organisms that exhale (breath it out) it, but some also comes from factory smokestacks and car fumes.

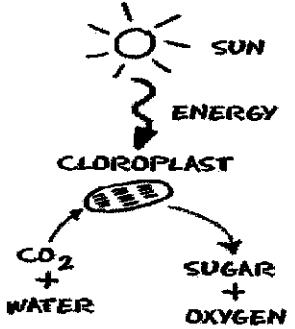
7. What is the formula for photosynthesis? _____
8. What three things are used to make glucose in photosynthesis? _____

Name _____ Date _____ Period _____

- 9. Where does the water come from? _____
- 10. Where does the water enter the plant? _____
- 11. Name 3 some sources of CO₂. _____
- 12. What type of energy does the plant use to convert CO₂ and H₂O into sugar? _____

The products are **glucose** and **oxygen**. The glucose produced is used by the plant for energy and growth. We also use this glucose by eating plants. The oxygen produced is released into the air for us to breath. Photosynthesis is essential for all life on earth, because it provides food and oxygen. Plants are considered autotrophs because unlike us humans, they can make their own food using this process.

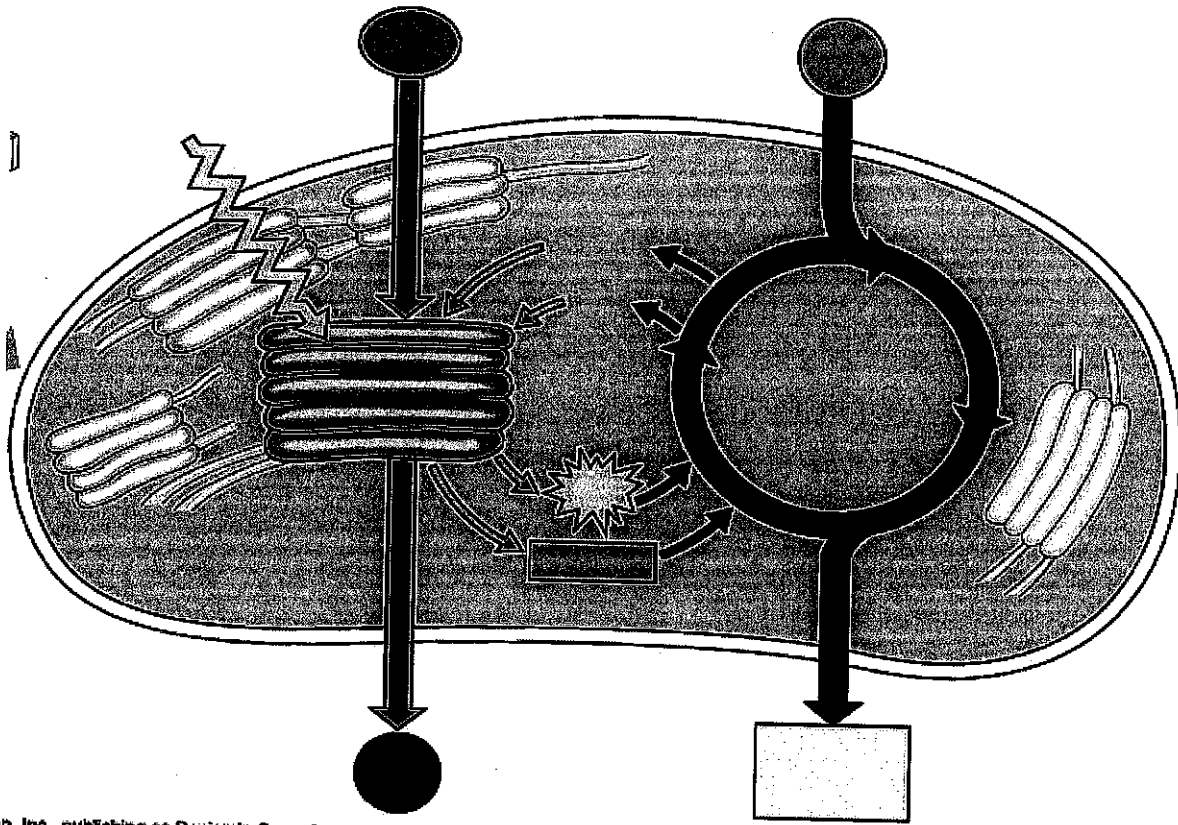
- 13. What is produced in photosynthesis? _____
- 14. What is the glucose used for? _____
- 15. What is the oxygen used for? _____
- 16. Here are three different ways to visualize the photosynthesis reaction: Is it easier for you to understand the reaction by using pictures, words, or symbols (see above)? Why?

Photosynthesis in pictures	Photosynthesis in words	Photosynthesis in symbols
	Carbon dioxide and water combine with sunlight to create oxygen and glucose.	$CO + H_2O + \text{sunlight} \rightarrow C_6H_{12}O_6 + O_2$

Essential Question: Describe, using scientific terms, how plants turn sunlight into energy? Make sure to refer to the chemical equation to photosynthesis and discuss the reactants and products.

Name _____ Date _____ Period _____

Label the diagram below to summarize the two stages of photosynthesis.



h, Inc., publishing as Benjamin Cummings.

Differentiate Aerobic and Anaerobic respiration. (Any six differences)

T- Chart

Draw a labeled diagram. Color it.

Mitochondria

CHLOROPLAST

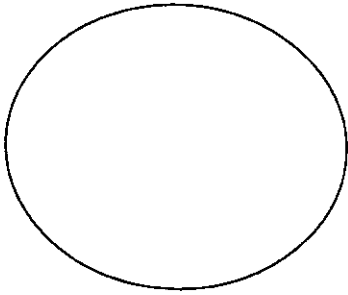
Mitosis Verses Meiosis

Directions: Write answers next to the question. Draw pictures on the back of this page, in order.

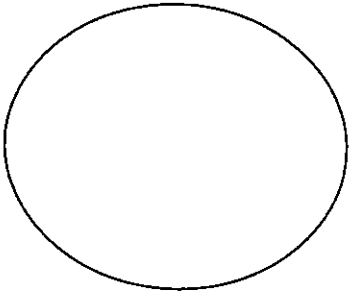
1. Describe the purpose of mitosis _____
2. How many times does the cell divide during mitosis? _____
3. What kind of cells are produced at the end of mitosis? _____
4. What are sister chromatids? _____
5. Briefly describe what happens during prophase _____
6. Draw and label picture of what a cell looks like during prophase. Draw on the back of page.
7. Briefly describe what happens during metaphase _____
8. Draw and label a picture of what a cell looks like during metaphase. Draw on the back of page.
9. Briefly describe what happens during anaphase _____
10. Draw and label a picture of what a cell looks like during anaphase. Draw on the back of page.
11. Briefly describe what happens during telophase _____
12. Draw and label a picture of what a cell looks like during telophase. Draw on the back of page.
13. Is cytokinesis part of mitosis _____
14. Briefly describe what happens during cytokinesis _____
15. Draw a picture of what a cell looks like during cytokinesis. Draw on the back of page.
16. Describe the purpose of meiosis _____
17. How many times does the cell divide during Meiosis? _____
18. What kind of cells are produced at the end of meiosis? _____
19. Briefly describe the difference of prophase I & II. _____
20. Draw and label a picture of prophase I & II. Draw on the back of page.
21. Briefly describe the difference of metaphase I & II. _____
22. Draw and label a picture of metaphase I & II. Draw on the back of page.
23. Briefly describe the difference of anaphase I & II. _____
24. Draw and label a picture of anaphase I & II. Draw on the back of page.
25. Briefly describe the difference of telophase I & II. _____
26. Draw and label a picture of telophase I & II. Draw on the back of page.
27. What would happen to cell division if a chemical was put in the cell that did not allow for cell division to occur?

Mitosis

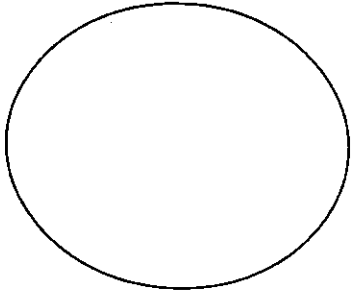
Prophase



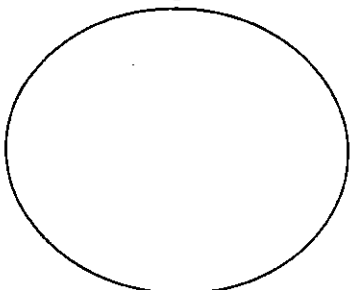
Metaphase



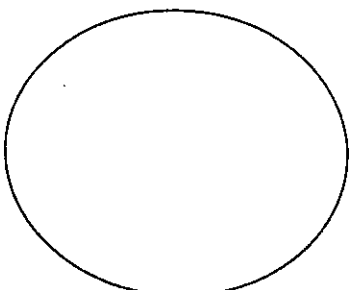
Anaphase



Telophase

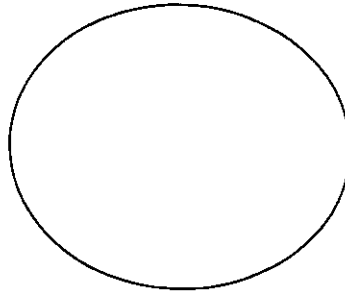


Cytokinesis

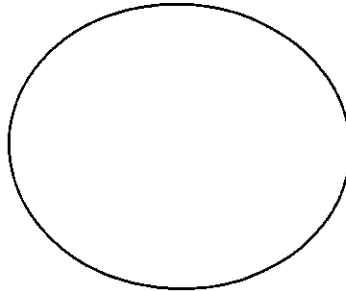


Meiosis I

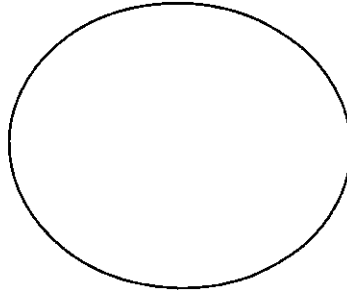
Prophase I



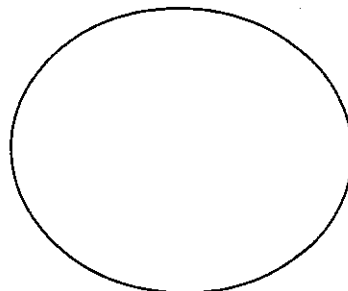
Metaphase I



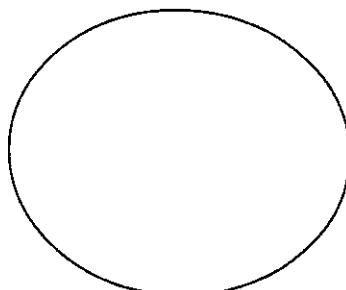
Anaphase I



Telophase I

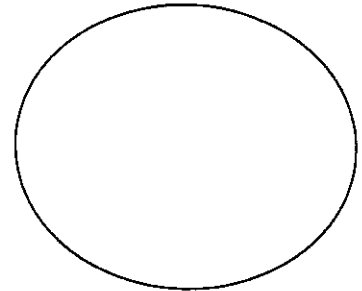


Cytokinesis

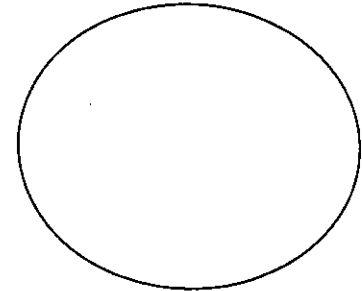


Meiosis II

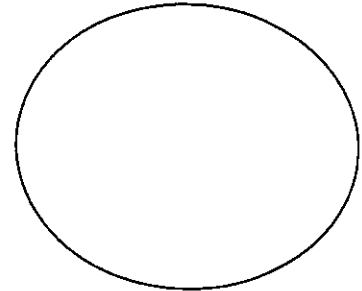
Prophase II



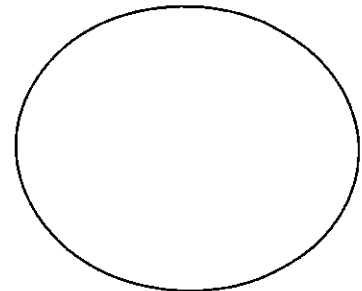
Metaphase II



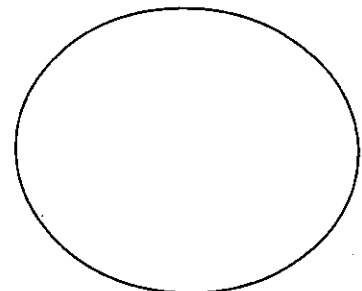
Anaphase II



Telophase II



Cytokinesis



Name _____ Date _____ Period _____

Genetics Vocabulary Worksheet Chapter 5

Section 1		
Word	Definition	Picture
Phenotype		
Genotype		
Homozygous		
Heterozygous		
Heredity		
Trait		

Name _____ Date _____ Period _____

Genetics Vocabulary Worksheet Chapter 5

Section 1		
Word	Definition	Picture
Genetics		
Gene		
Alleles		
Dominant Allele		
Recessive Allele		
Hybrid		

Name _____ Date _____ Period _____

Genetics Vocabulary Worksheet Chapter 5

Sections 2, 3, and 4		
Word	Definition	Picture
Probability		
Punnett Square		
Codominance		
Sexual Reproduction		
Diploid		

Name _____ Date _____ Period _____

Genetics Vocabulary Worksheet Chapter 5

Sections 2, 3, and 4		
Word	Definition	Picture
Meiosis		
Messenger RNA		
Transfer RNA		
Mutation		

Punnett square worksheet

Complete the following monohybrid crosses: draw a Punnett square, list the ratio and describe the offspring. Be sure to remember that the **capital letter is dominant**.

Example)

A green pea plant (GG) is being crossed with a green pea plant (Gg).

	G	G
G	GG	GG
g	Gg	Gg

GenoType= 2 GG: 2 Gg ; 0 gg

Phenotype= 4 Green pea plants: 0 other color

- 1) A green pea plant (Gg) is crossed with a yellow pea plant (gg).

- 2) A tall plant (TT) is crossed with a tall plant (Tt).

- 3) A tall plant (Tt) is crossed with a short plant (tt).

- 4) A red flower (Rr) is crossed with a white flower (rr).

- 5) A white flower (rr) is crossed with a white flower (rr).

- 6) A black chicken (BB) is crossed with a black chicken (BB).

Punnett square problems continued

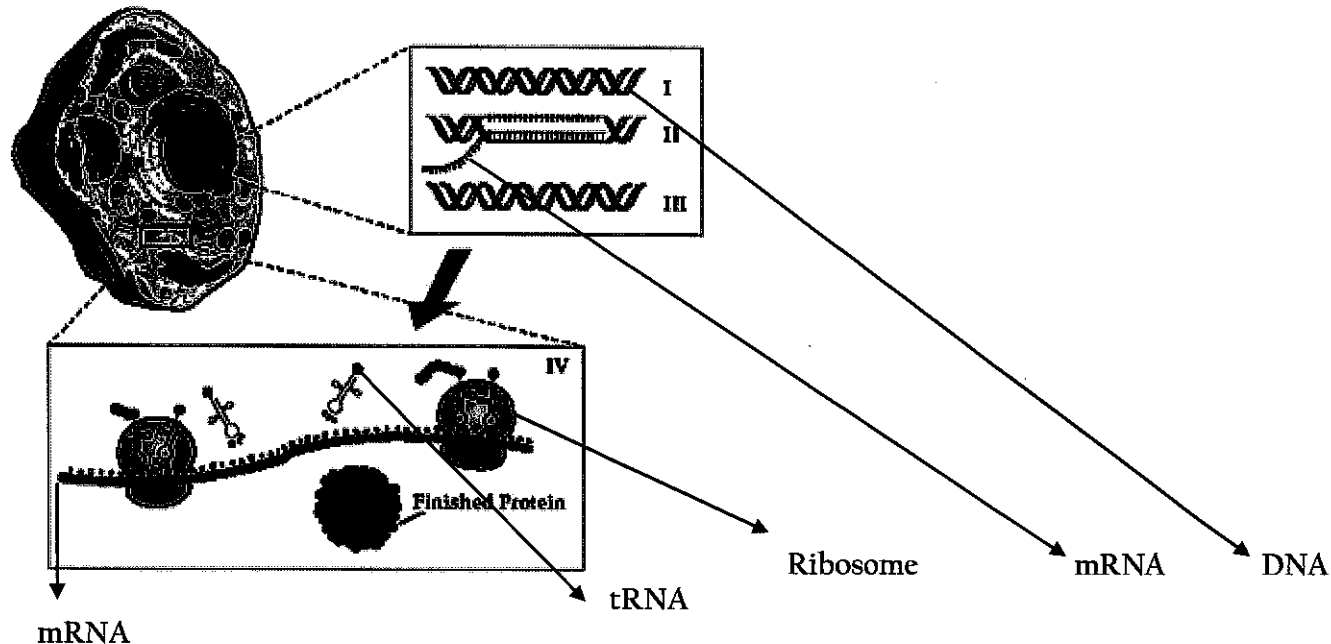
Complete the following problems. List the parent genotypes, draw and fill in a Punnett square, and then list the offspring genotypes and phenotypes.

1. A homozygous dominant brown mouse is crossed with a heterozygous brown mouse (tan is the recessive color).
2. Two heterozygous white (brown fur is recessive) rabbits are crossed.
3. Two heterozygous red flowers (white flowers are recessive) are crossed.
4. A homozygous tall plant is crossed with a heterozygous tall plant (short is the recessive size).
5. A heterozygous white rabbit is crossed with a homozygous black rabbit.

PROTEIN SYNTHESIS WORKSHEET

PART A. Read the following:

Protein synthesis is the process used by the body to make proteins. The first step of protein synthesis is called Transcription. It occurs in the nucleus. During transcription, mRNA transcribes (copies) DNA. DNA is "unzipped" and the mRNA strand copies a strand of DNA. Once it does this, mRNA leaves the nucleus and goes into the cytoplasm. mRNA will then attach itself to a ribosome. The strand of mRNA is then read in order to make protein. They are read 3 bases at a time. These bases are called codons. tRNA is the fetching puppy. It brings the amino acids to the ribosome to help make the protein. The 3 bases on tRNA are called anti-codons. Remember, amino acids are the building blocks for protein. On the mRNA strand, there are start and stop codons. Your body knows where to start and stop making certain proteins. Just like when we read a sentence, we know when to start reading by the capitalized word and when to stop by the period.



PART B. Answer the following questions on your paper:

1. What is the first step of protein synthesis? _____
2. What is the second step of protein synthesis? _____
3. Where does the first step of protein synthesis occur? _____
4. Where does the second step of protein synthesis occur? _____
5. Nitrogen bases are read _____ bases at a time.
6. The bases on the mRNA strand are called _____.
7. The bases on tRNA are called _____.
8. What is the start codon? _____
9. What are the stop codons? (Use your mRNA chart or pg. 298) _____
10. A bunch of amino acids attached together is called a _____.

PART C. Use your codon chart to determine the amino acid sequence. Remember to read through the strand and ONLY start on AUG and STOP when it tells you to stop. Follow example below:

Example:

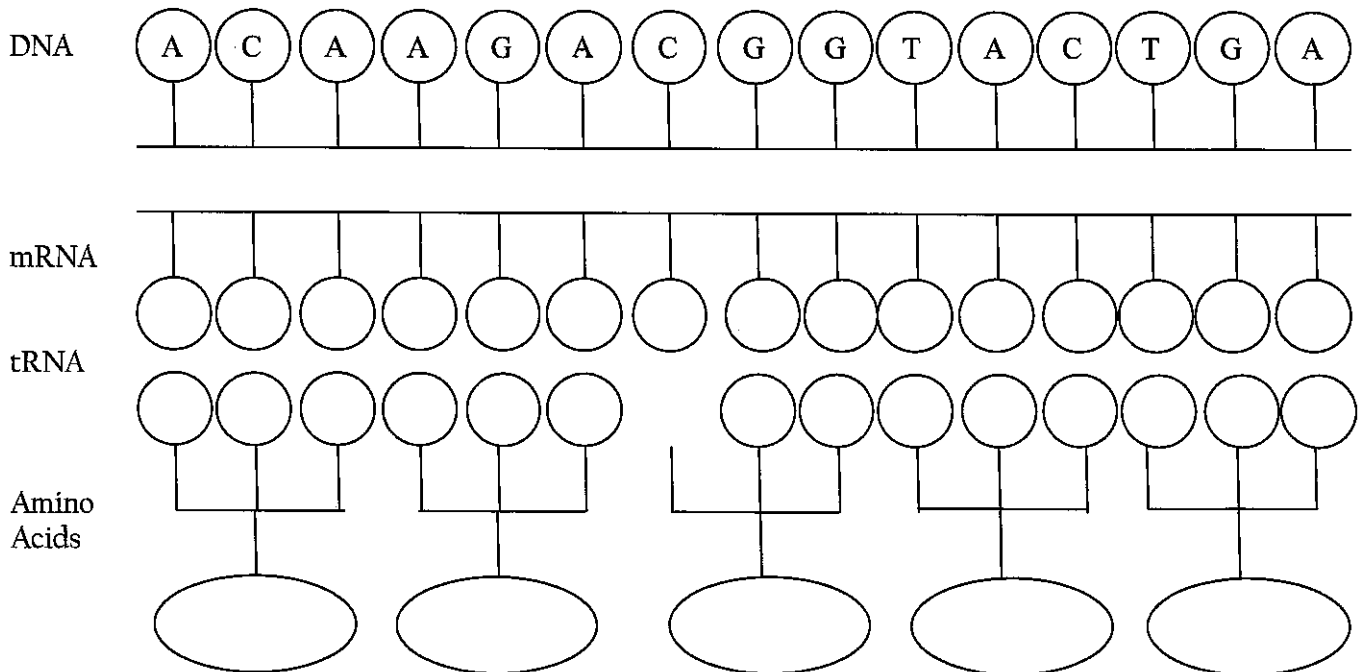
DNA → AGA CGG TAC CTC CGG TGG GTG CTT GTC TGT ATC CTT CTC AGT ATC
mRNA → UCU GCC AUG GAG GCC ACC CAC GAA CAG ACA UAG GAA GAG UCA UAG
protein → start - glu - ala - thre - hist - asp - glu - threo - stop

1. DNA → CCT CTT TAC ACA CGG AGG GTA CGC TAT TCT ATG ATT ACA CGG TTG CGA TCC ATA ATC
mRNA →
protein →
2. DNA → AGA ACA TAA TAC CTC TTA ACA CTC TAA AGA CCA GCA CTC CGA TGA ACT GGA GCA
mRNA →
protein →
3. DNA → TAC CTT GGG GAA TAT ACA CGC TGG CTT CGA TGA ATC CGT ACG GTA CTC GCC ATC
mRNA →
protein →
4. DNA → TAA ACT CGG TAC CTA GCT TAG ATC TAA TTA CCC ATC
mRNA →
protein →
5. DNA → CTA TTA CGA TAC TAG AGC GAA TAG AAA CTT ATC ATC
mRNA →
protein →
6. DNA → TAC CTT AGT TAT CCA TTG ACT CGA ATT GTG CGC TTG CTG ATC
mRNA →
protein →
7. DNA → ACC CGA TAC CTC TCT TAT AGC ATT ACA AAC CTC CGA GCG
mRNA →
protein →
8. DNA → TAC AGA CGG CAA CTC TGG GTG CTT TGT TCT CTT CTC AGT ATC
mRNA →
protein →

Circle the correct choice within the parenthesis for 1 -18.

1. (DNA/RNA) can leave the nucleus.
2. mRNA is made during (transcription/translation).
3. mRNA is made in the (cytoplasm/nucleus).
4. DNA is located in the (nucleus/cytoplasm)
5. (Translation/Transcription) converts DNA into mRNA.
6. (mRNA/rRNA) is used to carry the genetic code from DNA to the ribosomes.
7. (tRNA/rRNA) makes up the ribosome. Look in the book for this.
8. (DNA/RNA) uses uracil instead of thymine.
9. (RNA/amino) acids make up a protein.
11. Transcription takes place in the (nucleus/cytoplasm).
12. tRNA is used in (translation/transcription).
13. tRNA uses (anticodons/codons) to match to the mRNA.
14. Proteins are made at the (nucleus/ribosome).
15. (tRNA/mRNA) attaches the amino acids into a chain.
16. tRNA is found in the (nucleus/cytoplasm).
17. (Translation/Transcription) converts mRNA into a protein.
18. Translation takes place in the (cytoplasm/nucleus).

Fill the Diagram In



Thinking Questions

1. Draw a DNA nucleotide & an RNA nucleotide. Label each of the 3 major parts.
3. What is the point of DNA replication? _____
4. When & where does replication occur? _____
5. What is the point of transcription? _____ Where does it occur? _____
6. What are three nucleotides together called on mRNA? (ie: ACA) _____
7. The mRNA codons can be used in a chart to find: _____
8. What molecule contains an anti-codon? _____ During what process is it used? _____
10. Translation takes place in a _____.
11. _____ and _____ make up ribosomes.
12. What is the point of translation?
13. Transcription and translation together is the process of _____.

NATURAL SELECTION AND ARTIFICIAL SELECTION

NAME: DATE: PERIOD:

Difference between natural selection and artificial selection

T- Chart

DRAW ONE EXAMPLE FOR NATURAL SELECTION- Color and label the diagram

DRAW ONE EXAMPLE FOR ARTIFICIAL SELECTION- Color and label the diagram

Show your work at the back of this page.

EVOLUTION Vocabulary Worksheet

Name:

Date:

Period:

Evolution

Natural selection

Charles Darwin

Fitness

Variability

Inheritability

Artificial selection

Adaptation

Structural adaptation

Mimicry

Camouflage

Physiological adaptation

Fossil record

Homologous structures

Analogous structures

Vestigial structures

Embryology

Biochemistry

Genotype

Phenotype

Gene pool

Genetic drift

Founder effect

Bottleneck effect

Allele

Allele frequency

Stabilizing selection

Directional selection

Disruptive selection

CLADOGRAM

NAME: Date: Period:.....

1. What trait separates Lampreys from tuna
on this cladogram? _____

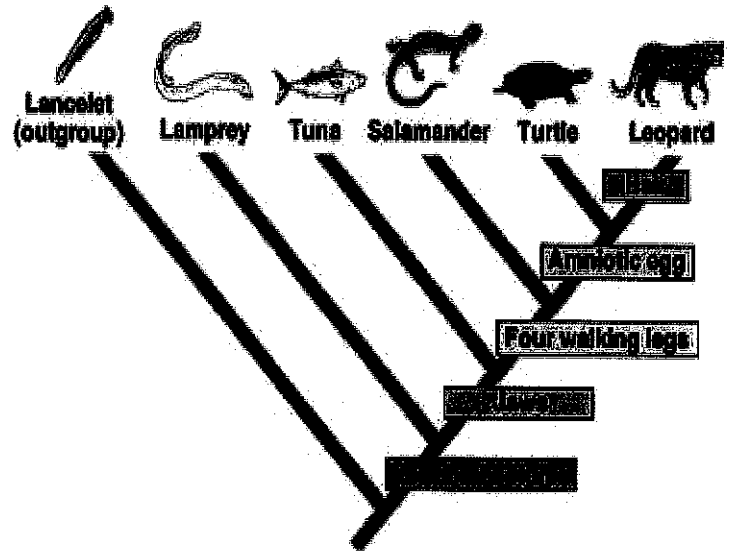
2. What separates a salamander from a
turtle? _____

3. Which organism is most related to the
leopard? _____

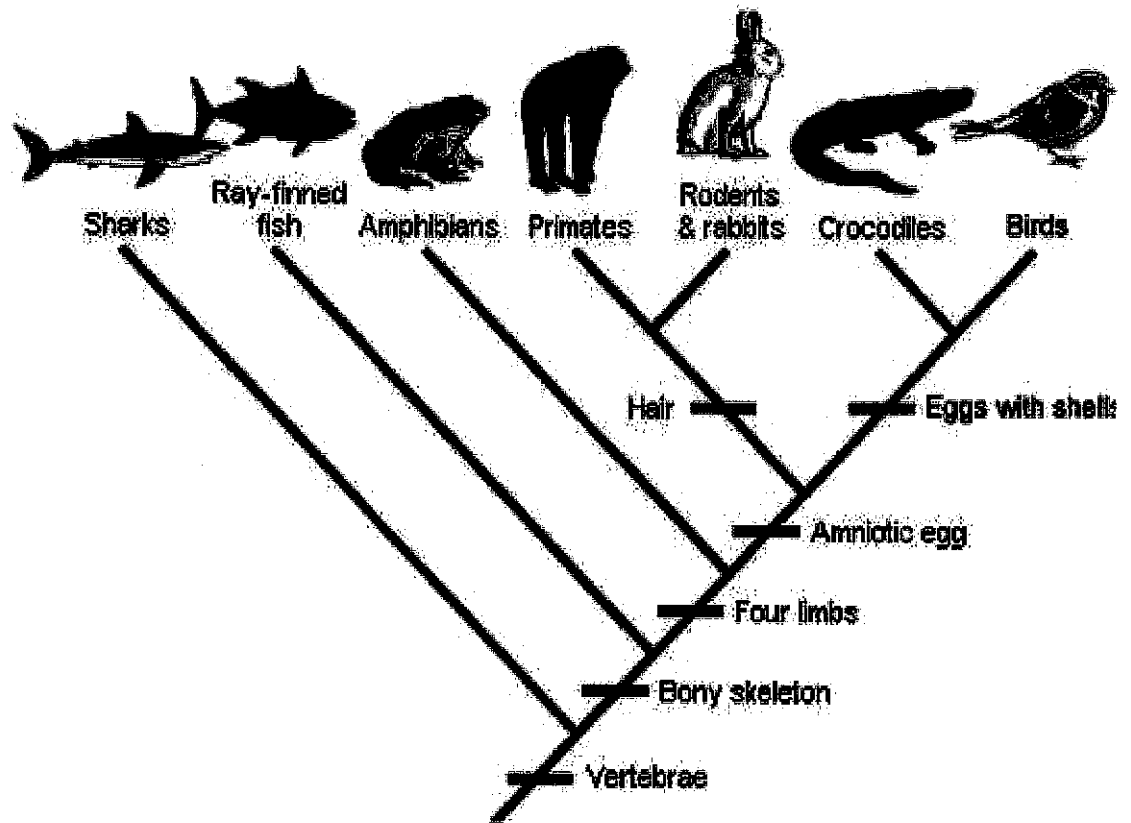
4. What 4 traits do these two organisms
share? _____

5. Which organism will have DNA most similar to the turtle? _____

6. Which organism's DNA will differ the most from the leopard? _____



Directions: Use the cladogram below to answer the questions on the backside of this worksheet



7. What trait separates amphibians from primates on this cladogram?

8. What separates rabbits and primates from crocodiles on this cladogram?

9. Which organism is most related to the bird on this cladogram?

10. What 5 traits do these two organisms share?

11. Which organism will have DNA most similar to the bird?

12. Which organism's DNA will differ the most from the bird?

Read the following situations below and identify the 5 points of Darwin's natural selection.

- 1) There are 2 types of worms: worms that eat at night (nocturnal) and worms that eat during the day (diurnal). The birds eat during the day and seem to be eating ONLY the diurnal worms. The nocturnal worms are in their burrows during this time. Each spring when the worms reproduce, they have about 500 babies but only 100 of these 500 ever become old enough to reproduce.



a. What worm has natural selection selected AGAINST? **Diurnal worm**
 FOR? **Nocturnal worms**

- b. Darwin's 5 points: Identify the 5 points in the scenario above.

Population has variations. **Nocturnal and diurnal worms**

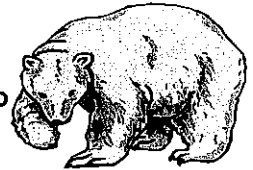
Some variations are favorable. **Nocturnal worms**

More offspring are produced than survive. **100 out of 500 survive**

Those that survive have favorable traits. **nocturnal**

A population will change over time. **nocturnal worms**

- 2) There are 3 types of polar bears: ones with thick coats, ones with thin coats and ones with medium coats. It is fall, soon to be winter. The temperatures are dropping rapidly and the bears must be kept warm, or they will freeze to death. Many of the bears have had ~2 cubs each but due to the extreme temperatures, many mothers only have one cub left.



a. What bear will natural selection select AGAINST? _____ FOR? _____

- b. Darwin's 5 points: Identify the 5 points in the scenario above.

Population has variations. _____

Some variations are favorable. _____

More offspring are produced than survive. _____

Those that survive have favorable traits. _____

A population will change over time. _____

3) In ostriches, there are 2 types: ones that run fast and those that run slowly. The fast birds can reach up to 40 miles an hour. Jackals love to eat ostrich, and they can reach speeds of up to 35-40 miles per hour. A flock of ostrich will lay ~ 10 eggs (each mother only lays 1), but many rodents break into the eggs and eat the fetus before they hatch.



- a. What ostrich will natural selection select AGAINST? _____ FOR? _____
- b. Darwin's 5 points: Identify the 5 points in the scenario above.
 - Population has variations. _____
 - Some variations are favorable. _____
 - More offspring are produced than survive. _____
 - Those that survive have favorable traits. _____
 - A population will change over time. _____

4) There are two types of rabbits: those that strictly eat grass and those that strictly eat berries and flowers. A drought occurs one year, and the plants have difficulty producing any extras (flowers, berries, etc.). They can only try and keep themselves green. The rabbits have had babies all year long but many are eaten by foxes or hawks. Due to the drought, many have starved to death.



- a. What rabbit will natural selection select AGAINST? _____ FOR? _____
- b. Darwin's 5 points: Identify the 5 points in the scenario above.
 - Population has variations. _____
 - Some variations are favorable. _____
 - More offspring are produced than survive. _____
 - Those that survive have favorable traits. _____
 - A population will change over time. _____

5) Bob believes that giraffes have long necks because they have stretched their necks to try and reach food that is high in trees. Since the parent had stretched its neck, it passed the long neck on to its offspring. Ryan believes that giraffes have long necks because the ones with long necks were able to reach the food, and those with short necks could not and died. The long necked giraffes reproduced, and soon all of the giraffes had long necks.



- a. Who thinks like Lamarck? _____
- b. Who thinks like Darwin? _____