

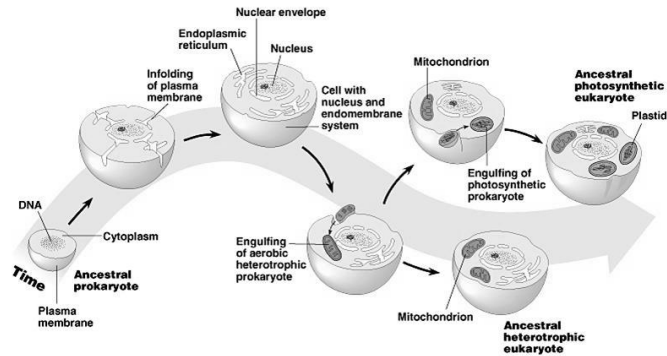
HHS BIOLOGY STAAR EOC REVIEW 2017

Prokaryotic and Eukaryotic Cells

Characteristics:

	Prokaryotic Cell	Both Cells	Eukaryotic Cell
4A	•	•	•
	•	•	•
	•		•

Explain the Endosymbiotic theory developed by Lynn Margulis in 1985.

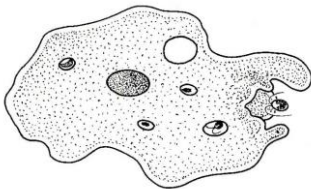


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I need to remember....



- Prokaryotic cells do not have _____
- In Eukaryotic cells, the _____ is surrounded by a membrane. (Just like the ER, Golgi body, Mitochondria, etc)
- Both types of cells have _____ to make proteins.



Sample Question:

Scientists determined that organisms of the genus *Spinoloricus* were eukaryotes and not prokaryotes because *Spinoloricus* cells have —

- A** flagella
- B** hereditary material
- C** cell walls
- D** nuclear membranes

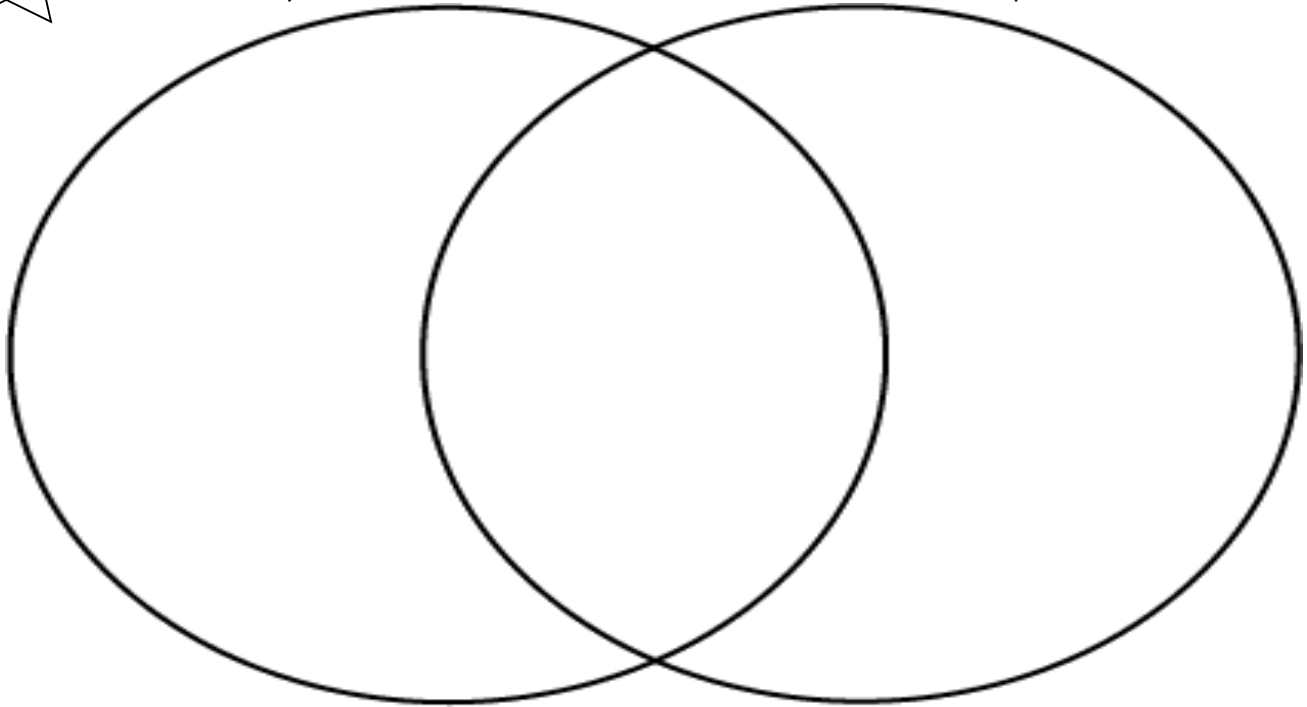
Cellular Processes

Compare and contrast Photosynthesis and Cellular Respiration in the Venn Diagram (include at least 2 facts per section)



Photosynthesis

Cellular Respiration



I need to remember

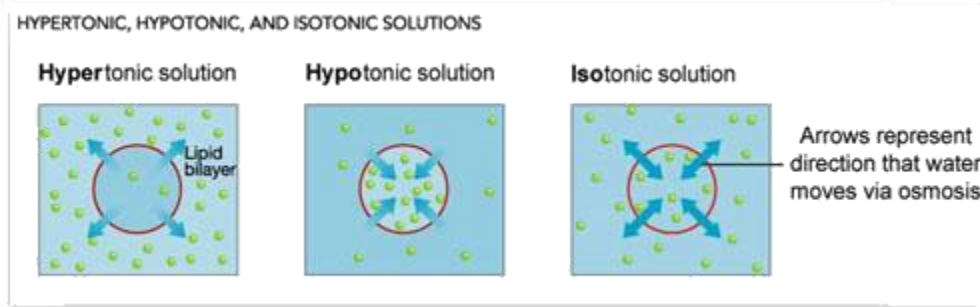
- The reactants and products for photosynthesis and cellular respiration are _____.
- Cellular respiration occurs in _____ and _____ cells.
- Plants use _____ during photosynthesis to convert _____ from the sun in order to make _____ and _____ and to release oxygen.

Sample Question:

Which of the following statements *best* describes the relationship between photosynthesis and respiration?

- a. Respiration is the reversal of the biochemical pathways of photosynthesis, using the exact same enzymes.
- b. Photosynthesis stores energy in complex organic molecules, while respiration releases it.
- c. Photosynthesis occurs only in plants and respiration occurs only in animals.
- d. ATP molecules are produced in photosynthesis and used up in respiration.

Cell Transport and Homeostasis



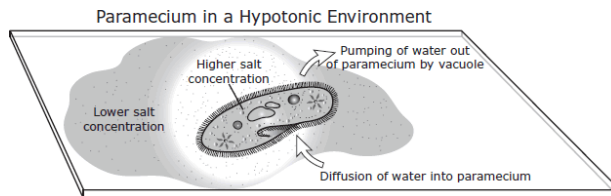
I need to remember ...

- _____ is the movement of water molecules across a _____ membrane.
- _____ transport needs energy because it is going _____ the flow.
- When the number of molecules inside a cell is _____ to the number of molecules on the outside of

Sample Question:

If the paramecium is then placed in a hypotonic environment, which of the following will occur?

- A** Water will diffuse into the paramecium.
- B** Water will diffuse out of the paramecium.
- C** Salt will be pumped out of the paramecium by the vacuole.
- D** Salt will be pumped into the paramecium by the vacuole.

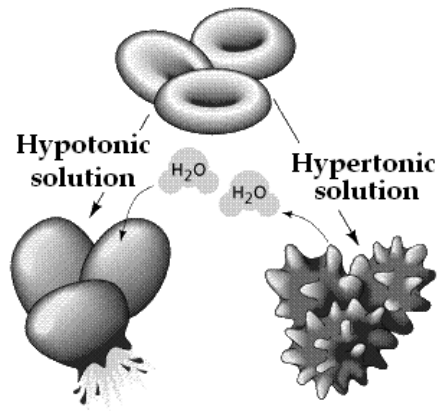


Sample question:

A researcher lyses a cell containing the tobacco mosaic virus (TMV). The cell contents are left in a covered test tube overnight. The next day this mixture is sprayed on tobacco plants, laboratory rat and mushroom. Which of the following would be expected to occur?

- a. All organisms would develop the symptoms of the TMV infection.
- b. The plants and the rat would be infected by the virus.
- c. Only the tobacco plants would develop the typical symptoms of TMV infection.
- d. None of the organisms would show any disease symptoms.





A patient has had a serious accident and lost a lot of blood. In an attempt to replenish body fluids, distilled water, equal to the volume of blood lost, is transferred directly into one of his veins. What will be the most probable result of this transfusion?

- The patient's red blood cells will burst because adding water to the blood makes it hypertonic compared to the red blood cells.
- The patient's red blood cells will shrivel up because adding water to the blood makes it hypotonic compared to the red blood cells.
- The patient's red blood cells will swell because adding water to the blood makes it hypotonic compared to the red blood cells.
- The patient's red blood cells will shrivel up because adding water to the blood makes it hypertonic compared to the red blood cells.

Cell cycle



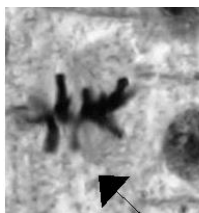
I need to remember ...

- The _____ is a continuous process of cell _____ and _____.
- _____ is the longest phase. Growth results from _____.
- _____ cells can develop during any part of interphase and never stops growing, using all the body's resources.

Sample question:

Imagine looking through a microscope at a squashed onion root tip. The chromosomes of many of the cells are plainly visible. In some cells, replicated chromosomes are aligned along the center (equator) of the cell. These particular cells are in which stage of mitosis?

- Telophase
- Prophase
- Anaphase
- Metaphase



Biomolecules

I need to remember ...



- _____, the smallest carbohydrates, are used as fuel.
- Carbohydrates main function is _____.
- Lipids store _____.
- A Protein's function depends on its sequence of _____.

Sample Question:

Like complex carbohydrates, proteins are biomolecules that serve many functions and can be chemically broken down and restructured. Both proteins and complex carbohydrates are which of the following?

- A** Polymers of smaller subunits **C** Lipids of large molecules
B Sequences of sugars **D** Nucleotides of DNA

Of the four different types of biomolecules, which of them can contain phosphorous in their structure?

- A.** Nucleic acid and lipids **C.** Protein and carbohydrate
B. Nucleic acid and carbohydrate **D.** Lipid and carbohydrate

Components of DNA



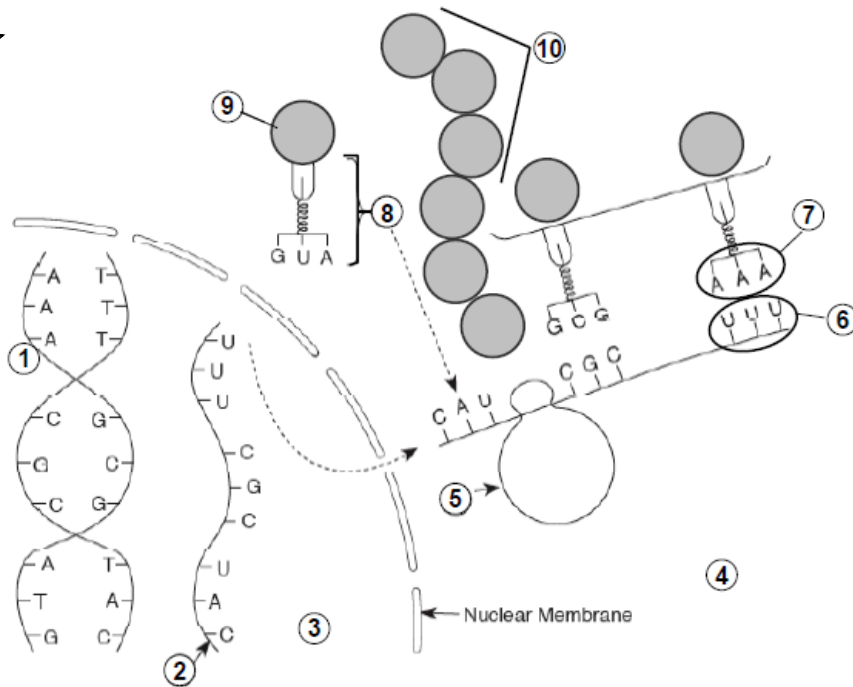
DNA		mRNA
	Strands	
	Nitrogen bases	
	Sugars	
	Location	

I need to remember ...

- DNA contains 4 _____ bases: _____, _____, _____, and _____.
- "A" matches with _____ and "G" matches with _____.
- The amount of A & T are _____ and the amount of G & C are _____.
- _____ hydrogen bonds hold DNA together.
- _____ are changes in DNA that can be inherited.
- Not all _____ are harmful, some are beneficial.



Transcription and Translation



Label all circled numbers!

What process creates molecule 2? _____

Describe what is happening at molecule 5. (Use the names of all numbered molecules involved)

Sample Question:

A mutation is **least** likely to affect a cell when the mutation —



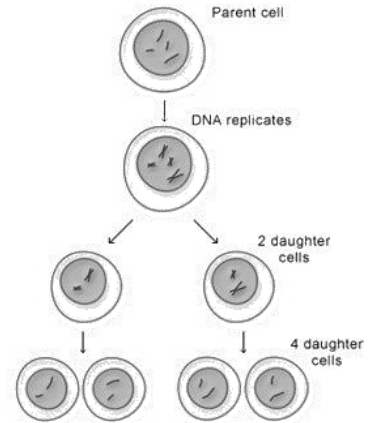
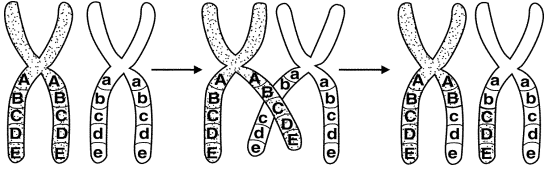
- A reverses the order of bases in a DNA strand
- B allows the total number of bases in a DNA sequence to remain the same
- C replaces a base with its complementary base
- D produces a triplet that codes for the same amino acid as the original triplet

Meiosis

_____ = sex cells

Daughter cells are _____ cells with half the number of chromosomes than the parent cell.

A normal human somatic cell has _____ chromosomes.



This process above is _____ and _____ genetic diversity

I need to remember ...

- Gametes are produced by the process of _____.
- Meiosis results in 4 genetically _____ cells that are _____ (half the amount of chromosomes).

Sample Question:

The segregations and divisions that occurs during meiosis results in a —

- A** decrease in the total number of cells per organism
- B** reduction in the number of chromosomes per cell
- C** single fertilized egg cell
- D** group of genetically identical cells



Genetics

Complete the following statements with the correct vocabulary word.

**Dominant
Homozygous**

**Recessive
Genotype**

**Phenotype
Heterozygous**

**Purebred
True breeding**

Hybrid

- Inheriting two of the same alleles for a trait is called _____, _____, or _____.
- Inheriting two different alleles for a trait is called _____.
- A _____ allele covers up other traits.
- Alleles that are hidden or covered up are called: _____.
- The actual physical expression of a gene is called its _____.
- The actual genes present that are represented by symbols are called its _____.



For each genotype below, indicate whether it is heterozygous (**He**) or homozygous (**Ho**)

AA _____
Cc _____

Ee _____
Gg _____

Bb _____
kk _____

ff _____
nn _____

For each of the **genotypes** below determine what **phenotypes** would be possible.

Brown fur is dominant to black fur.

BB _____
Bb _____
bb _____

For each **phenotype** below, list all of the **possible genotypes** (remember to use the letter of the dominant trait)

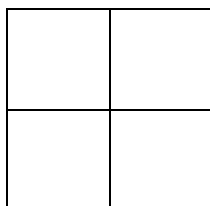
- Straight hair (H) is dominant to curly (h).
- Pointed heads (A) are dominant to round heads (a).

_____ straight _____ pointed
_____ curly _____ round

Sample Questions:

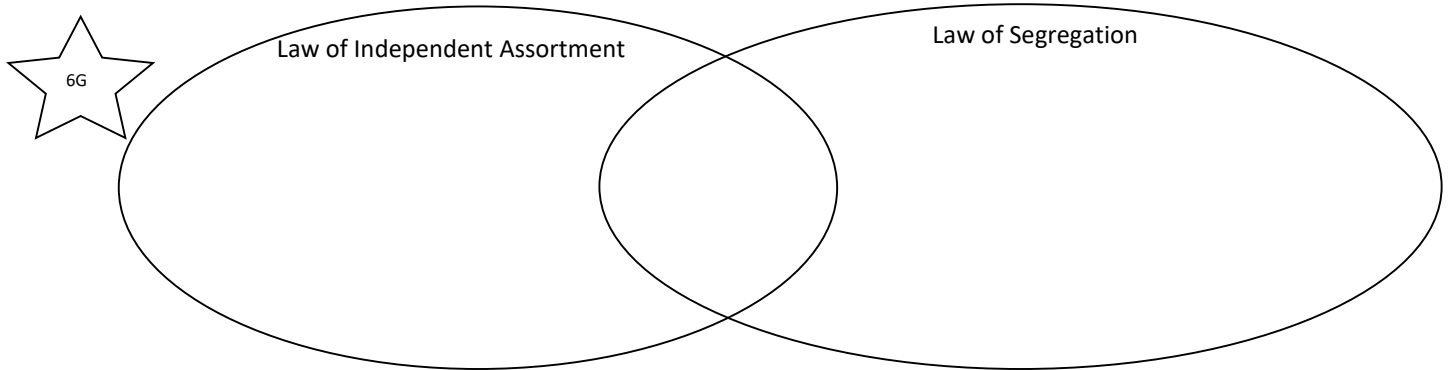
In rats, the allele for a rough coat (R) is dominant over the allele for a smooth coat (r). A **heterozygous** rat and a **homozygous recessive** rat are mated. What is the distribution of genotypes for the offspring?

- 100% Rr
- 50% Rr and 50% rr
- 75% Rr and 25% rr



In pea plants, red flower(R) is dominant over white(r). Cross a true-breeding red flower with a homozygous recessive flower. What is the probability of having a white flower in **F₂ generation**? (Show your work!!!!)

Compare and contrast Mendel's Laws of Heredity.



A dihybrid cross involves the crossing of two traits. Set up this punnett square using the following information:

- Dominant allele for purple corn kernels = R
- Recessive allele for yellow corn kernels = r
- Dominant allele for starchy kernels = T
- Recessive allele for sweet kernels = t




Cross a homozygous dominant parent of both traits with a homozygous recessive parent of both traits. Give the **genotypic** and **phenotypic percentage** and **ratios** of the F₁ offspring.

Key

Genotype

Cross

Phenotype

Non-Mendelian Genetics			
Incomplete Dominance	Codominance	Multiple Alleles	Sex-linked Traits
One trait is not completely dominant over the other (Results: MIXTURE)	Both traits seen equally (Results: SPOTTED)	Different genes control certain trait	Trait found on sex chromosome (23 rd Chromosome in humans)
Ex.  Red+White = PINK	Ex. Red +White = SPOTS	Ex. Blood Types: A blood – _____ B blood – _____ AB blood – _____ O blood – _____	Ex. Color Blindness Sex Chromosome: Female _____ Male _____

Heterozygous individuals have two different alleles. Explain with punnett square examples below how heterozygous individuals have different phenotype expressions when comparing **Complete Dominance(MENDEL)**, **Incomplete Dominance** and **Co-dominance**. (Use the Phenotypes Red and White to go with two genotype alleles of your choice)

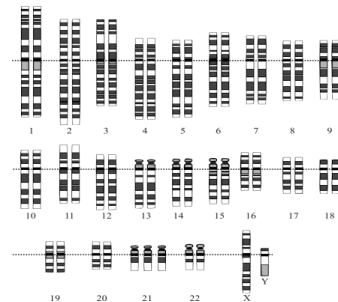
COMPLETE DOMINANCE	INCOMPLETE DOMINANCE	CO-DOMINANCE
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Cross:</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 5px; width: 45%;">Genotype</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Phenotype</div> </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Cross:</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 5px; width: 45%;">Genotype</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Phenotype</div> </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Cross:</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> <div style="border: 1px solid black; width: 45%; height: 100px; margin: 10px;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 5px; width: 45%;">Genotype</div> <div style="border: 1px solid black; padding: 5px; width: 45%;">Phenotype</div> </div>

Sample Questions:

Two parents are screening their unborn child for genetic disorders. The doctors return with the following karyotype. What is the diagnosis of the child?

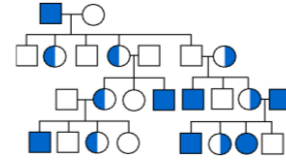


- A. Turner's Syndrome – monosomy X
- B. Cri du chat – shortened 5
- C. Down Syndrome – trisomy 21
- D. Klinefelters – sex linked non-disjunction



The following pedigree shows a genetic disorder in 4 generations of a family. Which disease could apply to this pedigree?

- A) Marfan Syndrome – 1 in every 3 people are affected, everyone is a carrier
- B) Albinism – Only homozygous recessives are affected, males are carriers
- C) Dwarfism – Anyone with a dominant allele is affected, no carriers
- D) Hemophilia – more males are affected, and women are carriers



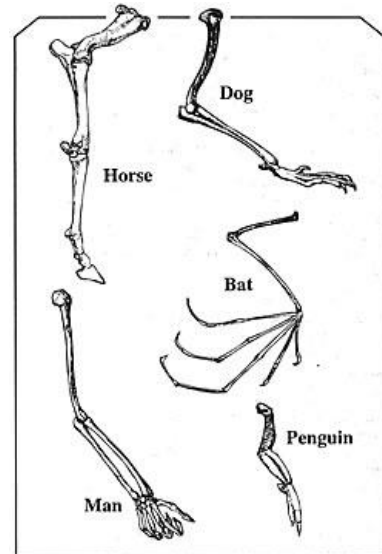
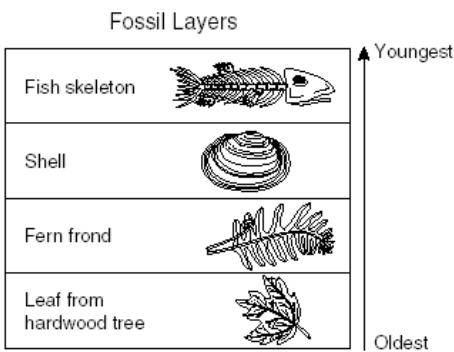
Evolution

I need to remember ...

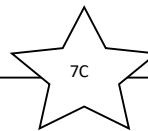
- Mendel used peas plants to study the _____ of traits.
- _____, purebred, and true-breeding all have the same _____ for a trait.
- Mendel’s principles of genetics apply to all _____



_____ Structures – same structure, different function.
Suggests that organisms have a _____.



Fossil Record is evidence of _____.



I need to remember ...

- Survival of the _____ refers to an organism’s ability get food successfully and to reproduce and pass on its traits. _____ refers to competition, fitness, and having the best adaptations to survive and pass on to offspring.

Sample Question:

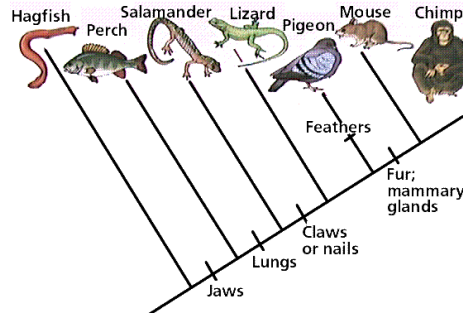
When we say that an individual organism has a greater biological fitness than another individual, we specifically mean that the organism

- A. lives longer than others of its species.
- B. competes for resources more successfully than others of its species.
- C. mates more frequently than others of its species.
- D. leaves more viable offspring than others of its species.



Taxonomy and Classification Levels

D
K
P
C
O
F
G
S



Cladogram

The lizard, pigeon, mouse, and chimp all have what traits in common?

Cladograms show _____ not dates.

Six Kingdoms

Fill in the blanks with the correct kingdom.

- _____ – extremophiles (live in extreme locations)
- _____ – bacteria that live in the same habits as humans
- _____ – eukaryotic organisms that are not plant, animal or fungus
- _____ – eukaryotic organisms, heterotrophic, cell wall made of chitin, DO NOT photosynthesis
- _____ – eukaryotic organisms, autotrophic, cell wall made of cellulose, DO photosynthesis
- _____ – eukaryotic organisms, heterotrophic, no cell walls, almost all are mobile



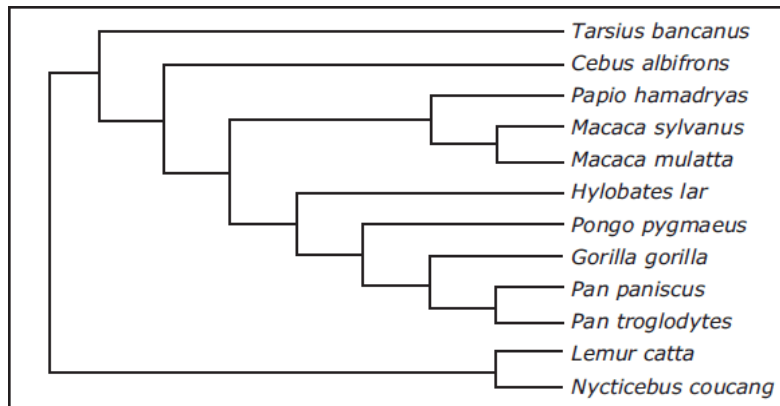
I need to remember ...

- _____ is a two part naming system using the last two levels of classification as the scientific name = _____ & _____. _____ names cause confusion if the names differ by location. Prokaryotic shapes are _____ (round), _____ (rod), & _____ (spiral).

Sample Questions:

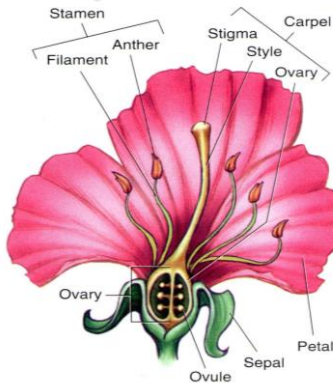
Methanogens, thermophiles, and halophiles are some of the most primitive life-forms found on Earth and thrive in very harsh environments. These unicellular, prokaryotic organisms most likely belong to which of the following kingdoms?

- A Fungi
- B Eubacteria
- C Protista
- D Archaeobacteria



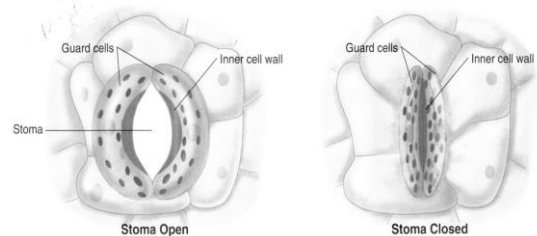
The diagram above shows a model of species divergence among some primates. If this model is correct, the greatest genetic differences would be found in the DNA sequences of which two species?

- A *Tarsius bancanus* and *Cebus albifrons*
- B *Macaca sylvanus* and *Macaca mulatta*
- C *Hylobates lar* and *Pongo pygmaeus*
- D *Pan troglodytes* and *Lemur catta*



Plants

The ovary in flowers will turn into _____. Stamen contains _____ reproductive tissues. Pistil (carpel) contains _____ reproductive tissues.



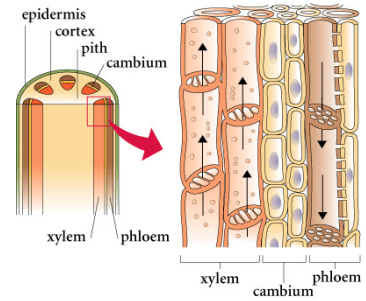
Stoma controls the amount of water lost through _____.



2 Types of Vascular Tissue:

_____ carries water and minerals up from roots.

_____ carries sugars down to the stems and roots.



I need to remember ...

- Plants get energy through _____.
- The _____ controls water loss.



Sample Question:

Cells

List the seven characteristics that all living things have in common.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____



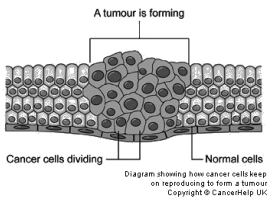
Four structures that all cells have in common:

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



What are the 3 parts to the Cell Theory

1. _____
2. _____
3. _____



What disorder results when human body cells lose the ability to respond to internal regulatory signals that control cell growth? _____

During which phase of the cell cycle is damaged DNA repaired? _____

The Human Body



Body System	Function
Integumentary	
Muscular	
Skeletal	
Circulatory	
Respiratory	
Digestive	
Excretory	
Nervous	
Endocrine	
Reproductive	
Lymphatic (Immune)	

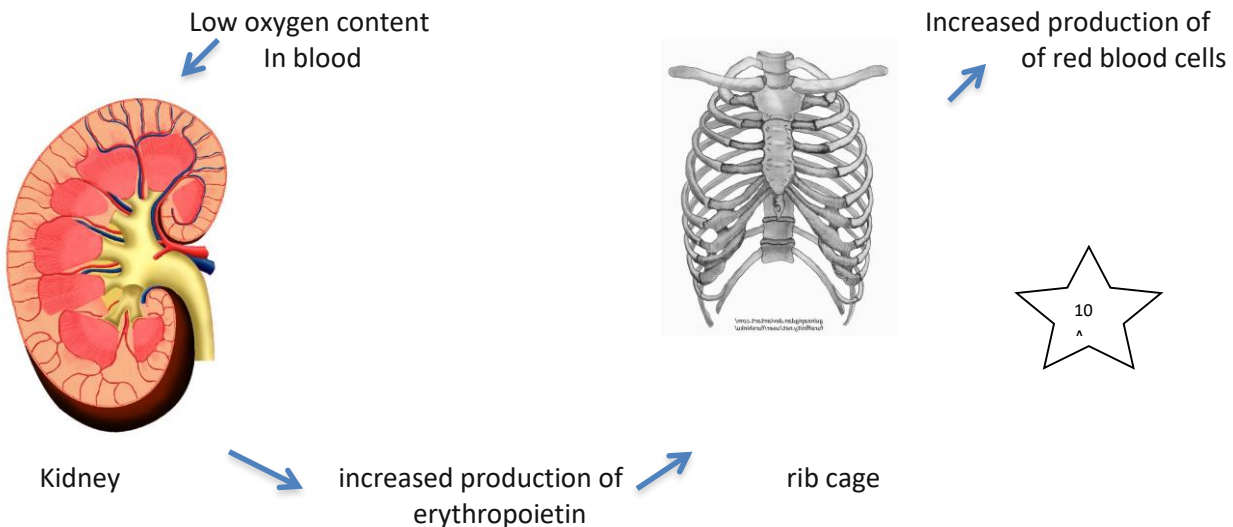


I need to remember ...

- How do the **circulatory** and **lymphatic** systems work together to fight infection?
- How does the **integumentary system** help maintain homeostasis?
- How do **nervous** and **endocrine** systems work together to regulate homeostasis?
- How do **digestive, excretory, and circulatory** systems work together to transport nutrients and get rid of metabolic waste?
- How do **circulatory** and **respiratory** systems work together in gas exchange?

Sample Questions:

The diagram shows part of one of the many feedback loops required to maintain homeostasis in the human body.



This diagram suggests that which of the following could cause a low red-blood-cell count?

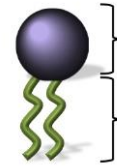
- A The growth of new bone tissue
- B Chronic kidney disease
- C Decreased levels of metabolic waste
- D An increased breathing rate

Cell Transport

- Function of cell membrane –
- What does semi-permeable or selectively permeable mean?



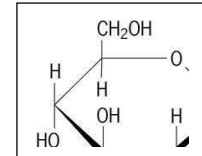
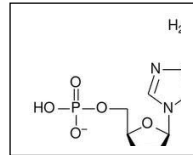
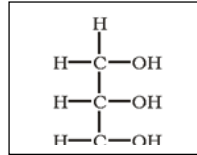
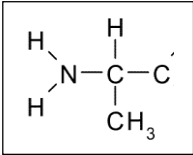
Label this



- What molecule makes up the semi-permeable/selectively permeable membrane?

Biomolecules:

Identify the following structures: **carbohydrates, lipids, proteins, and nucleic acids.**



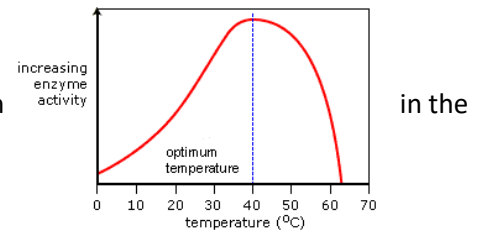
Describe how the order of monomers (subunits) might affect the function of the biomolecules.

Identify and investigate the role of enzymes.



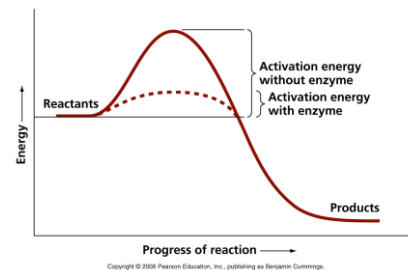
1. What are enzymes? _____
2. What is their function? _____
3. What type of macromolecule are enzymes? _____
4. List some examples.

5. Describe the effect of temperature and/or pH on enzyme activity as seen in the graph to the right.



6. What is biological catalyst?

7. What does a catalyst do? (explain the graph to the right)





The Earth is approximately 4.5 billions years old. Life did not evolve for another billion years. What is the age of the oldest fossilized life that we have found?

Which kingdom is the most recent ancestors of Fungi, Plants and Animals?

What is the difference between the Theories of Evolution proposed by Charles Darwin and Jean Baptiste LaMarck?

Charles Darwin –

_____ - nature puts stress/pressure on animals (called limiting factors), if they have the right adaptations they survive and reproduce

Jean Baptist LaMarck –

** Individual organisms DO NOT ADAPT to their environment. They have the adaptations from birth due to mutations in genetics.

_____ – the change in a species (not an individual) over time due to natural selection. Descent with Modification

Viable – _____

_____ – study of the INTERACTIONS of animals with each other and with their environment
Put these in order from largest level of organization to the smallest level of organization:

Biological systems are composed of multiple levels.



Put these 12 levels in order from largest to smallest

Ecosystem, Tissues, Communities, Organ systems, Organelles, Biome, Molecules, Elements/Atoms, Cells, Biosphere, Organism/species (a single member of species), Organs, Population (group of one species)

[Largest] _____, _____, _____,
_____, _____, _____, _____,
_____, _____, _____, _____,
_____, _____, [Smallest]

How is a **Habitat** different than a **Niche**? (explain and give an example)





Relationships: Symbiosis – association between two different species.

Mutualism – Both organisms _____ (bee and flower)

Commensalism – One organism _____ and the other organism is neither harmed nor helped. (moss & trees)

Parasitism – One organism _____ and the other is _____. (fleas & dogs)

Sample question:

A lichen is composed of two organisms, a fungus and a cyanobacterium. The fungus provides a growing surface, moisture, and nutrients to the cyanobacterium. The cyanobacterium provides food to the fungus. This relationship is considered to be an example of which of the following?

- A. Commensalism
- B. Mutualism
- C. Neutralism
- D. Parasitism



Draw a food web that has at least 3 food chains in it and shows the following trophic level organisms: 3 producers, 3 herbivores, 2 carnivore only, 2 omnivores, and 1 decomposer connected to every other organism

Trophic level – _____ (producer, herbivore, etc)

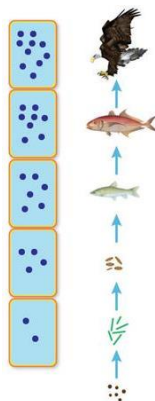
Food webs show _____ energy paths in an ecosystem

Food chains show _____ energy path

**** Food webs are made up of many food chains

Why are **Decomposers** so important for the environment?

What is this diagram showing to the right?





Water cycle:

What is the difference between evaporation and Transpiration?

Carbon cycle:

What are the TWO most important processes that make up the Carbon Cycle? _____ and _____

Nitrogen cycle:

Why is Nitrogen Fixation so important for life on this planet?

An asteroid has hit the state of Texas and **completely destroyed all life** in a 100 mile radius around Austin. **Explain** which type of succession will take place:



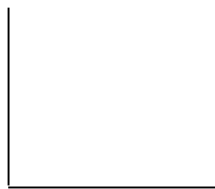
What is a **Limiting Factor**?

How are limiting factors associated with Natural Selection and Evolution?

Carrying Capacity – _____

Which type of graph does not have a carrying capacity? (Exponential or Logistic)

Draw a picture of this type of graph:



What is an **Invasive Species**?

Why are invasive species so bad for an ecosystem?

Succession



(Define) The two types of succession are...

1) Primary - _____

2) Secondary - _____

Ecological disasters (and succession)

Label the ecological event as primary (P) or secondary (S) succession:

- A) A volcano erupts and blows away the top 500 meters of the surface _____
- B) A forest fire burns for 3 days _____
- C) A hurricane kills all the plants along the Texas coast _____
- D) A volcanic island rises above the ocean surface _____
- E) A strip mining quarry is left unused _____
- F) A landslide destroys everything in its path _____

When an ecological disaster takes place, do all of the organisms affected respond the same way? Explain your answer...



Food Pyramids

What is the relationship between the numbers of producers and Consumers?

How does this relate to the energy flow through the ecosystem?

Explain why there are fewer organisms at the top of the food pyramid than at the bottom.

