

4/28
&
4/30

Biology OST

INCENTIVES

Over break, complete this packet to help you prepare for the Biology OST. By being prepared, you can earn the following incentives:

reward

Trip to Skyzone

Pizza for
your class

Donuts for
your class

Mints during
OST

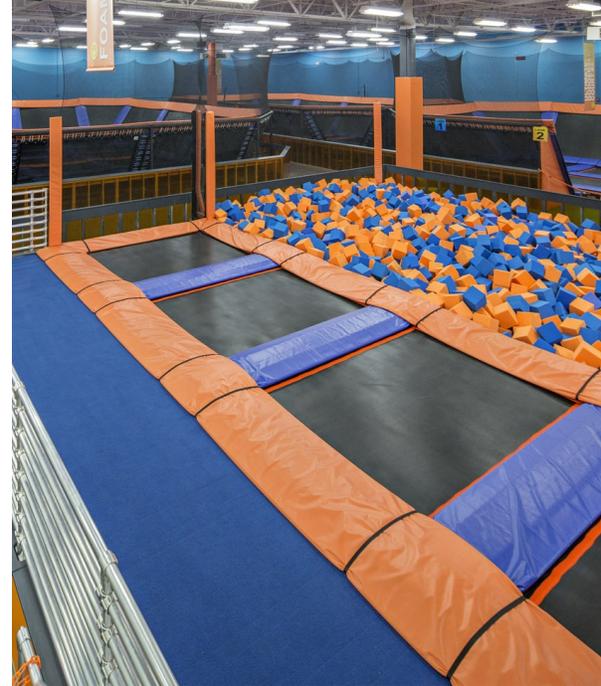
how to earn it

Score a 2 or higher
on the OST

Everyone completes
this packet

Everyone creates 15
flashcards for cell
organelles

Arrive on time for the
OST (8:35am)



Practice: Evolution Vocabulary

Match the following terms in the box with the appropriate definition.

A. Evolution	F. Genetic equilibrium	K. Punctuated equilibrium	P. Speciation	U. Anatomy
B. Natural selection	G. Adaptation	L. Convergent evolution	Q. Vestigial structures	V. Biochemistry
C. Gene pool	H. Descent with Mod.	M. Divergent evolution	R. Analogous structures	W. Paleontology
D. Gene flow	I. Coevolution	N. Mass extinction	S. Homologous struct.	X. Embryology
E. Sexual selection	J. Gradualism	O. Gradual extinction	T. Biogeography	Y. Fossil

1. ____ The wings of flightless birds, like the ostrich, are an example of this
2. ____ Study of nucleic acids and proteins to show evolutionary relationships
3. ____ Migration
4. ____ A physical trait that increases an organism's ability to survive in its environment
5. ____ Sudden elimination of a species due to a catastrophic event
6. ____ Rapid evolutionary change
7. ____ Biological change over time that causes descendants to be different from their ancestors
8. ____ Principle of natural selection that explains how beneficial traits should become more common over time, causing a change in allelic frequencies
9. ____ Body structures that are similar in orientation, but completely different in function due to organisms living in different environments
10. ____ Study of embryological development in vertebrates that has led to support the theory of common ancestry among vertebrates
11. ____ When two organisms, such as predator and prey, evolve in response to one another
12. ____ When traits that favor reproduction, even though they may decrease an organism's ability to survive, become more common over time
13. ____ When allelic frequencies are stable and unchanging, therefore evolution is not occurring
14. ____ When isolation, such as geographically, causes two populations of organisms to become so different that they can no longer reproduce with each other and create viable offspring
15. ____ The study of prehistoric life that allows scientists to make connections between current and extinct species
16. ____ Evolution that results in the formation of homologous structures
17. ____ Evolution that results in the formation of analogous structures.
18. ____ All of the genes available in a population
19. ____ Slow change in allele frequencies over long periods of time
20. ____ Organisms with traits that make them better adapted to their environment will live longer and reproduce more than organisms less adapted to the environment
21. ____ Study of body structures to provide evidence of evolution
22. ____ Remnants of organisms such as imprints, bones, and feces
23. ____ Slow elimination of species caused by small environmental changes over extended periods of time
24. ____ Similar body structures, such as fins, due to organisms living in the same environment, not same ancestry
25. ____ Study of the physical distribution of plants and animals

Practice: Population Ecology

Answer the following questions. Show work as needed.

1. The type of population growth that most natural populations follow is _____.
Sketch it on the graph to the right.

2. Add a dotted line to your graph to show the maximum population this environment can theoretically support. This is called the _____.

3. Can the line you drew in #2 change? Explain your thoughts.

4. The human population is increasing without limit. This is the same as _____ growth pattern. Sketch it on the graph to the right.

5. Factors that cause a population to not grow exponentially are said to be _____. These can be biotic (meaning _____) or abiotic (meaning _____.) Give examples of each below.

6. The amount of organisms in a given space is called the _____. Ecologists are more concerned with knowing about this than just population size because some limiting factors (usually the biotic ones) are _____ and others (usually the abiotic ones) are _____.

7. Consider a meadow that is 10 miles by 10 miles. It has 100 deer in it. A different meadow is 5 miles by 2 miles and has 50 deer in it. Which population is more at risk for predation by hunters during deer season? Explain.

8. Consider the same populations of deer in the meadows in #7. Which population would be more at risk if a forest fire hit and burned their entire food source? Explain. _____

9. Which population, from #7, would disease have the greatest negative impact on? Explain, based on the type of limiting factor that disease is. _____

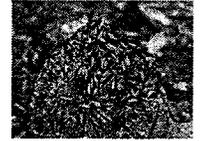
10. Which population, from #7, would a flash flood have the greatest negative impact on? Explain, based on the type of limiting factor that flash flooding is. _____

Define: mutualism, parasitism, commensalism, interspecific competition and intraspecific competition

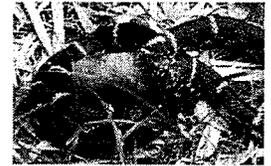
Practice: Interactions of Organisms

Read each scenario below and identify the type of relationship(s) being described. If it is symbiotic, specifically label if it is mutualism, parasitism, or commensalism. If it is competitive, include if it is interspecific or intraspecific. Some may have more than one.

1. Termites feed on dead plant material and cellulose, both of which they find in wood. Termites are able to eat and digest wood because of the bacteria and protists that make their home in the termites' intestines.



2. Moles create burrows underground – much to the frustration of many homeowners. Fortunately for the homeowners, rat snakes can inhabit their yards and eat the moles as a food source.



3. Many types of mushrooms are no harm at all to plants, but some types actually grow on trees and suck the nutrients out of the tree slowly, until it dies.



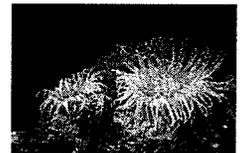
4. Mites often have the reputation of being harmful pests. However, mites and the carrion beetle have a different relationship. The carrion beetle transports the mites to different food sources, while the mites eat the maggots of flies that fight with beetle larvae for food.



5. If you look carefully at this picture of livestock, you will see small white birds interspersed around them. These birds are known as cattle egret. They do nothing to the cattle, but like to be near them because as the cattle move through the grasses and eat, they rustle up insects that the cattle egret can then easily eat.



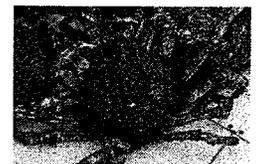
6. Sea anemones do not actively seek out their food. They are considered “opportunistic” feeders because they simply take advantage and eat whatever passes by them that they can reach with their tentacles. Because of this, they do not like to inhabit the same areas as other sea anemones, and will often fight for space.



7. Bees and flowers have coevolved due to their benefits for one another. Bees assist flowers in pollination, while the flowers provide food for the bees.



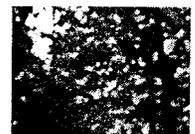
8. Spider crabs have poor eyesight and are known as “lethargic scavengers.” They lazily move through more shallow parts of the ocean searching for food. Because of this, they are very exposed to their predators. Algae grow on the backs of spider crabs, which gives them some camouflage, and the algae has a home.



9. Cheetahs and lions live in the same regions and eat the same food sources, such as gazelles and small wildebeests. Because of this, when food is limited, they often have to fight to survive.



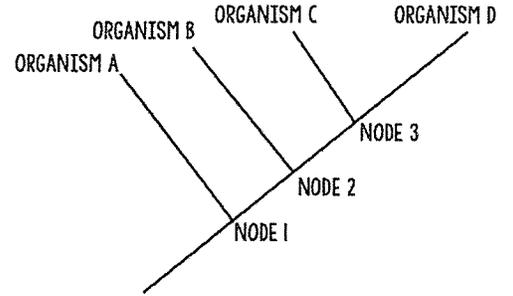
10. Spiders use tree limbs to support their webs, which don't affect the tree.



Practice: Phylogenetic Trees #1

Answer the questions about each tree below.

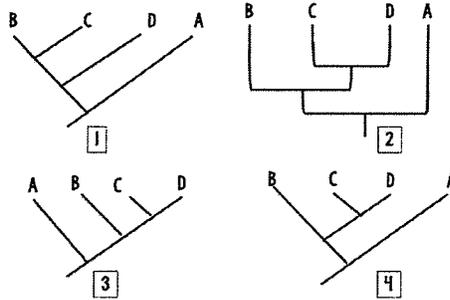
1. In the diagram to the right, which node represents the most recent common ancestor for organism B and C?



2. Which node represents the most recent common ancestor for A and C?

3. Which organism is B more closely related to, A or C? Explain.

4. Which organism is B more closely related to, C or D? Explain.

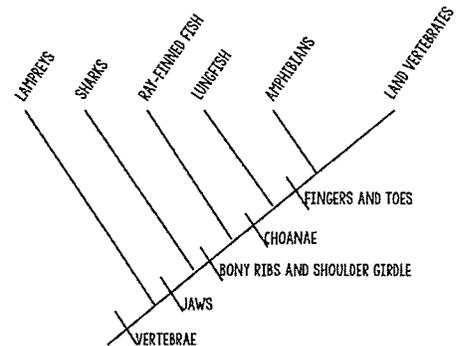


5. Which tree above shows a different evolutionary history from the others? Explain the difference.

6. What characteristic do all of the organisms in the tree to the right have in common?

7. What characteristic is common to only amphibians and land vertebrates?

8. What characteristic(s) do sharks and lungfish have in common?



9. Who is the ray-finned fish more closely related to – sharks or lungfish? Explain.

10. Are lungfish more closely related to amphibians or land vertebrates? Explain.

Practice: Phylogenetic Trees #2

Answer the questions about each tree below.

1. Is green alga more closely related to red alga or moss? Explain.

2. Is green alga more closely related to red algae or amoeba? Explain.

3. What does the “stem” of the tree represent? _____

4. What characteristic do all organisms on the tree to the right have in common?

5. What trait do primates, rodents, and rabbits share that no other organism does?

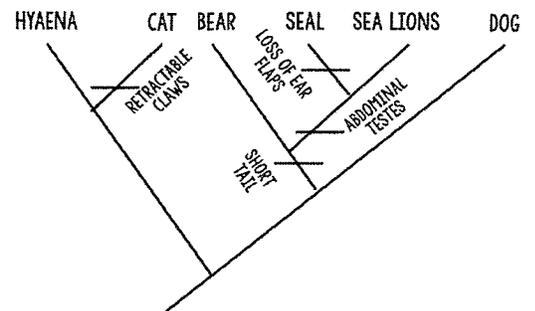
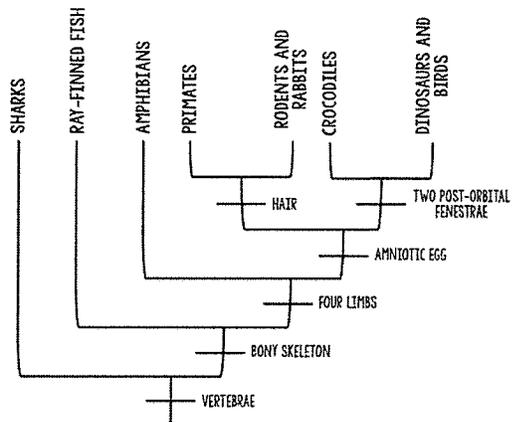
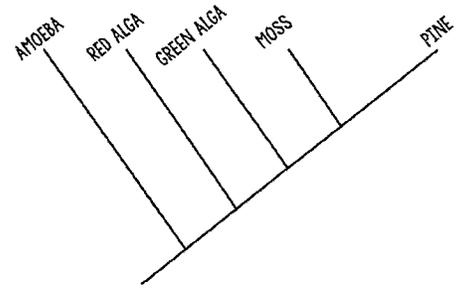
6. What characteristics do ray-finned fish and amphibians have in common?

7. Who are crocodiles most closely related to? _____

8. Are amphibians more closely related to sharks or primates? Explain how you know. _____

9. In the diagram to the right, which organism is the bear most closely related to? Explain how you know.

10. Based on the assumed traits of the common ancestor, list the traits that sea lions would have.



ASSUME THE COMMON ANCESTOR IN THIS TREE HAD A LONG TAIL, EAR FLAPS, EXTERNAL TESTES, AND FIXED CLAWS

Practice: Punnett Squares

Label the following genotypes as heterozygous or homozygous. You can use abbreviations.

1. AA _____ 2. Bb _____ 3. Cc _____ 4. dd _____ 5. ee _____

Based on the following genotypes, determine the phenotype.

6. Green pea pods are dominant to yellow.

GG = _____ Gg = _____ gg = _____

7. Round pea pods are dominant to wrinkled.

RR = _____ Rr = _____ rr = _____

8. Purple pea flowers are dominant to white.

PP = _____ Pp = _____ pp = _____

Based on the following phenotypes, determine all possible genotypes.

9. Tongue rolling is dominant to not being able to tongue roll in humans.

Can roll = _____ Can't roll = _____

10. Mid-finger hair is dominant to no mid-finger hair in humans.

Finger hair = _____ No finger hair = _____

Answer the questions below. You will need to complete Punnett Squares for each question to support your answers.

11. A heterozygous round pea plant is crossed with a homozygous round pea plant. (Remember round is dominant to wrinkled.) What percentage of the offspring will be homozygous round?
12. A white flowered pea plant is crossed with a heterozygous purple pea plant. (Remember purple is dominant to white.) What percentage of the offspring will have white flowers?
13. A green pea pod plant, that had a yellow pea pod parent, is crossed with a yellow pea pod plant. (Remember green is dominant to yellow.) What percentage of the offspring will have green pea pods?

14. A man who is homozygous for tongue rolling is crossed with a woman who is heterozygous for tongue rolling. (Remember tongue rolling is dominant to not tongue rolling.) Although both of them can roll their tongues, what is the percent chance that they have a child who can't?
15. In guinea pigs, short hair is dominant to long hair. Cross two heterozygous guinea pigs. Determine the phenotypic and genotypic ratios. Then determine how many guinea pigs, if 16 are born, will have long hair.
16. A woman who has no finger hair wants to marry and have children with a man who does have mid-finger hair. They do not know his genotype though. (Remember finger hair is dominant to no finger hair.) Determine the likelihood that they have a child with no finger hair like their mom. Include all possible options.
17. In chimpanzees, straight fingers are dominant to bent fingers. If two chimps are crossed and have offspring that are 50% bent fingers and 50% straight fingers, what must have been the genotypes of the parents?
18. In humans, dimples are dominant to no dimples and long eyelashes are dominant to short. A man with no dimples and short eyelashes mates with a woman who is heterozygous for both traits. Determine the phenotypic ratio of their offspring. Also determine what percentage of their offspring will have the same genotype as their mother.

19. In humans, widow peaks are dominant to straight hairlines and freckles are dominant to no freckles. A woman who is homozygous for her widow's peak and heterozygous for freckles marries a man that has a straight hairline and is also heterozygous for freckles. Determine the phenotypic ratio. What is the probability that they have a child who looks like dad?

20. In humans, almond shaped eyes are dominant to round shaped eyes and long eyelashes are dominant to short. A man who has round eyes and homozygous long eyelashes marries a woman who is heterozygous for both traits. Determine the phenotypic ratio. If they have 8 children, how many will have almond shaped eyes with long eyelashes?

Name: _____

Date: _____

Period: _____

Organelle	Description	Function	Animal, Plant or Both
CELL WALL			
CELL MEMBRANE			
CYTOPLASM			
NUCLEUS			
NUCLEAR MEMBRANE			
NUCLEOLUS			
CHROMATIN			
ENDOPLASMIC RETICULUM			
RIBOSOME			
MITOCHONDRIA			
VACUOLE			
CHLOROPLAST			
GOLGI BODY			
LYOSOME			
CENTRIOLE			

Cell Organelles Worksheet

Complete the following table by writing the name of the cell organelle in the right hand column that matches the structure/function in the left hand column.

Structure/Function	Cell Part
Stores material within the cell	
The sites of protein synthesis	
Organelle that manages or controls all the cell functions in a eukaryotic cell	
Contains chlorophyll, a green pigment that traps energy from sunlight and gives plants their green color	
Digests excess or worn-out cell parts, food particles and invading viruses or bacteria	
Surrounds the nucleus and controls what enters and exits the nucleus	
Firm, protective structure that gives the cell its shape in plants, fungi, most bacteria and some protists	
Produces a usable form of energy for the cell	
Packages proteins for transport out of the cell	
Assembles some components of the cell membrane; synthesizes lipids	
Site where ribosomes are made	
Provides support for the cell and controls what goes in and out of the cell	
Consist of hollow tubes which provide support for the cell and tracks for organelles to move on	
Jelly-like fluid inside the cell membrane	
Assembles some components of the cell membrane; modifies proteins; has ribosomes attached to it	
Small organelle that assists with cell division	

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		
Centrioles		
Chloroplast		
Smooth Endoplasmic Reticulum		
Cytoplasm		
Microtubules		
Rough Endoplasmic Reticulum		
Golgi apparatus		

Organelle	Plant Cells	Animal Cells
Lysosome		
Mitochondria		
Nucleolus		
Nucleus		
Nuclear membrane		
Cell membrane		
Central vacuole		
Ribosome		
Vacuole		

- What is the main difference between prokaryotes and eukaryotes?

- Are bacteria PROKARYOTES or EUKARYOTES?
- Are fungi, plants, and animals PROKARYOTES or EUKARYOTES?
- What are two organelles that all cells (prokaryotes AND eukaryotes) have?
- Fill in the blank. The Cell Theory states:
 1. All _____ things are composed of _____.
 2. _____ are the basic unit of structure and _____ in living things.
 3. New cells are created from _____.

Cell City Analogy

In a far away city called Grant City, the main export and production product is the steel widget. Everyone in the town has something to do with steel widget making and the entire town is designed to build and export widgets. The town hall has the instructions for widget making, widgets come in all shapes and sizes and any citizen of Grant can get the instructions and begin making their own widgets. Widgets are generally produced in small shops around the city, these small shops can be built by the carpenter's union (whose headquarters are in town hall).

After the widget is constructed, they are placed on special carts which can deliver the widget anywhere in the city. In order for a widget to be exported, the carts take the widget to the postal office, where the widgets are packaged and labeled for export. Sometimes widgets don't turn out right, and the "rejects" are sent to the scrap yard where they are broken down for parts or destroyed altogether. The town powers the widget shops and carts from a hydraulic dam that is in the city. The entire city is enclosed by a large wooden fence, only the postal trucks (and citizens with proper passports) are allowed outside the city.

Match the parts of the city (underlined) with the parts of the cell.

1. Mitochondria _____
2. Ribosomes _____
3. Nucleus _____
4. Endoplasmic Reticulum _____
5. Golgi Apparatus _____
6. Protein _____
7. Cell Membrane _____
8. Lysosomes _____
9. Nucleolus _____