



Biology B - Unit 1 - EVOLUTION
Unit Study Guide

1. Define/describe endosymbiosis.
2. List some evidence for evolution that we discussed in this unit.
3. Scientists think that the development of warning coloration in insects is the result of

4. How are DNA sequences used as evidence for evolution?
5. Define/describe vestigial structures.
6. Phylogeny is the study of
 - A) human evolution.
 - B) evolutionary relationships.
 - C) DNA similarities between related organisms.
 - D) shared physical features between related organisms.
7. What is true of members of the same species?

8. What are some advantages and disadvantages of sexual reproduction?

9. Parents can pass on chromosomes to their children that are different than their own when the new gene combinations are created by what process?

10. Compare/contrast meiosis and mitosis.

11. Think back to Darwin's trip to the Galapagos Islands. While there, he studied finches. How were the finches different on each island? What was Darwin's explanation for why they were different?

12. Jurassic Park scientists are working hard to bring dinosaurs back from extinction. First, they must find organisms that share a similar embryonic development pattern to these extinct dinosaurs. What species might they use??

13. Define/describe homologous structures.

14. How is asexual reproduction different from sexual reproduction? Compare and contrast the offspring of both.

15. In order for natural selection to occur, Charles Darwin stated we must begin with a population of organisms that has genetic _____.

16. Describe the adaptation of mimicry and how it is used. Give one example of a species using mimicry.

17. Natural selection would favor which of these bears in Antarctica?

A) grizzly bear

B) black bear

C) polar bear

Why?

18. A fossil of a fern and other large-leaved plants were found in an area of Alaska. What might this suggest about this area in Alaska?

19. Geologists searching for clues to the ancestors of modern-day vertebrate land animals should look in layer _____ of the fossil beds below.



20. Horses are much larger today than their two-foot tall ancestor, mesohippus. Geologists believe the change in size was the result of changing environments, from tropical forests to a grassland habitat. Larger size would be an advantage for survival in this new habitat because...

- A) taller horses could reach the leaves that grow high on trees.
- B) larger horses could find food easier than the shorter horses.
- C) the larger horses were better camouflaged than the smaller horses.
- D) larger horses had longer legs and could run faster to escape predators.

21. In any field of crops, the height of the plants vary. Birds first eat the seeds from the tallest plants. If this eating pattern continues season after season, what would we expect to happen to these crops over time? Why?

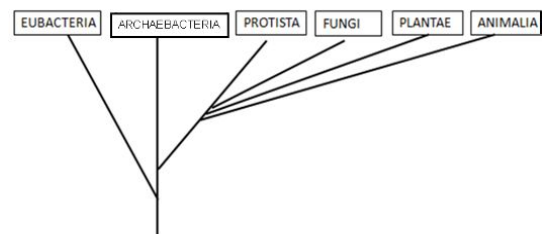
22. Peppered moths vary in color from light gray to almost black. The color of any moth depends on how many black spots are found on its wings. The name "peppered" refers to these black spots. During the day, the moths rest on trees. In England where the moths live, many light gray trees were covered with soot that came from the smoke stacks of factories. The trees got darker and darker from the soot. Over time the peppered moth population in polluted areas

- A) will become extinct.
- B) will become darker in color.
- C) will probably stay the same.
- D) will become lighter in color.

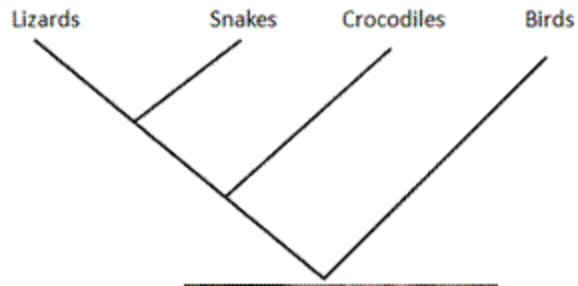
23. Scientists have recently devised a new six-kingdom classification of organisms.

According to the cladogram for the six-kingdom system

- A) the Eubacteria gave rise to all life on Earth.
- B) the Archaeobacteria gave rise to the eukaryotes.
- C) the Archaeobacteria are classified as eukaryotic.
- D) only the bacterial kingdoms have a common ancestor.



24. Review the cladogram below. Which are more closely related to lizards genetically?



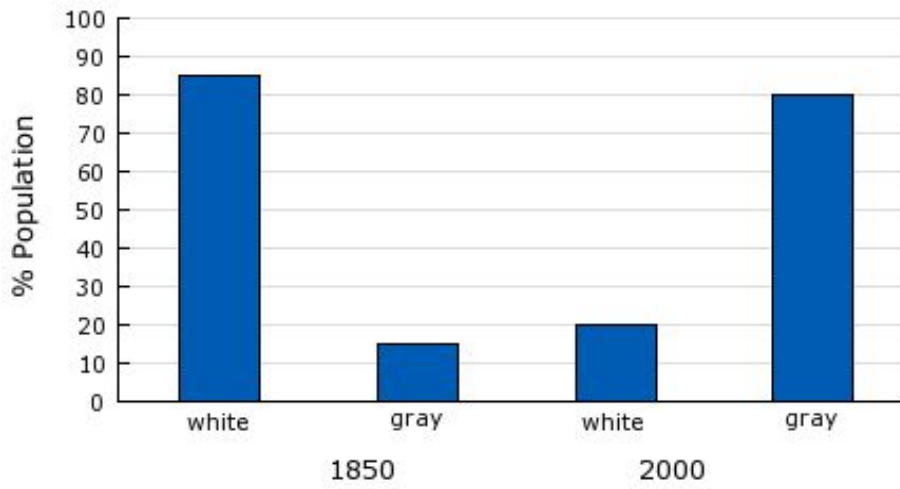
25. All life on Earth started as unicellular, prokaryotic organisms. Which of these structures was vital for organisms to develop in order to evolve into more complex, multicellular organisms?

- A) nucleus
- B) ribosomes
- C) cytoplasm
- D) cell membrane

26. What is the difference between a scientific theory and a scientific law? Is evolution considered a theory or a law and why?

27. The graph below show changes in rabbit population between 1850 and 2000.

Change in Rabbit Population 1850-2000



Part 1: In northern Canada, a population of rabbits was predominantly white in color. The allele for white color is recessive, while the allele for gray color is dominant. Over the last several decades, the average annual temperature of this area has increased, and the long-term deposits of ice and snow have become scarce. How can we explain this change in terms of allelic frequency?

Part 2: This change in population is an example of which type of selection? (nonrandom, directional, disruptive, stabilizing)

28. Farmers have long been using DDT to control pests that would prey on their crops. Over time, these pests have become resistant to this pesticide. What happened that allowed the bug population to increase?

29. One way new species may be formed is by geographic isolation. This occurs when members of a population are physically separated, for example, by a river, or a desert. After the separation the two populations, responding to different conditions, will adapt differently, and so their evolutionary paths will _____.

- A) converge.
- B) dissect.
- C) diverge.

D) reverse.

30. Analyze the data in the table below and answer the following questions. Imagine that the different color beans represent animals that might be prey: mice, for example. A student in each group was the predator: a hawk. Beans (mice) were randomly scattered on multicolored floor tiles, each color within four tiles. The hawk collected mice (beans) for 10 seconds. Mice not eaten reproduced. Three generations of data are shown in the table.

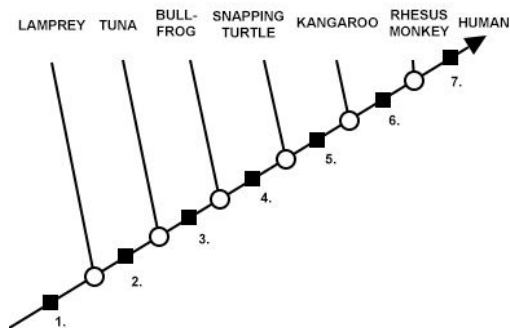
| Bean Color | Parental Generation | | | First Generation | | | Second Generation | | |
|-------------|---------------------|-------|----------|------------------|-------|----------|-------------------|-------|----------|
| | Begin | Eaten | Survived | Begin | Eaten | Survived | Begin | Eaten | Survived |
| White | 50 | 30 | 20 | 80 | 68 | 12 | 48 | 42 | 6 |
| Red | 50 | 35 | 15 | 60 | 45 | 15 | 60 | 50 | 10 |
| Black | 50 | 28 | 22 | 88 | 72 | 16 | 64 | 48 | 16 |
| Tan | 50 | 10 | 40 | 160 | 50 | 110 | 440 | 142 | 298 |
| Red Striped | 50 | 5 | 45 | 180 | 60 | 120 | 480 | 135 | 345 |

Question 1: Which color bean(s) had the best survival rates? Why do you think they performed better than the others?

Question 2: Give 2 possible reasons for the color variation in the “mice.”

- 1.
- 2.

31. What kingdom and domain do all of the organisms below belong in?



Kingdom: _____ Domain: _____

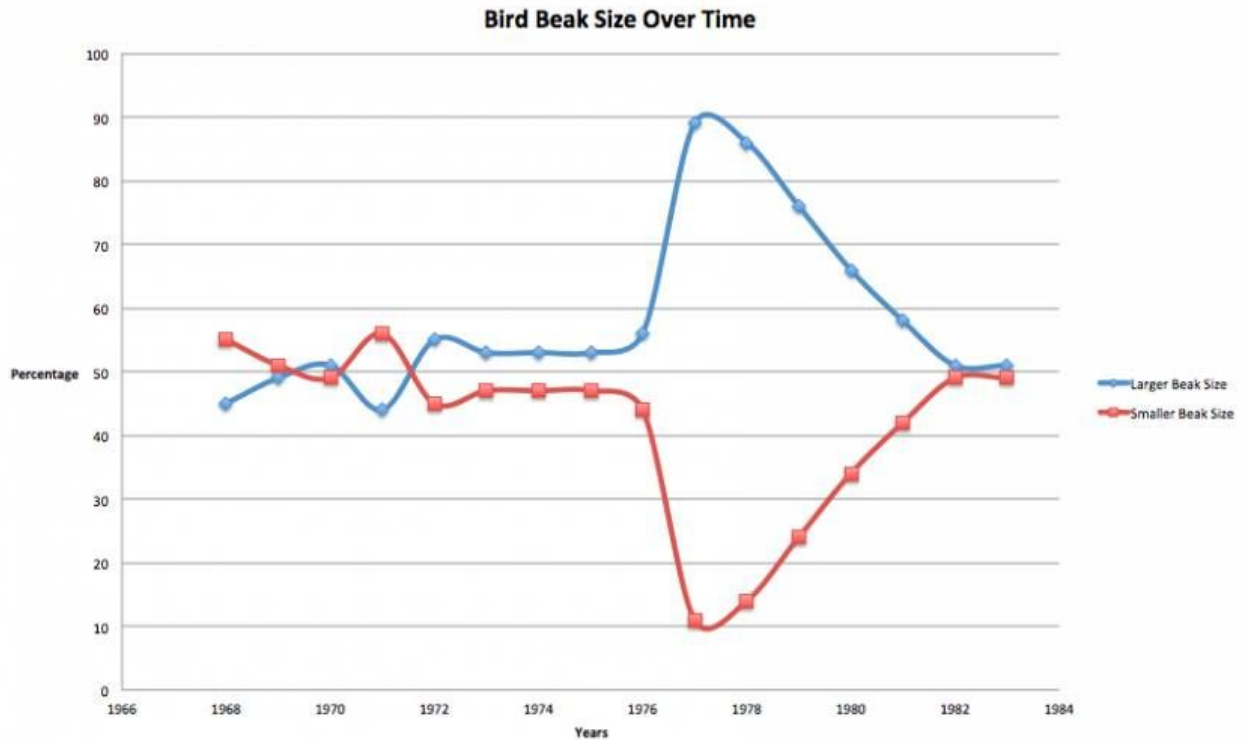
32. Flesh-eating parasitizing maggots are the offspring of the fly, *Ormia ochracea*, which invaded Hawaii from North America. The adult flies follow the chirps of a calling cricket and then deposit wriggling maggots onto the cricket's back. The maggots burrow into the cricket, and emerge, a week later, killing the cricket in the process. Between 1991 and 2001, there were documented major declines in the island's cricket population. In one study, 30% of calling males were infested with the parasite, and in 2001, the island was virtually silent. But in 2003, the cricket population had rebounded. Crickets were back but they were silent crickets! Speculate as to how this might have happened?

33. The table below is showing you the amino acid sequence of the same protein in different organisms. Knowing that genes code for proteins, identify the organism that is most closely related to the human and the organism that is the least related.

**Amino Acid Sequences and Evolutionary Relationships
(Molecular Homology)**

| Horse | Chicken | Tuna | Frog | Human | Shark | Turtle | Monkey | Rabbit |
|-------|---------|------|------|-------|-------|--------|--------|--------|
| Q | Q | Q | Q | Q | Q | Q | Q | Q |
| A | A | A | A | A | A | A | A | A |
| P | E | E | A | P | Q | E | P | Y |
| F | F | Y | F | Y | F | F | Y | P |
| I | S | S | S | S | S | S | S | S |
| T | T | T | T | T | T | T | T | T |
| D | D | D | D | A | D | E | A | D |
| K | K | K | K | K | K | K | K | K |
| N | N | S | N | N | S | N | N | N |
| K | K | K | K | K | K | K | K | K |
| G | G | G | G | G | G | G | G | G |
| I | I | I | I | I | I | I | I | I |
| T | T | U | T | I | T | T | I | T |
| K | G | N | G | G | Q | G | G | G |
| E | E | N | E | E | Q | E | E | E |
| E | D | D | D | D | E | E | D | D |
| T | T | T | T | T | T | T | T | T |
| L | L | L | L | L | L | L | L | L |
| M | M | M | M | M | R | M | M | M |
| E | E | E | E | E | I | E | E | E |
| K | D | S | S | K | K | D | K | K |
| A | A | A | A | A | T | A | A | A |
| T | T | T | G | T | A | T | A | T |
| N | S | S | S | N | A | S | N | N |

34. Data was collected concerning Galapagos bird beak size over time. There are 13 types of Galapagos finches, and they are also known as Darwin's Finches. These finches share the same habits and characteristics except for one; they all have different beaks. The differences in their beaks might be the most important aspect of their survival because beak size determines the type of seed able to be eaten. Only the birds with the largest of beaks are able to eat the toughest, biggest, and spine covered seeds. Based on the data given, choose the BEST conclusion.



- A) This data shows that over time the type of food available remained constant.
- B) This data shows that the environment did not change over the course of time.
- C) This data shows a fluctuation in bird species over time most likely due to food availability.
- D) This data shows a fluctuation in bird species over time most likely due to the inheritance of acquired characteristics.