

CP Biology: Evolution

Name: _____ Per: _____

Directions: Use your textbook to help you answer the practice questions for each chapter. It is important that you READ the chapter sections and not just search for the answer in order to make sure you understand the material. Similarly, it is important that you really think about your answer and write a complete answer; don't just write the minimum that you think you can get away with or you will not learn the material well enough for the final exam.

Also, be sure to study the Reviewing Content questions at the end of chapters 15, 16, and 17.

Vocabulary: Chapters 15-17

WORD BANK

Natural Selection	Adaptations	Directional Selection	Speciation
Artificial Selection	Common Descent	Stabilizing Selection	Behavioral Isolation
Theory	Homologous Structures	Disruptive Selection	Geographic Isolation
Fossils	Vestigial Organs	Genetic Drift	Temporal Isolation
Fitness	Gene Pool	Founder Effect	
Evolution	Relative Frequency	Hardy-Weinberg	

1. A well-supported testable explanation of phenomena that have occurred in the natural world _____
2. Slight differences among members of the same species that can be inherited _____
3. Group of individuals that are genetically similar enough to breed with one another. _____
4. The principle that all species are derived from common ancestors. _____
5. Anatomical structures that different mature forms but develop from the same embryonic tissue (like the bones in a bird's wing and a mamma's leg) _____
6. Type of selection that takes place when individuals with one or the other extreme versions of a trait (from each end of the curve) have the greatest fitness _____
7. Type of selection that takes place when individuals with one extreme version of a trait (from one end of the curve) have the greatest fitness _____
8. Type of selection that takes place when individuals with an intermediate form of a trait (from the middle of the curve) have the greatest fitness _____
9. Principle that states that allele frequencies in a population will remain constant unless one or more factors caused those frequencies to change (the population is not evolving) _____
10. When two populations do not interbreed because they are separated by geographic barriers _____
11. When two populations do not interbreed because they have different mating rituals _____
12. When two populations do not interbreed because they mate at different times of day or year _____
13. All of the genes, including all of the different alleles, that are present in a population _____
14. The process of gradual genetic changes in the gene pool of a species over time _____
15. Body parts that no longer serve a function but traces of which still remain in an organism _____
16. Process in which the most fit individuals survive and pass their traits on to the next generation _____
17. The number of times an allele occurs in a gene pool compared to the number of times other alleles for the same gene occur (the percent of a particular allele compared to others) _____
18. Process in which a new species is formed when it evolves from an existing species _____
19. When allele frequencies change as a result of the migration of a small subgroup of a population _____
20. Inherited characteristics that increase an organism's ability to survive _____
21. The ability of an animal to survive in its specific environment and reproduce _____
22. Changes in allele frequency due to chance, most noticeably in small populations _____

10. How does natural selection differ from artificial selection? Give an example to help illustrate your explanation.

11. How does natural selection cause evolution? Give an example to help illustrate your explanation.

12. What four types of evidence exist for evolution which Darwin detailed in his book "On the Origin of Species"?
 - 1)
 - 2)
 - 3)
 - 4)

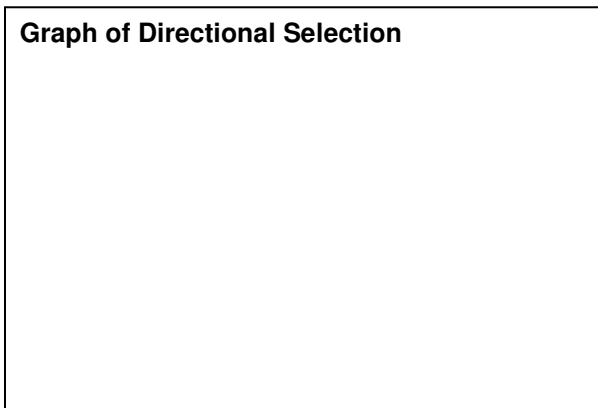
13. How can two species that look very different from one another be more closely related than two other species that look similar to one another?

14. Why can vestigial organs exist for thousands of years after they are no longer needed?

15. Copy down the five principles of Darwin's theory of evolution listed on page 386 (copy them down word for word, the entire thing!). Then draw a picture next to each to illustrate that principle.

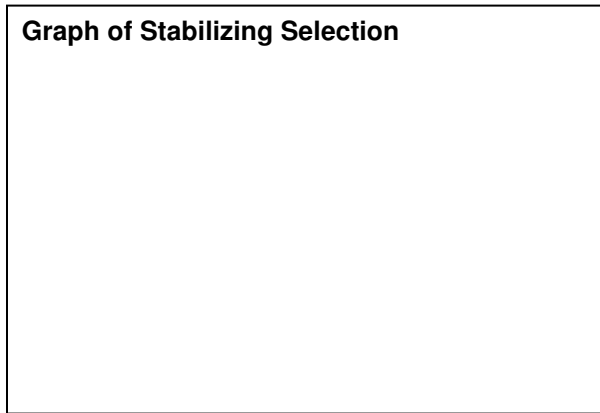
Ecology: Chapter 16

16. What two big questions about heredity did Darwin have since genetics was not well understood during his time?
1)
2)
17. What are the two main sources of genetic variation?
1) 2)
18. Why would the gene pool of one population of a species differ from the gene pool of a different population of the same species?
19. How do you know when a species is evolving?
20. A few rats escape from a ship exploring a previously uncharted island. Two years later the population of rats on the small island includes about 10,000 individuals. In this population, about 2500 rats are black, 500 rats are white, and the rest are brown. Five years later the population has grown to about 2,000,000 rats of which about 500,000 are black, 100,000 are white, and the rest are brown. Based on this one allele, is the rat population evolving? Explain.
21. Some mutations are helpful, some are harmful, and some have no effect on an organism. Describe what causes each possible outcome. That is, under what circumstances would each of these outcomes happen?
- Harmful:
- Helpful:
- No Effect (several possible causes):
22. Because homologous chromosomes are randomly separated into gametes during meiosis and humans have 23 pairs of chromosomes, how many different possible chromosome combinations can result for each person's eggs or sperm?
23. In addition to random assortment, what other process occurs during meiosis that creates additional gene shuffling in the gametes?
24. Draw a graph and give an example of directional selection.



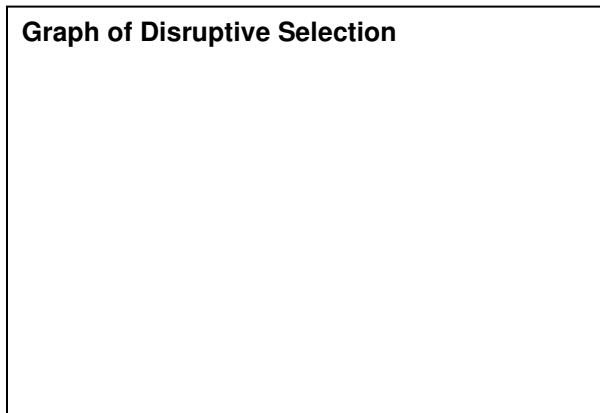
Example:

25. Draw a graph and give an example of stabilizing selection.



Example:

26. Draw a graph and give an example of disruptive selection.



Example:

27. Why is genetic drift only significant in small populations?

28. Under what conditions does genetic equilibrium occur according to the Hardy-Weinberg principle?

- 1)
- 2)
- 3)
- 4)
- 5)

29. Why are large populations necessary for genetic equilibrium?

30. How often do you think populations experience genetic equilibrium?

31. For each of the following, identify the type of reproductive isolation that is occurring:

- a. An earthquake creates a chasm between two populations of mice: _____
- b. One population of lilies opens its flowers at dawn and another at dusk: _____
- c. Volcanic activity creates a mountain range between two populations of desert turtles: _____
- d. Members of one population of fish prefer red mates while another population prefers blue: _____
- e. A heat wave causes less rain to fall and thus what used to be one large lake is now two small lakes thereby separating the fish in each: _____
- f. One population of a butterfly species lays eggs in early spring while another does so in late spring: _____
- g. Finches prefer to mate with other finches that have the same sized beak as they do: _____

32. List and describe the five steps that typically lead to speciation?

1)

2)

3)

4)

5)

Ecology: Chapter 17

33. What percent of all species that have ever lived on earth are now extinct?

34. The most common fossils are those found in sedimentary rock. Describe and draw each step of how these are formed.

35. A scientist discovers a fossil of a newly discovered animal in a layer of rock. He wants to know when the animal lived. How can he use index fossils and relative dating to determine when the animal existed?

36. A scientist discovers a fossil of a newly discovered animal and wants to use carbon dating to figure out how old it is. He determines that about 25% of the carbon in the rock surrounding the fossil is carbon-14 and 75% is carbon-12. About how old is the sample?

37. If a sample contains more argon-40 than potassium-40, then it is at least _____ years old.

38. What are the four eras of earth's history, in order starting with the oldest?

1)

2)

3)

4)

39. During which era did mammals first evolve?

40. What era are we currently in? When did it begin?

41. How old is the earth?

42. What six main gases made up earth's earliest atmosphere?

43. The first cells on earth evolved about _____ billion years ago.

44. Put the following in order of when they occurred, starting with the oldest: (write 1 next to the oldest, and so on)

___ photosynthesizing cells evolved (release oxygen)

___ the oceans turned from brown to blue

___ aerobic cells evolved (use oxygen)

___ earth was struck by a giant object causing it to superheat

___ sexual reproduction evolved

___ The first amino acids and nucleic acids formed

___ eukaryotic cells evolved

___ Earth cooled and the first oceans formed

___ multicellular organisms evolved

___ Earth cooled and the first land and atmosphere formed

