

CHAPTER 23: Species and Their Formation

1. Describe what Linnaeus and his use of a morphological species concept in species classification?

2. Define the term species as related to the biological species concept.

3. Define the modes of speciation:

a. allopatric speciation - _____

b. sympatric speciation - _____

4. How can polyploidy lead to speciation?

5. Why are allopolyploid hybrids usually sterile?

6. Define and give an example for each of the following pre-zygotic barriers that cause evolution:

a. habitat isolation - _____

b. temporal isolation - _____

c. mechanical isolation - _____

d. gametic isolation - _____

e. behavioral isolation - _____

7. Define and give an example for each of the following post-zygotic barriers that cause evolution:

a. low hybrid zygote viability - _____

b. low hybrid adult viability - _____

c. hybrid infertility - _____

8. How do island chains encourage adaptive radiation?

9. Compare gradualism and punctuated equilibrium.

END OF CHAPTER 23 MULTIPLE CHOICE

1. The biological species concept defines a species as a group of
 - A) actually interbreeding natural populations that are reproductively isolated from other such groups.
 - B) potentially interbreeding natural populations that are reproductively isolated from other such groups.
 - C) actually or potentially interbreeding natural populations that are reproductively isolated from other such groups.
 - D) actually or potentially interbreeding natural populations that are reproductively connected to other such groups.
 - E) actually interbreeding natural populations that are reproductively connected to other such groups.

2. Which of the following is not a condition that favors allopatric speciation?
 - A) Continents drift apart and separate previously connected lineages.
 - B) A mountain range separates formerly connected populations.
 - C) Different environments on two sides of a barrier cause populations to diverge.
 - D) The range of a species is separated by loss of intermediate habitat.
 - E) Tetraploid individuals arise in one part of the range of a species.

3. Finches speciated in the Galápagos Islands because
 - A) the Galápagos Islands are not far from the mainland.
 - B) the Galápagos Islands are arid.
 - C) the Galápagos Islands are small.
 - D) the islands of the Galápagos archipelago are sufficiently isolated from one another that there is little migration among them.
 - E) the islands of the Galápagos archipelago are close enough to one another that there is considerable migration among them.

4. Which of the following is not a potential prezygotic reproductive barrier?
 - A) Temporal segregation of breeding seasons
 - B) Differences in chemicals that attract mates
 - C) Hybrid infertility
 - D) Spatial segregation of mating sites
 - E) Sperm that cannot penetrate an egg

5. A common means of sympatric speciation is
 - A) polyploidy.
 - B) hybrid infertility.
 - C) temporal segregation of breeding seasons.
 - D) spatial segregation of mating sites.
 - E) imposition of a geographic barrier.

6. Narrow hybrid zones may persist for long times because
 - A) hybrids are always at a disadvantage.
 - B) hybrids have an advantage only in narrow zones.
 - C) hybrid individuals never move far from their birthplaces.
 - D) individuals that move into the zone have not previously encountered individuals of the other species, so reinforcement of reproductive barriers has not occurred.
 - E) Narrow hybrid zones are artifacts because biologists generally restrict their studies to contact zones between species.

7. Which statement about speciation is not true?
 - A) It always takes thousands of years.
 - B) Reproductive isolation may develop slowly between diverging lineages.
 - C) Among animals, it usually requires a physical barrier.
 - D) Among plants, it often happens as a result of polyploidy.
 - E) It has produced the millions of species living today.

8. Speciation is often rapid within groups whose species have complex behavior because
 - A) individuals of such species make fine discriminations among potential mating partners.
 - B) such species have short generation times.
 - C) such species have high reproductive rates.
 - D) such species have complex relationships with their environments.
 - E) such species are particularly abundant.

9. Evolutionary radiations
 - A) often happen on continents, but rarely on island archipelagoes.
 - B) characterize birds and plants, but not other groups of organisms.
 - C) have happened on continents as well as on islands.
 - D) require major reorganizations of the genome.
 - E) never happen in species-poor environments.

10. Speciation is an important component of evolution because it
 - A) generates the variation on which natural selection acts.
 - B) generates the variation on which genetic drift and mutations act.
 - C) enabled Charles Darwin to perceive the mechanisms of evolution.
 - D) generates the high extinction rates that drive evolutionary change.
 - E) has resulted in a world with millions of species, each adapted for a particular way of life.