

## Speciation & Extinction

Use The Origin of Species chapter from the textbook to answer questions 1 – 10.

1. Define speciation.

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2. Define species (biological concept).

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3. Based on the definition of species, what must occur before one species evolves into more than one species?

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4. Classify each of the following as either a prezygotic barrier or a postzygotic barrier. Use the key below to indicate your answers.

A. = Prezygotic barrier

B. = Post zygotic barrier

\_\_\_\_\_ Impede mating or hinder fertilization

\_\_\_\_\_ Prevent zygote from developing

\_\_\_\_\_ Habitat isolation, temporal isolation, behavioral isolation, mechanical isolation, gametic isolation

\_\_\_\_\_ Reduced hybrid viability, reduced hybrid fertility, hybrid breakdown

\_\_\_\_\_ Two species of snakes of the same genus live in the same geographic area but one lives mainly in water while the other lives mainly on land

\_\_\_\_\_ The geographic ranges of two species of skunk overlap but one mates in later winter while the other mates during late summer

\_\_\_\_\_ Hybrids of two different salamander species do not complete development and those that do are frail

\_\_\_\_\_ The hybrid offspring of a donkey and a horse is robust but sterile



5. Use the key below to identify the type of reproductive barrier being described.

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|-------------------------|-------------------------|
| A. Habitat isolation    | D. Temporal isolation   |
| B. Behavioral isolation | E. Mechanical isolation |
| C. Gametic isolation    |                         |

- \_\_\_\_\_ Gametes fail to fuse
- \_\_\_\_\_ Egg & sperm don't recognize each other
- \_\_\_\_\_ Differences in sexual or anatomical structures
- \_\_\_\_\_ Mating dance of a male not recognized by female
- \_\_\_\_\_ Different mating seasons within the population
- \_\_\_\_\_ Members of population separated by a mountain range
- \_\_\_\_\_ Male flowers of some members of a plant species produce pollen before most of the female flowers are open
- \_\_\_\_\_ Variation in mating ritual not recognized by female
- \_\_\_\_\_ Male reproductive organs in insect populations vary enormously in size and shape, preventing the effective transfer of sperm to females of different species
- \_\_\_\_\_ Structure of flower restricts access of insects without specific physical and behavioral adaptations
- \_\_\_\_\_ Two species of sea urchin release their gametes at the same time, but cross-specific fertilization does not occur
- \_\_\_\_\_ Two species of orchid have different length nectar tubes and are pollinated by different species of moths
- \_\_\_\_\_ Two species of mayflies emerge during different weeks in springtime
- \_\_\_\_\_ Two similar species of birds have different mating rituals
- \_\_\_\_\_ Peepers breed in woodland ponds, whereas leopard frogs breed in swamps



## AP Biology: Unit 2: Evolutionary Biology &amp; Biodiversity

6. Match the type of postzygotic barrier with the correct description.

- A. Reduced hybrid viability
- B. Reduced hybrid fertility
- C. Hybrid breakdown

\_\_\_\_\_ Zygote fails to develop; zygote fails to reach sexual maturity

\_\_\_\_\_ Hybrid fails to produce functional gametes

\_\_\_\_\_ Offspring not viable or infertile; offspring of hybrid have reduced viability or fertility

\_\_\_\_\_ Two species of frogs are mated in the lab and produce viable, but sterile, offspring

\_\_\_\_\_ Two species of salamanders will mate in the lab and produce viable, fertile offspring, but offspring of these hybrids are sterile

\_\_\_\_\_ When two species of mice are bred in the lab, embryos usually abort

7. Two bird species in a forest are not known to interbreed. One species feeds and mates in the treetops and the other on the ground. But in captivity, the two species can interbreed and produce viable fertile offspring. What type of reproductive barrier most likely keeps these species separate? Explain.

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8. How is allopatric speciation different from sympatric speciation?

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9. Explain how each of the following can result in sympatric speciation.

Polyploidy: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Habitat differentiation: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Sexual selection: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Indicate if each of the following statements is true of **G**radualism or **P**unctuated Equilibrium.

\_\_\_\_\_ Gradual divergence of a species from the ancestral form

\_\_\_\_\_ Most change occurred when species branched from ancestral form

\_\_\_\_\_ Long periods of stasis punctuated by episodes of speciation

\_\_\_\_\_ Darwinism

\_\_\_\_\_ Evolution occurred in spurts of rapid change

\_\_\_\_\_ Big changes occur from the accumulation of many small ones



**Big Five Mass Extinction Events**

Use the BBC Nature: Prehistoric Life web site to answer question 11. The web site is posted at the AP Biology Canvas (<http://bit.ly/bhsapbio>).

11. The following statements describe the various aspects of the big five mass extinctions. Use key below to identify the mass extinction event being described.

- CT. Cretaceous – Tertiary Mass Extinction
- LD. Late Devonian Mass Extinction
- OS. Ordovician – Silurian Mass Extinction
- P. Permian Mass Extinction
- TJ. Triassic – Jurassic Mass Extinction

- \_\_\_\_\_ Occurred 450 to 440 million years ago (MYA)
- \_\_\_\_\_ Killed 85% of sea life
- \_\_\_\_\_ Climate change was the possible cause
- \_\_\_\_\_ Occurred 359 MYA
- \_\_\_\_\_ Killed life in shallow seas and reefs
- \_\_\_\_\_ Impact events were the possible cause
- \_\_\_\_\_ The great dying
- \_\_\_\_\_ Occurred 248 MYA
- \_\_\_\_\_ Killed 96% of all species and many marine creatures
- \_\_\_\_\_ Catastrophic methane release, flood basalt eruptions, climate change, and impact events were the possible causes
- \_\_\_\_\_ Occurred 200 MYA
- \_\_\_\_\_ Killed many types of animals including reptiles, amphibians, and reef-building animals
- \_\_\_\_\_ Flood basalt eruptions, climate change, and impact events were the possible causes
- \_\_\_\_\_ Occurred 65 MYA
- \_\_\_\_\_ Killed the dinosaurs
- \_\_\_\_\_ Flood basalt eruptions and impact events were the possible causes



Use The History of Life on Earth chapter from the textbook to answer the following questions.

12. What impact did the formation of Pangea have on biological diversity?

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What impact did the breakup of Pangea have on biological diversity?

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13. What happens during adaptive radiation?

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