**Chapter 5: Evolution of Biodiversity**

**Vocabulary**

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| 1. Species Richness | 8. Genotype | 15. Adaptation | 22. Allopatric Speciation | 29. Distribution |
| 2. Species Eveness | 9. Phenotype | 16. Gene Flow | 23. Reproductive Isolation | 30. Niche Generalists |
| 3. Phylogeny | 10. Mutation | 17. Genetic Drift | 24. Sympatric Speciation | 31. Niche Specialist |
| 4. Evolution | 11.  Recombination | 18. Bottleneck Effect | 25. GMO |  |
| 5. Microevolution | 12. Artificial Selection | 19. Extinction | 26. Range of Tolerance |  |
| 6. Macroevolution | 13. Natural Selection | 20. Founder Effect | 27. Fundamental Niche |  |
| 7. Gene | 14. Fitness | 21. Geographic Isolation | 28. Realized Niche |  |

**Opening Story: The Dung of the Devil**

1. What does the story of the Dung of the Devil illustrate about the value of biodiversity of humans?
2. What does a rapid decline in biodiversity indicate about the health of an ecosystem? Why?

**Module 14: The Biodiversity of the Earth**

1. Many traditional societies (such as indigenous tribes) have cultural traditions of using certain plants or animals as part of medicinal treatments. How can we determine which ones actually have an effect, and which ones are superstition?
2. How many species have been discovered so far, how many are estimated to exist, and why is it difficult to get an accurate count?
3. Can an ecosystem have high species richness and low species evenness, or vice versa? Explain.
4. Why is it important to measure “baseline” species richness and evenness in an ecosystem?
5. Do you think species richness or species evenness is a more important property in helping ecosystems endure changes?
6. How do scientists determine the positions of species on a phylogenetic tree?
7. What techniques and evidence are used by scientists to create phylogenic trees?
8. In Figure 14.3, what key features do chipmunks and trout share?
9. In Figure 14.3, which species evolved most recently? How do we know?

**Module 14 AP Review Questions**

1. 2. 3. 4.

**Module 15: How Evolution Creates Biodiversity**

1. Evolution acts on phenotype, not genotype, explain the importance of this statement.

2. Explain how genetic diversity (the ‘raw material’) of evolution is created.

3. Are mutations harmful or helpful for a species? Explain.

4. What have been the benefits and drawbacks of humans’ artificial selection on crop and animal species?

5. Why do most pests gain resistance over time to the pesticides designed to kill them?

6. Why are overproduction of offspring and differential reproductive success crucial for natural selection to occur?

7. In artificial selection, humans are doing the selecting to shape evolution. How is selection done in natural selection?

8. How can random processes cause evolution? How do these processes differ from natural and artificial selection?

9. Gene flow and the founder effect both involve random evolution through migration of individuals. How do they differ?

10. Where are genetic drift and bottleneck effects more likely to happen - large populations or small ones? Explain why.

**Module 15 AP Review Questions**

1. 2. 3. 4. 5. 6. 7.

**Module 16: Speciation and the Pace of Evolution**

1. Describe the process through which allopatric speciation splits 1 species into 2 distinct ones.
2. How can sympatric speciation occur, even if individuals are not geographically isolated and are capable of reproducing?
3. What factors influence the rate of evolutionary change in a species?
4. Why does the speed of environmental change heavily influence the ability of species to evolve in response?
5. How have humans unintentionally caused artificial selection to occur in many fish populations?
6. How are GMOs created?
7. *Science Applied -* What defines a biodiversity hotspot, and why are they important to protect?
8. *Science Applied -* In Figure SA2.2 (pg185), what general trends are there in the locations of biodiversity hot spots? Why?
9. *Science Applied -* What factors (other than species diversity) must be considered when evaluating an area for conservation?
10. *Science Applied -* We have limited resources and lots of biodiversity in need of protection. What do you think we should prioritize to maximize biodiversity conservation?

**Module 16 AP Review Questions**

1. 2. 3. 4.

**Module 17: Evolution of Niches and Species Distribution**

1. How does a species' reproductive success vary within its range of tolerance for various abiotic factors?
2. How do a species’ range of tolerance for various conditions determine its fundamental niche?
3. Why don’t species always use their full fundamental niche?
4. What are some of the major differences between niche generalists and niche specialists?
5. Are niche generalists or specialists more likely survive rapid environmental change?
6. How is global climate change expected to affect species distributions? How could scientists determine the likely effect on a particular species?
7. The average lifespan of a species is just 1-10 million years. Why do you think there are such a high rates of speciation and extinction constantly occurring throughout the history of life on Earth?
8. How does the 6th mass extinction differ from all previous ones?
9. *Working Towards Sustainability - What types of ecosystems does TNC target for purchase, and why?*

**Module 17 AP Review Questions**

1. 2. 3. 4. 5.

**Chapter 5 Multiple Choice Questions Practice Exam**

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.