

Name: _____ Date: _____ Block: _____

Miller and Spoolman's Living in the Environment 16th ed.

Chapter 4 Reading Guide – Biodiversity and Evolution

Case Study – Why Should We Care about the American Alligator?

1. Explain what could happen to the ecosystem where American alligators live if the alligators went extinct.
2. Name a plant species and an animal species that would be seriously affected by the extinction of the alligators, and describe how each might respond to these changes in their environmental conditions.

Section 4-1 – What Is Biodiversity and Why Is It Important?

3. Explain why biodiversity is a vital renewable resource.
4. Define the following terms.

Species diversity	
Genetic diversity	
Ecosystem diversity	
Functional diversity	

Section 4-2 – Where Do Species Come From?

5. Summarize Darwin's and Wallace's theory of evolution (be sure to include the 4 main points).
6. What is a fossil and why are fossils important in understanding biological evolution?
7. State the alternative way to summarize the process of biological evolution.
8. Identify the three adaptations that make humans such a powerful species.
9. Describe the three common myths about natural selection and what makes them wrong.

Section 4-3 – How Do Geological Processes and Climate Change Affect Evolution?

10. Describe conditions on the earth that favor the development of life as we know it.

Section 4-4 – How Do Speciation, Extinction, and Human Activities Affect Biodiversity?

11. Imagine how a population of American alligators might have evolved into two species had they become separated, with one group evolving in a more northern climate. Describe some of the traits of the hypothetical northern species.

12. What role does each of the following processes play in helping implement the four scientific principles of sustainability (Chapter 1): (a) natural selection, (b) speciation, and (c) extinction?

13. What is artificial selection? Give useful examples of artificial selection.

14. What is genetic engineering? Give useful example of genetic engineering. What are some concerns about genetic engineering?

15. How would you respond to someone who says that because extinction is a natural process, we should not worry about the loss of biodiversity when species become prematurely extinct as a result of our activities?

Section 4-5 – What Is Species Diversity and Why Is It Important?

16. Differentiate between species diversity and species richness.

17. Describe the theory of island biogeography.

18. Suppose we have two national parks surrounded by development. One is a large park and the other is much smaller. Which park is likely to have the highest species richness? Why?

19. Compare the hypotheses that try to answer the question: Does species richness enhance the stability, or sustainability of an ecosystem?

Section 4-6 – What Roles Do Species Play in Ecosystems?

20. Describe the major differences between the ecological niches of humans and cockroaches. Are those two species in competition? If so, how do they manage to coexist?

21. How would you experimentally determine whether an organism is a keystone species?

22. Is the human species a keystone species? Explain.

23. If humans were to become extinct, what are three species that might also become extinct and three species whose populations would probably grow?

