Name _____ **Period** _____

Chapter 52: An Introduction to Ecology and the Biosphere

What determines which organisms will be found in an area? In this chapter, you will learn about the role of climate in affecting this distribution.

Overview

1. What is *ecology*?

2. Study Figure 52.2 in your text. It shows the different levels of the biological hierarchy studied by ecologists. Notice also the different types of questions that might be studied by an ecologist at each level of study. Use this figure to develop a flowchart of the hierarchy from most to least inclusive.

***Concept 52.1** Earth's climate varies by latitude and season and is changing rapidly*

3. What is climate? What four factors are its components?

4. What is the difference between *macroclimate* and *microclimate*?

5. Study Figures 52.3 and 52.4 in your text, which summarize Earth's climate patterns and how they are formed. Explain how Earth's curvature and axis of rotation influence the amount of sunlight reaching a given area—for our purposes Miami and Chicago—and how these factors influence the temperature, precipitation, and levels of photosynthesis in that area.

6. Explain the "rain shadow" effect.

7. What effect does elevation have on climate? Why do we say that hiking from Gatlinburg, Tennessee, at 393 meters of elevation in the Smoky Mountains region, to the top of Mount LeConte, at 2,010 meters, is like traveling to Canada?

8. Every environment on Earth is characterized by _____, or nonliving, factors and _____, or living, factors.

9. Use the example of the beech tree to explain how global climate change can alter the current range of a species.

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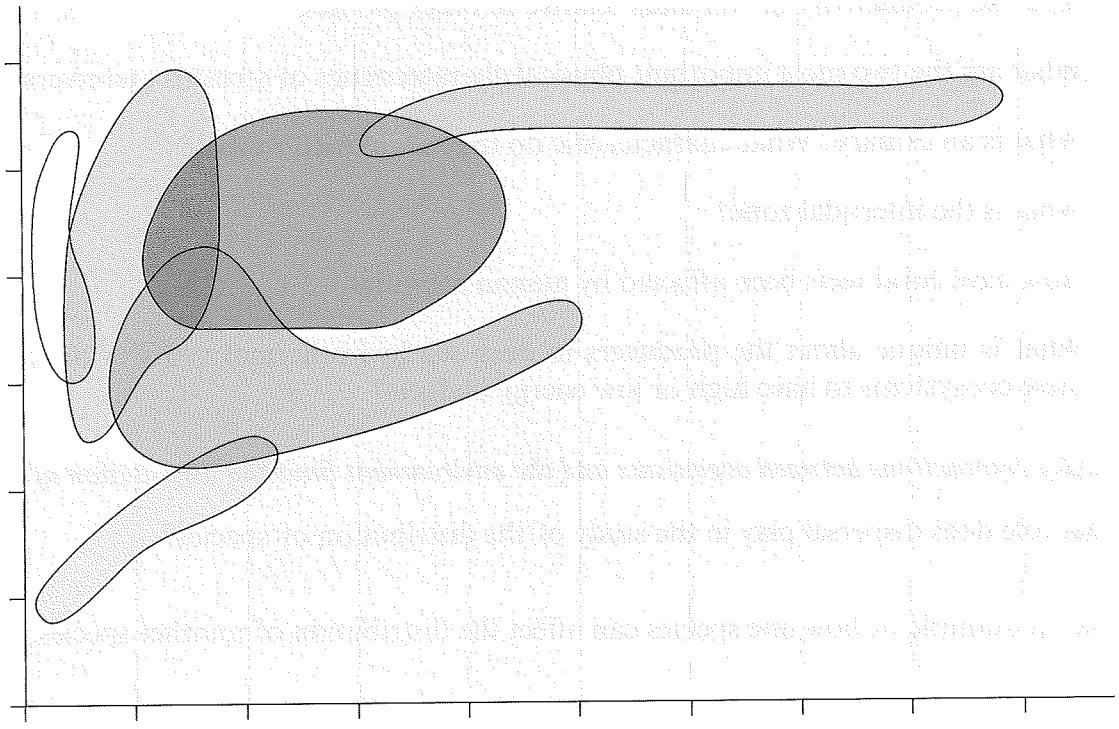
***Concept 52.2** The structure and distribution of terrestrial biomes are controlled by climate and disturbance*

10. What is a *biome*?

11. Figure 52.9 in your text shows a *climograph* for some major biomes in North America. What two abiotic factors shown here are most important in determining the distribution of the biome?

12. Label the axes of this figure, and identify each biome shown. Try to do this based on your understanding of the figure, and then use the text to check your answers. You will use these biomes: *temperate grassland, temperate broadleaf forest, tropical forest, northern coniferous forest, desert,* and *tundra.*



13. The energy budget of a biome is set by its level of photosynthesis. In general, warm temperatures and abundant rainfall translate to high levels of photosynthesis and biomes with high energy budgets.

    a. Which biome has the highest energy budget and, consequently, the greatest species diversity?

    b. Which biome would you predict has the lowest energy budget?

    c. What effect would you expect global warming to have on the total area of the northern coniferous forest?

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***Concept 52.3** Aquatic biomes are diverse and dynamic systems that cover most of Earth*

14. What is the largest marine biome, and how much of Earth's surface does it cover?

15. As you read this section and study Figure 52.14 in your text, you will encounter a number of new ideas about aquatic biomes. Although it is not necessary to memorize a vast amount of data, a few trends should be part of your general biology knowledge, a knowledge base that will ultimately help you with a wide variety of questions. The following questions will give you a starting outline.

    a. How do oligotrophic and eutrophic lakes differ?

    b. Why do ecologists consider preservation of wetlands important in maintaining water quality?

    c. Rate the productivity of wetlands relative to other biomes.

    d. What are the two most important physical characteristics of streams and rivers?

    e. What is an estuary? What characteristic do they share with wetlands?

    f. What is the intertidal zone?

    g. How have coral reefs been affected by human activities?

    h. What is unique about the producers in deep-sea hydrothermal vents? Would you expect these ecosystems to have high or low energy budgets?

***Concept 52.4** Interactions between organisms and the environment limit the distribution of species*

16. What role does dispersal play in the study of the distribution of species?

17. Give an example of how one species can affect the distribution of another species.

18. List five abiotic factors. Include an example and description of each factor's influence on living organisms.

Abiotic Factor	Example and Description

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Test Your Understanding Answers

Now you should be ready to test your knowledge. Place your answers here:

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

6. _____ 7. _____

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