

Academic Biology: Midterm Study Guide

Directions: This packet contains an extensive study guide that will help you prepare for the upcoming Midterm Exam. Pace yourself and be prepared to work on part of it on your own time. This study guide covers the majority of the material that will appear on your Midterm Exam. Use your book and notes to answer the following question. Your answers should be detailed and complete. This study guide is meant to help you review the materials we have studied. It does not contain every question, or even every topic, that may appear on the midterm exam.

Topics:

Chapter 1 Scientific Method (include notes on microscopes)
 Chapter 3 The Biosphere
 Chapter 4 Ecosystems and Communities
 Chapter 5 Populations
 Chapter 6 Humans in the Biosphere
 Chapter 18 Classification

Study Suggestions:

- Create a concept map (or other graphic organizer) to summarize all of the important information in a chapter. Explain your concept maps to classmates or family members.
- Work in a small study group and assign different study tasks to different people then share all of the information.
- Write a summary of all of the important information in each Chapter.
- Write a summary of all of the important information in each section of class notes. Do not just recopy the notes, summarize the information into an easy to understand paragraph. Include important vocabulary.
- Answer the questions on the chapter assessments at the end of each chapter.

Directions: Write the 6 steps of the scientific method (in order) in the spaces below.

- | | |
|----------|----------|
| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | 6. _____ |

Directions: Match each step of the scientific method with the correct description.

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| 7. Identify what it is you want to ask. | A. Research the problem. |
| 8 . Gather background information on the problem | B. Analyze the data. |
| 9. What are possible solutions to my problem? | C. Test the hypothesis. |
| 10. Perform an experiment. | D. State the problem. |
| 11. Did the experiment turn out as expected? | E. Draw conclusions. |
| 12. Provide an answer to the problem. | F. Form a hypothesis. |

13. Define the five levels of organization in the biosphere, starting with the smallest.
14. Describe the two sources of energy that fuel life on Earth.
15. Describe the direction of energy flow through an ecosystem.
16. Differentiate between autotrophs and heterotrophs.
17. What are decomposers (or detritivores)?
18. How does a food web differ from a food chain?
19. Describe the three types of ecological pyramids.
20. How much energy is transferred from one trophic level to the next in an energy pyramid? Why is it so low?
21. What four processes move carbon through the biosphere (carbon cycle)? Explain them.

22. Describe the roles of bacteria in the nitrogen cycle.
23. Why do organisms need nitrogen?
24. How might a large input of phosphorus affect a freshwater lake over time?
25. What are two ways water can enter the atmosphere?
26. Explain how ocean currents originate and affect Earth's climates.
27. How does weather differ from climate?
28. Explain the sun's role in Earth's climate.

29. Describe the greenhouse effect and explain how it maintains Earth's temperature range.
30. Name and define the three main classes of symbiotic relationships. Give examples of each.
31. What is a microclimate? Give an example.
32. Define the photic, aphotic and benthic zones of the ocean.
33. What are the two kinds of ecological succession? Explain each.
34. Discuss four ways population size can change.

35. Differentiate between exponential and logistic growth. Draw and label a graph for each.

36. Explain the limiting factors that control population growth.

37. Differentiate between density-dependent and density-independent limiting factors.

38. Sequence the historical events that contributed to the current human population growth.

39. How is Earth like an island?

40. What causes acid rain? What is the effect of acid rain on natural habitats?

41. Discuss biodiversity as a source of medicines.
42. What are introduced species? How are they a threat to biodiversity?
43. Explain biological magnification (aka biomagnification) using the example of DDT.
44. What causes desertification (think of the 1930's Dust Bowl)?
45. Discuss one of the challenges to conservation efforts in developing countries.
46. What is biodiversity? What are at least three threats to biodiversity?
47. As biologists classify the diversity of life, what two main tasks do they carry out?
48. List in order from smallest to largest the seven categories in Linnaeus's system of classification.

49. How did binomial nomenclature avoid the problems of the first attempts at scientific naming?
50. In the system of evolutionary classification, why do scientists classify different species into the same genus?
51. How is evolutionary classification different from Linnaeus's system of classification?
52. What type of characteristic is considered in a cladistic analysis?
53. How are DNA mutations used in molecular clocks?
54. In the discipline of taxonomy, what is a domain? What are the three domains into which organisms can be grouped?
55. What characteristic is shared by all members of the domain Eukarya?
56. What must you find out about a prokaryote to know which domain it belongs to?

57. In what ways are members of the domain Bacteria and the domain Archaea similar?

58. What are two ways that most members of the kingdom Plantae and the kingdom Animalia differ?