



**AP[®] Biology
2004 Free-Response Questions
Form B**

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2004 AP[®] BIOLOGY FREE-RESPONSE QUESTIONS (Form B)

BIOLOGY

SECTION II

Time—1 hour and 30 minutes

Directions: Answer all questions.

Answers must be in essay form. Outline form is not acceptable. Labeled diagrams may be used to supplement discussion, but in no case will a diagram alone suffice. It is important that you read each question completely before you begin to write. Write all your answers on the pages following the questions in the goldenrod booklet.

1. Prokaryotes are found throughout the biosphere. Answer two of the following.

- Provide three examples of adaptations found in various prokaryotes. Explain how these three adaptations have ensured the success of prokaryotes.
- Discuss how prokaryotes early in Earth's history altered environments on Earth.
- Discuss three ways in which prokaryotes continue to have ecological impact today.

2. In most aquatic environments, primary production is affected by the light available to the community of organisms.

Using measurements of dissolved oxygen concentration to determine primary productivity, design a controlled experiment to test the hypothesis that primary productivity is affected by either the intensity **or** the wavelength of light. In your answer, be sure to include the following.

- A statement of the specific hypothesis that you are testing
- A description of your experimental design (Be sure to include a description of what data you would collect and how you would present and analyze the data using a graph.)
- A description of results that would support your hypothesis

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3. Homeostasis, maintaining a steady-state internal environment, is a characteristic of all living organisms. Choose three of the following physiological parameters and for each, describe how homeostasis is maintained in an organism of your choice. Be sure to indicate what animal you have chosen for each parameter. You may use the same animal or different animals for your three descriptions.

- Blood-glucose levels
- Body temperature
- pH of the blood
- Osmotic concentration of the blood
- Neuron resting-membrane potential

4. Organisms differ from one another and yet share common characteristics.

- Select two kingdoms and briefly describe three characteristics used to distinguish between members of one kingdom and members of the other.
- Describe three characteristics (at least one molecular and one cellular) that members of these two kingdoms share.
- Propose an explanation for the existence of similarities and differences between the two kingdoms.

END OF EXAMINATION