



## **AP<sup>®</sup> Biology 2005 Free-Response Questions**

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# 2005 AP<sup>®</sup> BIOLOGY FREE-RESPONSE QUESTIONS

## 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 pink booklet.

1. Yeast cells are placed in an apparatus with a solution of sugar (a major nutrient for yeast metabolism). The apparatus detects bubbles of gas released by the yeast cells. The rate of respiration varies with the surrounding temperatures as indicated by the data below.

Temperature (°C)	0	10	20	30	40	50	60	70
Number of bubbles of gas produced per minute	0	3	7	12	7	4	1	0

- (a) **Graph** the results on the axes provided. **Determine** the optimum temperature for respiration in the yeast.
- (b) Respiration is a series of enzyme-catalyzed reactions. Using your knowledge of enzymes and the data above, **analyze** and **explain** the results of this experiment.
- (c) **Design** an experiment to test the effect of varying the pH of the sugar solution on the rate of respiration. Include a prediction of the expected results.

A large grid for graphing and writing an answer. The grid is 20 columns wide and 20 rows high.

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2. The unit of genetic organization in all living organisms is the chromosome.
- Describe** the structure and function of the parts of a eukaryotic chromosome. You may wish to include a diagram as part of your description.
  - Describe** the adaptive (evolutionary) significance of organizing genes into chromosomes.
  - How does the function and structure of the chromosome differ in prokaryotes?
3. Angiosperms (flowering plants) have wide distribution in the biosphere and the largest number of species in the plant kingdom.
- Discuss** the function of FOUR structures for reproduction found in angiosperms and the adaptive (evolutionary) significance of each.
  - Mosses (bryophytes) have not achieved the widespread terrestrial success of angiosperms. **Discuss** how the anatomy and reproductive strategies of mosses limit their distribution.
  - Explain** alternation of generations in either angiosperms or mosses.
4. An important defense against diseases in vertebrate animals is the ability to eliminate, inactivate, or destroy foreign substances and organisms. **Explain** how the immune system achieves THREE of the following:
- Provides an immediate nonspecific immune response
  - Activates T and B cells in response to an infection
  - Responds to a later exposure to the same infectious agent
  - Distinguishes self from nonself

**END OF EXAM**