2017

AP CollegeBoard

AP Biology

Sample Student Responses and Scoring Commentary

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AP® BIOLOGY
2017 SCORING GUIDELINES

Question 5

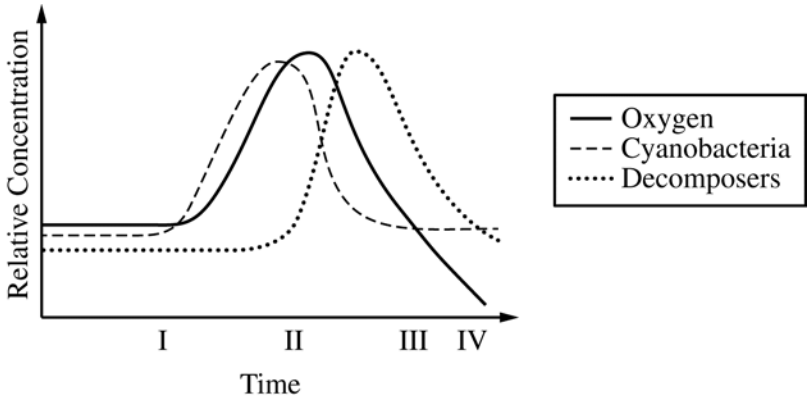


Figure 1. Characteristics of a pond community over time

Microcystis aeruginosis is a freshwater photosynthetic cyanobacterium. When temperatures increase and nutrients are readily available in its pond habitat, *M. aeruginosis* undergoes rapid cell division and forms an extremely large, visible mass of cells called an algal bloom. *M. aeruginosis* has a short life span and is decomposed by aerobic bacteria and fungi. **Identify** the metabolic pathway and the organism that is primarily responsible for the change in oxygen level in the pond between times I and II AND between times III and IV.

Identification (2 points per row; 4 points maximum)

Time Period	Metabolic pathway **(1 point per box)**	Organism **(1 point per box)**
I – II	Photosynthesis	Cyanobacteria (*M. aeruginosis*)
III – IV	Cellular respiration	Decomposers/fungi/bacteria

5A.

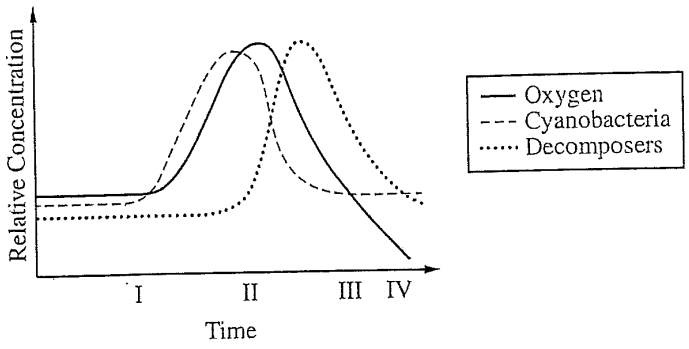


Figure 1. Characteristics of a pond community over time

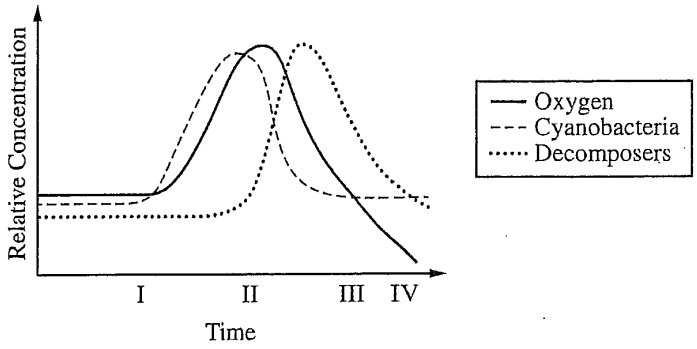
5. *Microcystis aeruginosis* is a freshwater photosynthetic cyanobacterium. When temperatures increase and nutrients are readily available in its pond habitat, *M. aeruginosis* undergoes rapid cell division and forms an extremely large, visible mass of cells called an algal bloom. *M. aeruginosis* has a short life span and is decomposed by aerobic bacteria and fungi. **Identify** the metabolic pathway and the organism that is primarily responsible for the change in oxygen level in the pond between times I and II AND between times III and IV.

PAGE FOR ANSWERING QUESTION 5

The metabolic Pathway that is Primarily responsible for the change in oxygen level in the Pond between times I & II is Photosythesis & the organism responsible is the Photosynthetic cyanobacterium Microcystis aeruginosis. The metabolic Pathway that is Primarily responsible for the change in oxygen level in the pond between times III & IV is cellular respiration & the organism responsible is the aerobic bacteria & fungi/decomposers.

GO ON TO THE NEXT PAGE.

5B,



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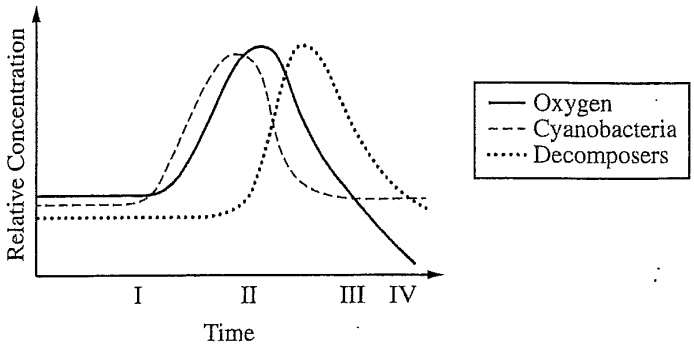
PAGE FOR ANSWERING QUESTION 5

Between times I and II the metabolic pathway responsible for the change in oxygen is photosynthesis and the organism is the Microcystis aeruginosis cyanobacterium. Between times III and IV the pathway is glycolysis and the organism is the bacteria and fungi.

5C,



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PAGE FOR ANSWERING QUESTION 5

The organism that is primarily responsible for the change in oxygen levels in the pond between time I and II is the cyanobacteria. The organism that is primarily responsible for the change in oxygen levels in the pond between time III and IV is the decomposers.

AP® BIOLOGY
2017 SCORING COMMENTARY

Question 5

Overview

This question focused on analyzing data to identify the causes of change in oxygen levels in a pond community. Students were presented with a graph showing the relative concentrations of cyanobacteria, decomposers, and oxygen in a pond ecosystem over time. Students were asked to identify the metabolic pathway and the organism that was primarily responsible for the change in oxygen levels between time points.

Sample: 5A
Score: 4

The response earned 1 point for identifying that the metabolic pathway responsible for the change in oxygen level in the pond between times I and II is photosynthesis. The response earned 1 point for identifying that the organism responsible for the change in oxygen level between times I and II is the photosynthetic cyanobacterium. The response earned 1 point for identifying that the metabolic pathway responsible for the change in oxygen level between times III and IV is cellular respiration. The response earned 1 point for identifying that the organism responsible for the change in oxygen level between times III and IV is the aerobic bacteria. The response could have earned 1 point for identifying fungi or decomposers as the organism responsible for the change in oxygen level between times III and IV, but the point had already been earned.

Sample: 5B
Score: 3

The response earned 1 point for identifying that the metabolic pathway responsible for the change in oxygen level in the pond between times I and II is photosynthesis. The response earned 1 point for identifying that the organism responsible for the change in oxygen level between times I and II is *Microcystis aeruginosis*. The response earned 1 point for identifying that between times III and IV the organism responsible for the change in oxygen level is the bacteria. The response could have earned 1 point for identifying fungi as the organism responsible for the change in oxygen level between times III and IV, but the point had already been earned.

Sample: 5C
Score: 2

The response earned 1 point for identifying that the organism responsible for the change in oxygen level between times I and II is the cyanobacteria. The response earned 1 point for identifying that the organism responsible for the change in oxygen level in the pond between times III and IV is the decomposers.