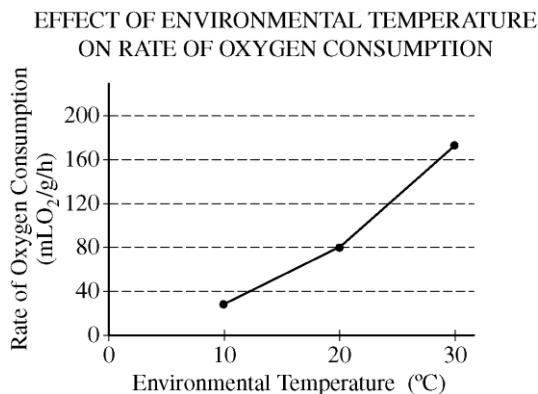


**AP[®] BIOLOGY
2014 SCORING GUIDELINES**

Question 7



- (a) Based on the graph, **describe** a specific method of thermoregulation used by the species of animal. **Provide** support for your answer using the data. (2 points maximum; LO 2.21, 2.24, 2.27)

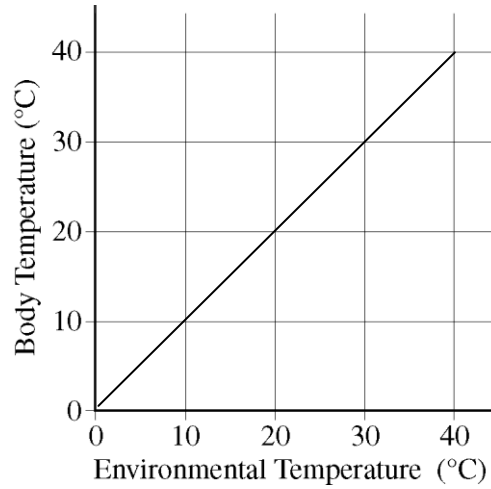
NOTE: students may only earn points within one row.

Describe method (1 point)	Support (1 point)
This species is an ectotherm/incapable of endoregulation	<ul style="list-style-type: none"> • Increased metabolic rate/O₂ consumption rate/respiration rate with increased temperature • Decreased metabolic rate/O₂ consumption rate/respiration rate with decreased temperature • If the animal were endothermic, O₂ consumption rate/respiration rate/metabolic rate would increase with decreasing temperature
Behavior to adjust body temperature, i.e., seeking shade, basking in the sun, burrowing in mud, evaporative cooling	<ul style="list-style-type: none"> • Increased metabolic rate/O₂ consumption rate/respiration rate with increased temperature • Decreased metabolic rate/O₂ consumption rate/respiration rate with decreased temperature • This species is ectothermic/incapable of endoregulation

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Question 7 (continued)

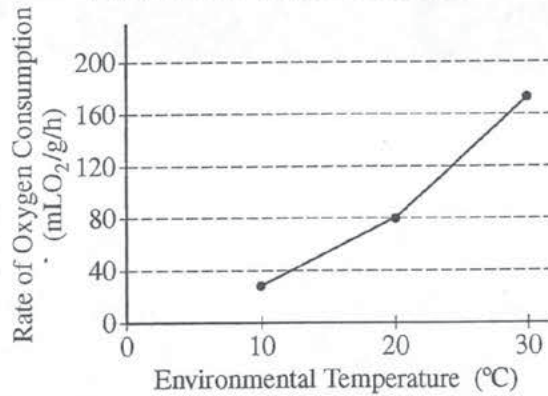
- (b) On the labeled axis provided below, **draw** a line to indicate the most likely relationship between body temperature and environmental temperature in the species. (**1 point**; LO 2.22)



- Line/curve with positive slope

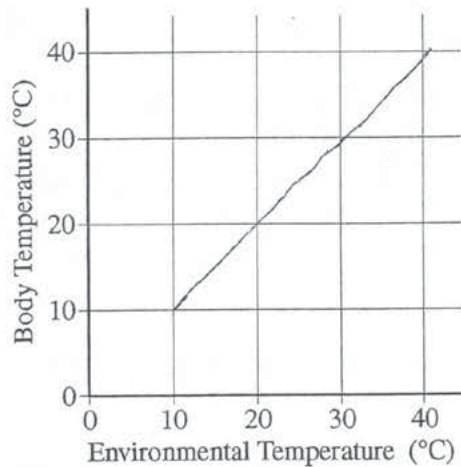
7A1

EFFECT OF ENVIRONMENTAL TEMPERATURE
ON RATE OF OXYGEN CONSUMPTION



7. (a) Based on the graph, **describe** a specific method of thermoregulation used by the species of animal. **Provide** support for your answer using the data.
- (b) On the labeled axis provided below, **draw** a line to indicate the most likely relationship between body temperature and environmental temperature in the species.

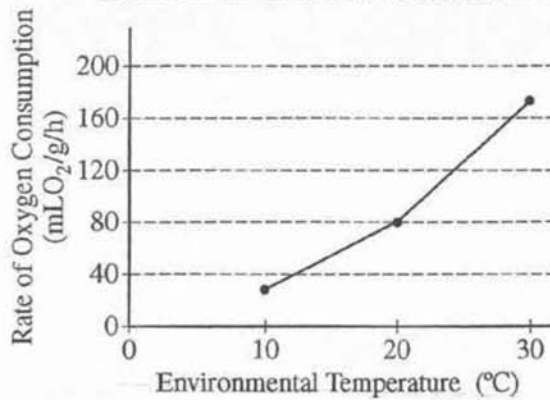
PAGE FOR ANSWERING QUESTION 7



A method of thermoregulation is ectothermic regulation experienced by cold-blooded animals such as reptiles like lizards. Ectothermic regulation means that the environment controls the body temperature of the organism. As the environmental temperature increased, body temperature and other metabolic

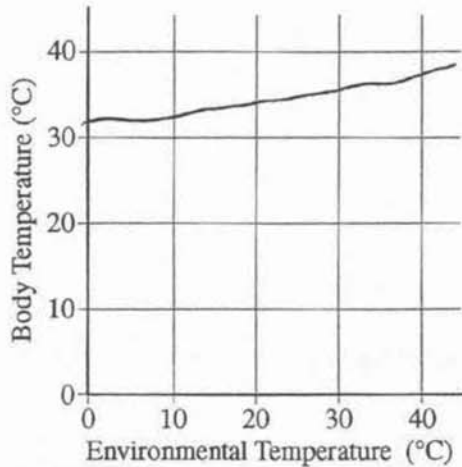
EFFECT OF ENVIRONMENTAL TEMPERATURE
ON RATE OF OXYGEN CONSUMPTION

7B



7. (a) Based on the graph, **describe** a specific method of thermoregulation used by the species of animal. **Provide** support for your answer using the data.
- (b) On the labeled axis provided below, **draw** a line to indicate the most likely relationship between body temperature and environmental temperature in the species.

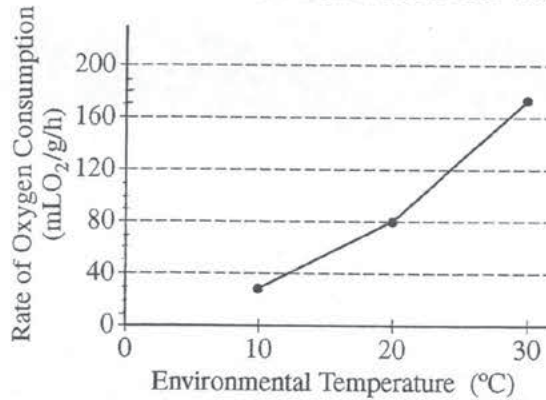
PAGE FOR ANSWERING QUESTION 7



The animal may burrow itself
in a hole to keep cold.

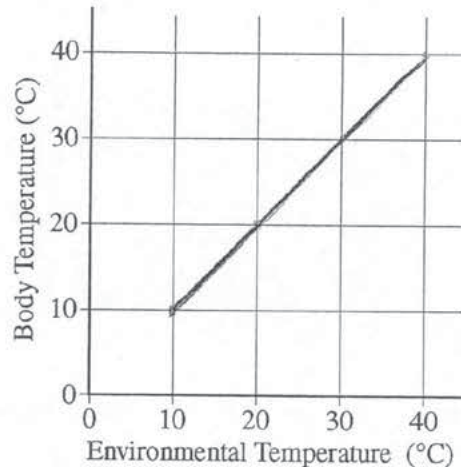
EFFECT OF ENVIRONMENTAL TEMPERATURE
ON RATE OF OXYGEN CONSUMPTION

7C



7. (a) Based on the graph, **describe** a specific method of thermoregulation used by the species of animal. **Provide** support for your answer using the data.
- (b) On the labeled axis provided below, **draw** a line to indicate the most likely relationship between body temperature and environmental temperature in the species.

PAGE FOR ANSWERING QUESTION 7



A method of thermoregulation used by this species is increased oxygen intake in higher temperatures. The graph supports this statement because it demonstrates that the rate of oxygen consumption was only 30 mL O₂/g/h at 10°C and 170 mL O₂/g/h at 30°C.

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2014 SCORING COMMENTARY

Question 7

Question 7 was written to the following Learning Objectives in the AP Biology Curriculum Framework: 2.21, 2.22, 2.24, and 2.27.

Overview

Question 7 asks students to analyze data to connect patterns in an abiotic factor to behavioral mechanisms used to maintain homeostasis. Students were asked to describe a method of thermoregulation most likely used by the animal species. Students were asked to justify their answer using a graph that shows an increasing rate of oxygen consumption with increasing environmental temperature. Students were then asked to refine a model (graph) by drawing a line illustrating the relationship between body temperature and environmental temperature for the species in question.

Sample: 7A

Score: 3

The response in Sample 7A earned 1 point in part (a) for describing that the method of thermoregulation is ectothermic. The response earned 1 point for providing the support that, “As the environmental temperature increased, body temperature and other metabolic activities increased causing an increase in rate of oxygen consumption.”

The response earned 1 point in part (b) for drawing a line with positive slope on the labeled axes provided.

Sample: 7B

Score: 2

The response in Sample 7B earned 1 point in part (a) for describing that the animal uses behavior to regulate body temperature (“burrow itself in a hole to keep cold”).

The response earned 1 point in part (b) for drawing a line with positive slope on the labeled axes provided.

Sample: 7C

Score: 1

The response in Sample 7C earned 1 point in part (b) for drawing a line with positive slope on the labeled axes provided.