

Chapter 9

Energy in a Cell

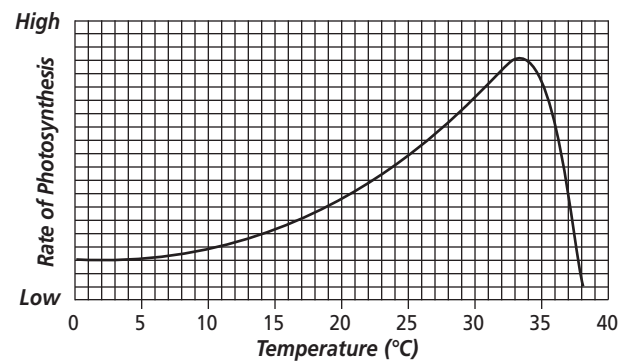
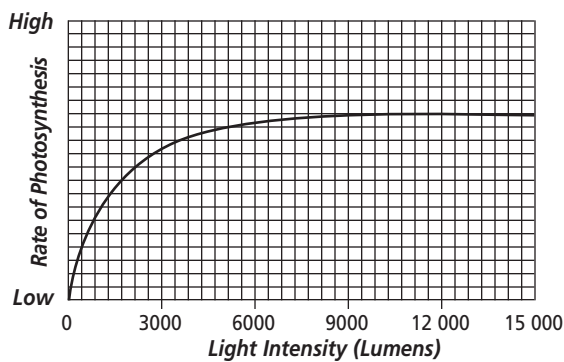
Critical Thinking/Problem Solving

Use with Chapter 9, Section 9.2

Two Factors Affecting Photosynthesis

The rate at which photosynthesis occurs is not always the same. The intensity of light, temperature, supply of carbon dioxide, supply of water, and availability of minerals are important factors that affect the rate of photosynthesis in land plants. The rate also varies by species and a plant's health and maturity. The two graphs below show the effects of

light intensity and temperature on the rate of photosynthesis in land plants. These two factors affect many enzymes that control photosynthetic reactions. Study the graphs and answer the questions that follow. (Light intensity is measured in lumens, the SI unit of light flow.)



1. What does the graph on the left tell about the effect of light intensity on the rate of photosynthesis?

2. What happens when light intensity rises above 9000 lumens?

3. What adaptive advantages would a plant have if its photosynthetic rate kept increasing with light intensity above 9000 lumens?

4. What does the graph on the right tell about the effect of temperature on the rate of photosynthesis?

5. What happens when the temperature rises above 33°C?

6. What might cause this change?

7. What light intensity and temperature levels allow the highest photosynthesis rate?

Name _____

Date _____

Class _____

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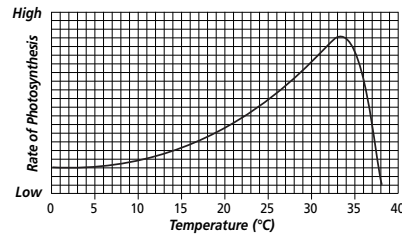
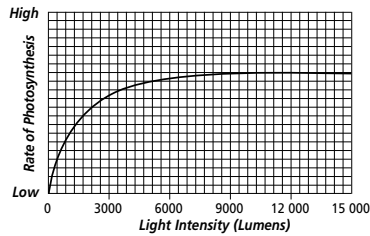
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Two Factors Affecting Photosynthesis

The rate at which photosynthesis occurs is not always the same. The intensity of light, temperature, supply of carbon dioxide, supply of water, and availability of minerals are important factors that affect the rate of photosynthesis in land plants. The rate also varies by species and a plant's health and maturity. The two graphs below show the effects of

light intensity and temperature on the rate of photosynthesis in land plants. These two factors affect many enzymes that control photosynthetic reactions. Study the graphs and answer the questions that follow. (Light intensity is measured in lumens, the SI unit of light flow.)



- What does the graph on the left tell about the effect of light intensity on the rate of photosynthesis?
The rate of photosynthesis increases as light intensity increases to about 9000 lumens, indicating that there are other factors that limit photosynthesis.
- What happens when light intensity rises above 9000 lumens?
The rate of photosynthesis does not increase; it levels off.
- What adaptive advantages would a plant have if its photosynthetic rate kept increasing with light intensity above 9000 lumens?
Accept reasonable answers. A plant could carry on photosynthesis and survive in very intense light.
- What does the graph on the right tell about the effect of temperature on the rate of photosynthesis?
The rate of photosynthesis increases as the temperature increases to about 33°C.
- What happens when the temperature rises above 33°C?
The rate of photosynthesis sharply decreases.
- What might cause this change?
Accept reasonable answers. The increasing temperature causes enzymes to break down, which results in a rapid decrease in the rate of photosynthesis.
- What light intensity and temperature levels allow the highest photosynthesis rate?
Light intensity of 9000 lumens and a temperature of about 33°C allow the highest photosynthesis rate.