Light in the Shade

Trace how plants turn light into stored energy.

L.5.3A "Students will demonstrate an understanding of photosynthesis and the transfer of energy from the sun into chemical energy necessary for plant growth and survival..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the two kinds of light that reach plants in the passage, and circle the two materials plants take in to make sugar. Write 1 beside the sentence about storing energy in sugar and 2 beside the sentence about using sugar to keep cells working.

Can a Plant Grow Without Direct Sun?

1. A bean plant sits in a courtyard where a high wall blocks direct sunlight. The sky is still bright above the wall, so some scattered sunlight reaches its leaves. Leaves take in this light through chlorophyll, a green substance. The light gives the plant energy to make food. A plant in deep shade may grow slowly because less light reaches it, but shade does not always mean total darkness.

2. To make food, the bean plant takes in carbon dioxide from the air and water from the soil. Light energy helps it turn these materials into sugar, a form of stored chemical energy. This process is called photosynthesis. The plant also releases oxygen into the air. It can use the sugar to build new parts and release energy from sugar to keep its cells working, even when it is dark.

3. Now imagine a bean plant inside a windowless storage room. No sunlight, direct or scattered, reaches it, so it cannot make sugar by photosynthesis in the dark. A grow lamp can provide light instead. With light from the lamp, water, and carbon dioxide, the plant can make sugar. The lamp needs electricity. The plant can use stored sugar while the lamp is off, but it makes no new sugar then.

2 ANSWER WITH EVIDENCE

Use the passage

1. How can the courtyard bean plant photosynthesize when the wall blocks direct sunlight?

2. How does energy from sunlight become energy the courtyard plant can store? Include what the plant takes in.

3. While the grow lamp is off, what can the plant use to keep its cells working? What can it not make in the dark?

4. What could you add to the windowless storage room so the plant can make sugar? Explain how your addition would get the energy it needs.

3 YOUR TURN

Your own words

Choose a place without direct sunlight that is different from the courtyard and storage room. In three or four sentences, explain how a plant there could get light, make sugar, and use that sugar to grow or survive.

ANSWER KEY

Light in the Shade

GRADE 5 · L.5.3A

PART 1 · READ AND MARK

Underline the two kinds of light that reach plants in the passage, and circle the two materials plants take in to make sugar. Write 1 beside the sentence about storing energy in sugar and 2 beside the sentence about using sugar to keep cells working. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How can the courtyard bean plant photosynthesize when the wall blocks direct sunlight?	**Scattered sunlight still reaches its leaves and provides light energy for photosynthesis.**
2	How does energy from sunlight become energy the courtyard plant can store? Include what the plant takes in.	**The plant takes in light, water, and carbon dioxide. During photosynthesis, light energy helps it make sugar that stores chemical energy.**
3	While the grow lamp is off, what can the plant use to keep its cells working? What can it not make in the dark?	**It can release energy from stored sugar to keep its cells working, but it cannot make new sugar by photosynthesis in the dark.**
4	What could you add to the windowless storage room so the plant can make sugar? Explain how your addition would get the energy it needs.	**Add a grow lamp. Electricity powers the lamp, which provides light the plant can use to make sugar.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A plant on a windowless submarine needs an electric grow lamp because sunlight cannot reach it. The lamp gives the plant light for photosynthesis. With that light, water, and carbon dioxide, the plant makes sugar and releases oxygen. It uses the sugar to build new parts and releases energy from sugar to keep its cells working.

Accept a source of indirect sunlight or an artificial light that reaches the plant. The response should connect light, water, and carbon dioxide to sugar and explain how the plant uses that sugar.