What Are Chloroplasts?

Worksheet

Chloroplasts are organelles containing chlorophyll that use light energy to convert carbon dioxide and water into glucose and oxygen through photosynthesis.

Questions

1. What is the main product of photosynthesis that stores energy?

A) Oxygen
B) Water
C) Glucose
D) Carbon dioxide

2. Where do the light reactions of photosynthesis take place?

A) Stroma
B) Thylakoid membrane
C) Mitochondrial matrix
D) Nucleus

3. What gas is released when water splits during the light reactions?

A) Carbon dioxide
B) Nitrogen
C) Oxygen
D) Hydrogen gas

4. What happens to the Calvin cycle if a plant gets no light?

A) It speeds up
B) It is unaffected
C) It stops because ATP/NADPH run out
D) It switches to using oxygen instead

5. A plant is kept in complete darkness for several days. Predict what happens to its photosynthesis and explain why.

6. Why do leaves appear green?

7. Explain why chloroplasts have a large internal membrane system (thylakoids) instead of a single flat membrane.

8. Define: What do chloroplasts do?

9. Define: What pigment captures light in chloroplasts?

10. Define: Where do the light reactions occur?

Answer Key

1. C) Glucose - Photosynthesis converts light energy into chemical energy stored in glucose.

2. B) Thylakoid membrane - Chlorophyll in the thylakoid membranes captures light for the light reactions.

3. C) Oxygen - Splitting water releases oxygen as a byproduct.

4. C) It stops because ATP/NADPH run out - The Calvin cycle depends on ATP and NADPH made by the light reactions, which stop without light.

5. The light reactions need sunlight to split water and generate ATP and NADPH. Without light, the light reactions stop, so no ATP/NADPH are made. The Calvin cycle then also stops (it depends on those products), so no new glucose is produced.

6. Chlorophyll, the main pigment in chloroplasts, absorbs red and blue light strongly. It reflects green light instead of absorbing it. Our eyes detect that reflected green light, so leaves look green.

7. Photosynthesis's light reactions happen on the thylakoid membrane, where chlorophyll and enzymes are embedded. Stacking thylakoids into grana increases the membrane's total surface area. More surface area means more light-capturing pigment and faster ATP/NADPH production.

8. They carry out photosynthesis, converting light energy into chemical energy stored in glucose.

9. Chlorophyll, located in the thylakoid membranes.

10. In the thylakoid membranes.