What Are Chloroplasts and How Does Photosynthesis Work?

Worksheet

Photosynthesis is the process by which chloroplasts use light energy to convert carbon dioxide and water into glucose and oxygen, occurring in two stages: the light-dependent reactions and the Calvin cycle.

Questions

1. Where do the light-dependent reactions occur?

A) Stroma
B) Thylakoid membrane
C) Mitochondria
D) Nucleus

2. What is the overall formula for photosynthesis?

A) C6H12O6 + O2 CO2 + H2O
B) 6CO2 + 6H2O + light C6H12O6 + 6O2
C) CO2 + O2 glucose
D) H2O H2 + O2

3. Where does the Calvin cycle take place?

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

4. What produces the oxygen released during photosynthesis?

A) Splitting of CO2
B) Splitting of water
C) Breakdown of glucose
D) The Calvin cycle

5. A plant fixes 60 CO2 molecules during the Calvin cycle. How many glucose molecules can it produce (6 CO2 1 glucose)?

6. For every glucose molecule made, 6 O2 molecules are released. How much O2 is released when a leaf makes 15 glucose molecules?

7. A greenhouse increases light intensity so a plant's photosynthesis rate doubles from 20 to 40 CO2 molecules fixed per minute. How many more glucose molecules form per minute?

8. Define: What is the main job of chloroplasts?

9. Define: What are the two main stages of photosynthesis?

10. Define: Where does oxygen released in photosynthesis come from?

Answer Key

1. B) Thylakoid membrane - The light reactions occur in the thylakoid membrane, where chlorophyll captures light.

2. B) 6CO2 + 6H2O + light C6H12O6 + 6O2 - Photosynthesis converts CO2 and water into glucose and oxygen using light energy.

3. B) Stroma - The Calvin cycle occurs in the stroma of the chloroplast.

4. B) Splitting of water - Water molecules are split during the light reactions, releasing O2.

5. Glucose = CO2 6 Glucose = 60 6 = 10 glucose molecules

6. O2 = glucose 6 O2 = 15 6 = 90 O2 molecules

7. Glucose before = 20 6 3.33 Glucose after = 40 6 6.67 Extra glucose 6.67 3.33 3.33 more glucose molecules per minute

8. To capture light energy and convert CO2 and water into glucose and oxygen via photosynthesis.

9. The light-dependent reactions (thylakoid) and the Calvin cycle (stroma).

10. From splitting water molecules during the light reactions.