

# What is Chloroplast Structure and Function?

## Worksheet

Chloroplasts use chlorophyll in thylakoid membranes to capture light energy (light reactions) and use that energy in the stroma to fix carbon dioxide into glucose (Calvin cycle/dark reactions).

## Questions

1. Where do the light reactions of photosynthesis occur?
  - A) Stroma
  - B) Thylakoid membrane
  - C) Mitochondrial matrix
  - D) Nucleus
2. What is the main product of the Calvin cycle?
  - A) Oxygen
  - B) Water
  - C) Glucose
  - D) Carbon dioxide
3. Which molecule absorbs light energy in chloroplasts?
  - A) Hemoglobin
  - B) Chlorophyll
  - C) Keratin
  - D) Insulin
4. What is released when water is split during the light reactions?
  - A) Carbon dioxide
  - B) Nitrogen
  - C) Oxygen
  - D) Methane
5. A chloroplast fixes 36 CO<sub>2</sub> molecules. How many glucose molecules can it make?
6. Why do chloroplasts appear green?
7. A leaf chloroplast produces 12 O<sub>2</sub> molecules during light reactions. How many H<sub>2</sub>O molecules were split?
8. Define: What is the main function of a chloroplast?
9. Define: What are grana and stroma?
10. Define: What pigment captures light in chloroplasts?

## Answer Key

1. B) Thylakoid membrane - The light reactions occur in the thylakoid membranes, where chlorophyll is located.
2. C) Glucose - The Calvin cycle uses CO<sub>2</sub>, ATP and NADPH to build glucose.
3. B) Chlorophyll - Chlorophyll is the primary light-absorbing pigment in chloroplasts.
4. C) Oxygen - Photolysis of water releases oxygen gas as a byproduct.
5. 6 CO<sub>2</sub> 1 glucose Glucose = 36 / 6 = 6 molecules
6. Chlorophyll absorbs red and blue wavelengths of light Green wavelengths are reflected, not absorbed The reflected green light is what we see
7. Photolysis: 2H<sub>2</sub>O O<sub>2</sub> + 4H<sup>+</sup> + 4e<sup>-</sup> Each O<sub>2</sub> comes from 2 H<sub>2</sub>O H<sub>2</sub>O split = 12 2 = 24 molecules
8. To carry out photosynthesis, converting light energy into chemical energy stored in glucose.
9. Grana are stacks of thylakoid membranes (light reactions); stroma is the fluid around them (Calvin cycle).
10. Chlorophyll, located in the thylakoid membranes.

### **Bounlu**

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