Photosynthesis: How Plants Make Food

Ages 13–16 · Science

Name _____ Class _____ Date _____

A Key terms: match each term to its meaning

Write the letter of the correct meaning in the box next to each term.

1 **Photosynthesis**	☐	**A** Column-shaped, tightly packed cells near the top of a leaf that contain many chloroplasts.
2 **Chlorophyll**	☐	**B** The structure in plant cells where photosynthesis happens.
3 **Chloroplast**	☐	**C** Tiny pores, mostly on the underside of a leaf, that let carbon dioxide in and oxygen and water vapour out; each is opened and closed by two guard cells.
4 **Stomata**	☐	**D** The process in every living cell that releases energy from glucose.
5 **Palisade cells**	☐	**E** A carbohydrate that plants make from glucose to store energy, for example in roots and seeds.
6 **Limiting factor**	☐	**F** The process in which plants and algae use light energy to make glucose and oxygen from carbon dioxide and water.
7 **Starch**	☐	**G** The factor in shortest supply, which holds back the rate of a process even if other factors are increased.
8 **Respiration**	☐	**H** The green pigment in chloroplasts that absorbs light energy, mostly red and blue light.

B Quick quiz

Circle the best answer, write its letter, then explain your choice in a few words.

1 Which of these is the correct word equation for photosynthesis?

a) Glucose + oxygen → carbon dioxide + water
b) Carbon dioxide + water → glucose + oxygen
c) Carbon dioxide + oxygen → glucose + water
d) Water + oxygen → glucose + carbon dioxide

Answer: _____ Why? _____

2 Why are most chloroplasts found in the palisade cells near the top of a leaf?

a) That is where the most light reaches
b) That is where the roots are
c) Chloroplasts are too heavy to sink lower
d) The stomata are on the top surface

Answer: _____ Why? _____

3 A plant is kept warm and given plenty of carbon dioxide, but it is in dim light. What will increase its rate of photosynthesis most?

a) Adding more carbon dioxide
b) Raising the temperature further
c) Increasing the light intensity
d) Adding more oxygen

Answer: _____ Why? _____

4 Which of these is NOT a way a plant uses the glucose it makes?

a) Storing it as starch
b) Building cellulose for cell walls
c) Releasing energy by respiration
d) Turning it into carbon dioxide to release through roots for photosynthesis

Answer: _____ Why? _____

5 Where does the oxygen released during photosynthesis come from?

a) Carbon dioxide
b) Water
c) Glucose
d) Chlorophyll

Answer: _____ Why? _____

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Answer key for teachers · Ages 13–16 · Science

A Key terms

1	**Photosynthesis**	F	The process in which plants and algae use light energy to make glucose and oxygen from carbon dioxide and water.
2	**Chlorophyll**	H	The green pigment in chloroplasts that absorbs light energy, mostly red and blue light.
3	**Chloroplast**	B	The structure in plant cells where photosynthesis happens.
4	**Stomata**	C	Tiny pores, mostly on the underside of a leaf, that let carbon dioxide in and oxygen and water vapour out; each is opened and closed by two guard cells.
5	**Palisade cells**	A	Column-shaped, tightly packed cells near the top of a leaf that contain many chloroplasts.
6	**Limiting factor**	G	The factor in shortest supply, which holds back the rate of a process even if other factors are increased.
7	**Starch**	E	A carbohydrate that plants make from glucose to store energy, for example in roots and seeds.
8	**Respiration**	D	The process in every living cell that releases energy from glucose.

B Quick quiz

1 **b) Carbon dioxide + water → glucose + oxygen**
Plants take in carbon dioxide and water and, using light energy absorbed by chlorophyll, make glucose and release oxygen. The first option is the equation for aerobic respiration.

2 **a) That is where the most light reaches**
Palisade cells sit just under the upper surface, where light arrives first, so packing chloroplasts there captures the most light energy.

3 **c) Increasing the light intensity**
Light intensity is the limiting factor here because it is in shortest supply. Raising the other factors makes little difference until more light is available.

4 **d) Turning it into carbon dioxide to release through roots for photosynthesis**
Plants use glucose for respiration, store it as starch, build cellulose from it and convert it to sucrose for transport. Carbon dioxide for photosynthesis comes from the air through the stomata.

5 **b) Water**
Light energy splits water molecules in the chloroplasts, and the oxygen released comes from that water. The carbon dioxide provides the carbon that ends up in glucose.