

Photosynthesis for Kids: the recipe, the leaf, two experiments and a 15-question worksheet

The recipe

Water (from the roots) + carbon dioxide (from the air) + light energy (caught by chlorophyll, the green stuff) = sugar (the plant's food) + oxygen (given off).

In symbols: $6\text{CO}_2 + 6\text{H}_2\text{O} + \text{light} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

The leaf is the kitchen

Roots drink water; the stem carries it up. Tiny holes under the leaf (stomata) let carbon dioxide in and oxygen out. Chlorophyll in the leaf cells catches the light. The sugar travels to wherever the plant needs it: new leaves, flowers, fruit, roots.

Two experiments

1. Starch test: keep a plant in the dark for two days, then put one leaf in the sun with a strip of foil clipped over part of it for a day. Boil the leaf briefly, soak in warm alcohol to remove the green, rinse, add iodine. The sunlit part turns blue-black (starch, made from sugar); the covered part stays brown. No light, no food.
2. Bubbles: put pondweed (Elodea) in a jar of water in bright light. Count the bubbles a minute; move the jar into shade and count again. The bubbles are oxygen, and there are fewer without light.

Worksheet

1. Which gas do plants take in for photosynthesis? _____
2. Which gas do plants give out? _____
3. What is the green substance that catches light called? _____
4. Where does the plant get water from? _____
5. What food does the plant make? _____
6. Name the tiny holes under a leaf. _____
7. Which part of the plant makes most of the food? _____
8. What happens to a plant kept in the dark for a week? _____
9. True or false: plants breathe out carbon dioxide at night. _____
10. Why are most leaves flat and wide? _____
11. What does iodine turn starch? _____
12. Fill in: water + carbon dioxide + _____ = sugar + oxygen
13. Why do animals need plants, even animals that eat only meat? _____
14. Which colour of light do leaves NOT use much (the colour they reflect)? _____
15. A plant in a sealed jar with a candle: does the plant help the candle burn longer? _____

Answers

1) carbon dioxide 2) oxygen 3) chlorophyll 4) the soil, through its roots 5) sugar (glucose), stored as starch 6) stomata 7) the leaves 8) it turns pale and stops growing; it uses up its stored food 9) true (respiration happens all the time; photosynthesis only in light) 10) to catch as much light as possible 11) blue-black 12) light (energy) 13) the meat came from animals that ate plants; all food chains start with plants 14) green 15) yes, in the light, because it gives off oxygen

Where this goes next

Grade 5 to 7 (US), KS2 and KS3 (UK), Year 5 to 8 (Australia) and CBSE Class 7 (Nutrition in Plants) all teach this version; Class 10 and GCSE add the chemistry and the rate experiments. 1-on-1 online science: sciencewithshobha.com/subjects/biology/