



# EXPERIMENTS



We only do an experiment to prove a hypothesis.

It ALWAYS has the same sections:

**AIM:** This is a short statement telling what you are **AIMING to PROVE.**

**METHOD:** This simply tells you (in a numbered step-by-step) what you need to **DO**. (A diagram can help clarify what your words have described.)

**RESULT:** Describes only what **HAPPENED.**

**CONCLUSION:** Briefly tells what you **PROVED.**

# WHY DO WE DO THE STARCH TEST?

- Experiment 1 shows how you test the leaf for the presence of starch. (The Starch Test.)
- Experiments 2, 3, and 4 all finish with this **Starch Test**.
- If there **is** starch in the leaf, this means that this leaf **was** photosynthesising, and storing some food.

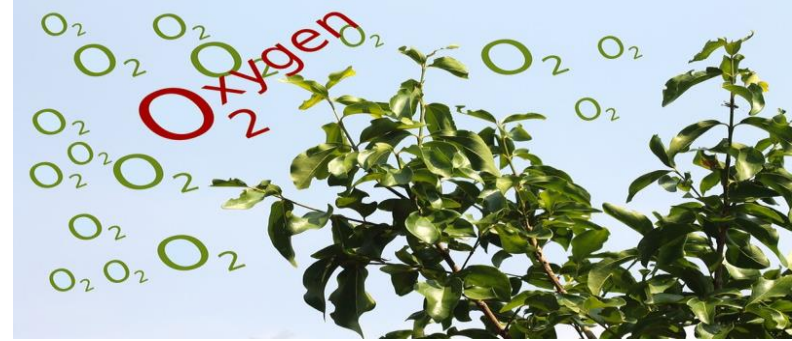
*The Leaf's Procedure explains this:*



- 1. It makes glucose (food).*
- 2. It converts **some** glucose into starch, and **stores** it in the leaf (in case it needs any extra energy).*
- 3. It sends the food made **after this** to the rest of the plant.*

**So:** If you do the Starch Test and there is **no** starch in the leaf, then it was **not** photosynthesising, and therefore had to **use** its stored reserves.

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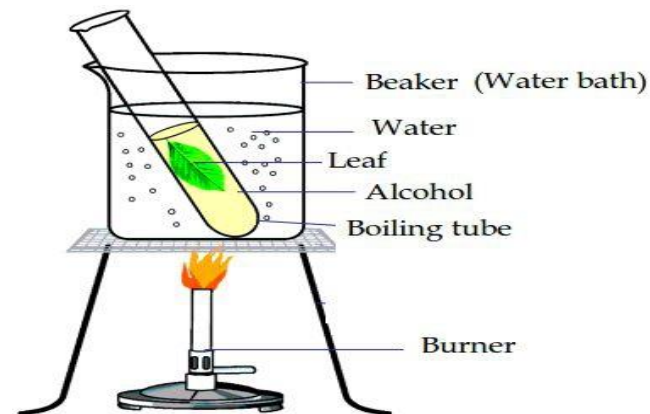


## Question 5

1. To see if Oxygen is released in PhotoSynthesis. [2]
2. 1 to 2 bubbles per minute (at distance of 180 cm) [1]
3. 140 cm [1]
4. Hold a glowing match in the gas. If it bursts into flames, this gas is Oxygen. [4]
5. CO<sub>2</sub> concentration. Temperature. [2]
6. The further away the light, the fewer bubbles. The closer the light, the more bubbles. No increase when closer than 120 cm – plant is already working at maximum capacity. [4]
7. How quickly Oxygen is released = how quickly photosynthesis is happening. [2]

## Question 6

1. To let it photosynthesise, make food, store starch. [2]
2. Stop all its functions. Soften its tissue. [2]
3. Goes from green to colourless [1]
4. Takes the chlorophyll out of the leaf. [2]
5. Do not heat it on a flame – easily flammable. [2]
6. Palisade MesoPhyll. Spongy MesoPhyll. Stomatal (Guard) cells. [3]
7. Black [1]
8. Starch is present in the leaf. [2]



## Question 7

1. Let it use up all its food reserves so there is no starch in the leaf. [2]
2. Put it in a dark cupboard for 48 hours. [2]
3. Areas exposed to light were positive for starch – those in the dark could not make food to produce starch. [4]
4. SunLight is essential for the process of PhotoSynthesis. [2]
5. To remove all the starch so you can see where subsequent photosynthesis takes place. [2]
6. It was not properly de-starched – there was still starch stored across the whole leaf. [2]

How can you tell whether  
photosynthesis has occurred or not?

By testing for starch using iodine solution.

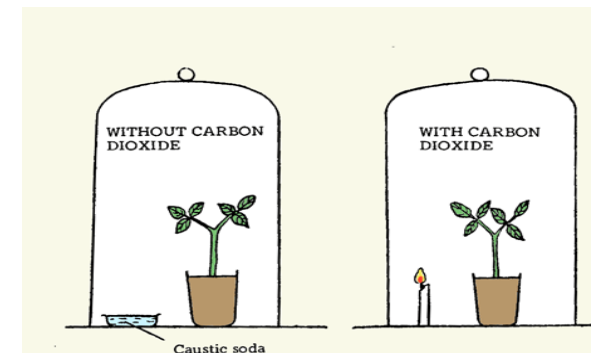


## Question 8

1. Because its green areas have chlorophyll and its white areas do not. [2]
2. Green areas tested positive for starch. Clear areas tested negative. [2]
3. Experiment: Green. Control: Clear. [2]
4. ChloroPhyll is essential for PhotoSynthesis. [2]

## Question 9

1. To see if CO<sub>2</sub> is needed for PhotoSynthesis. [2]
2. Soda lime. Caustic soda. [2]
3. To seal it and control the amount of CO<sub>2</sub> in it. [2]
4. To allow PhotoSynthesis to occur. [2]
5. Yellow [1]
6. Black [1]
7. CO<sub>2</sub> is needed in PhotoSynthesis. [1]



## Question 10

1. To show effects of different light intensities on rate of PhotoSynthesis in different concentrations of  $\text{CO}_2$ . [2]
2. [1] for each of: Heading (X & Y). *X=Light Intensity. Y=Rate of PhotoSynthesis. Regular spacing of units on X. Regular spacing of units on Y. Line graph.* [6]  
[2] for: Shape of one graph. Shape of other graph. [4]  
[1] for:  $\text{CO}_2$  concentration of each. [2]
3. Light intensity. Carbon Dioxide. [2]
4. Higher concentrations of  $\text{CO}_2$  result in quicker photosynthesis. [2]  
Maximum photosynthesis occurs in the plant with 5 units of light intensity. [2]

