

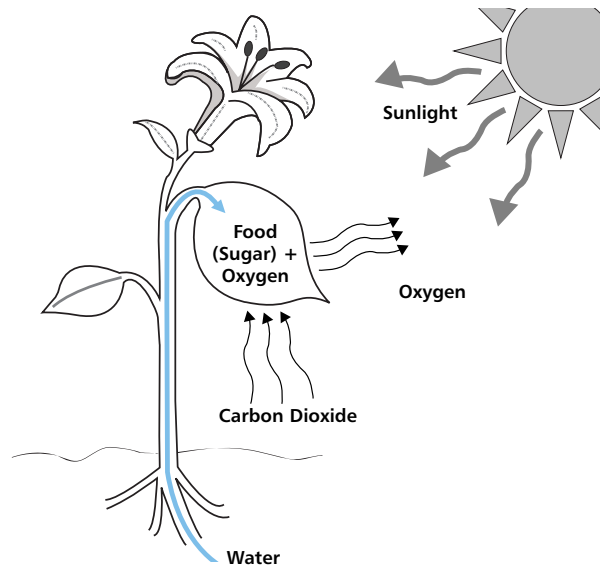
# Photosynthesis Explored

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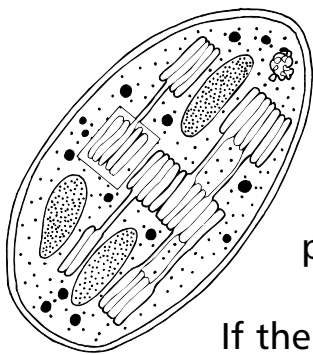
Plants can make their own food which they use for energy to grow.

Plants contain a green chemical called **chlorophyll** which can absorb energy from sunlight. This energy is used to turn the simple chemicals **carbon dioxide** gas from the air, and **water** from the soil) into larger chemicals called **sugars**.



## Chemical reaction:

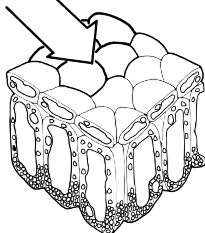
**Carbon dioxide + water + light energy → sugar (glucose) + oxygen**



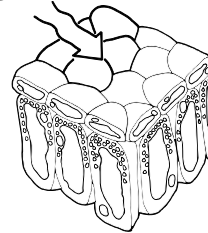
Most of a plant's chlorophyll is found in the cells of its leaves - it is what makes them green. It is stored in little discs called **chloroplasts**, which are found just inside the cell walls. These chloroplasts can move about the cell, according to the Sun's position and strength.

If the sunlight is very strong the chloroplasts move down the cell, away from the light. If it is weak they move up the cell again.

**Strong Sunlight**



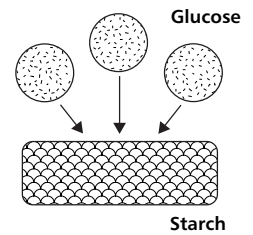
**Weak Sunlight**



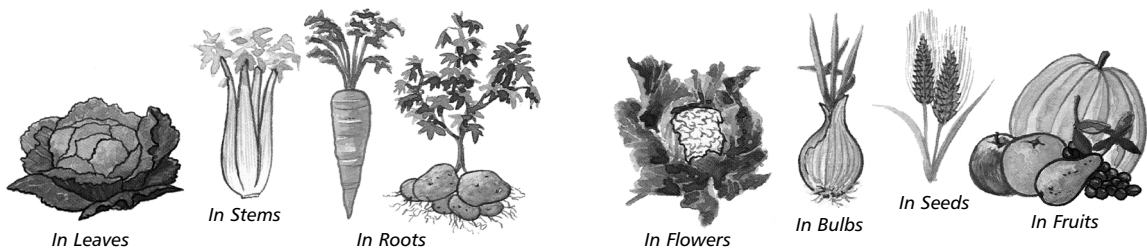
**Moving and storing food**

Glucose dissolves easily in water. This means its can be carried around the plant in the plant's sap.

When plants produce more glucose than they need, they join the molecules together and turn them into **starch**. Starch does not dissolve in water, so it is often a good way of storing food.



The pictures below show where different plants store their food. Biologists often test for starch to see whether photosynthesis has taken place.

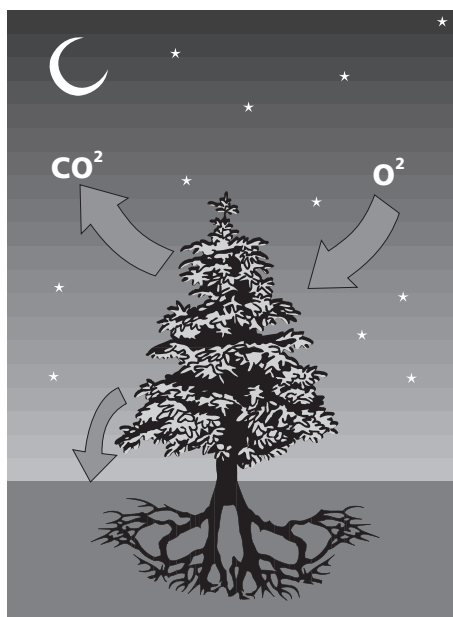


**Respiration**

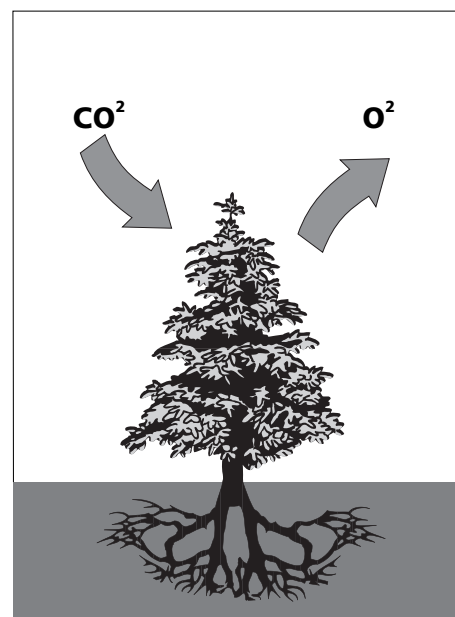
Like animals, plants need to take in oxygen to release energy from their food. This process is called **respiration**.

**When plants respire they take in oxygen and give out carbon dioxide.**

Respiration continues throughout the night when a plant cannot photosynthesize.



In Darkness



In Daylight

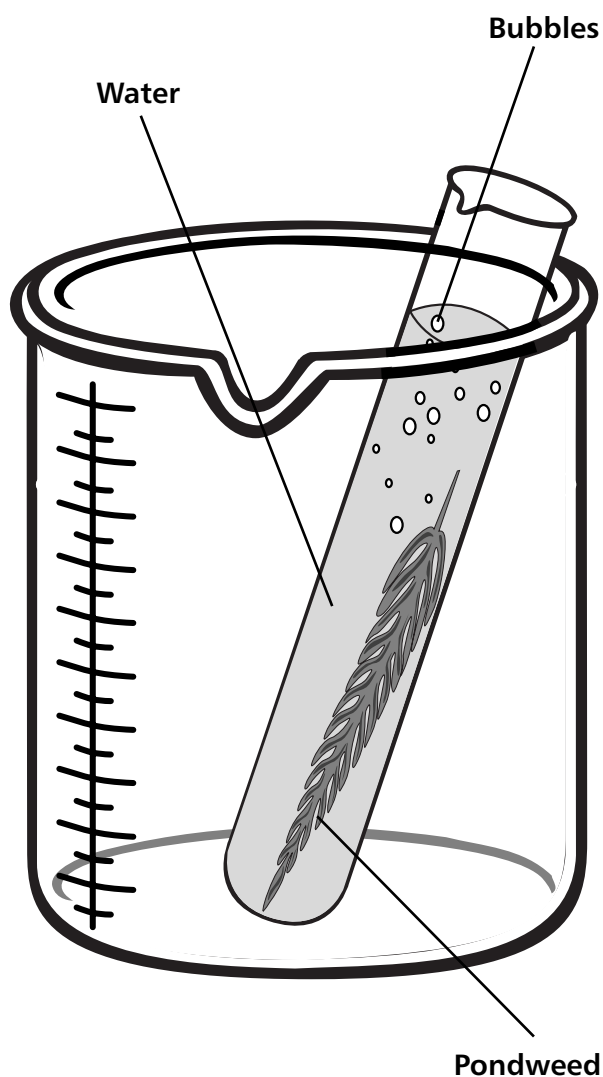
## Canadian Pondweed - bubble experiment

### You need:

- living, clean pondweed from a pet shop
- a test tube
- a ruler
- a timer
- water (containing 4 - 5 teaspoon measures of bicarbonate of soda).

### What to do:

- 1) Put the pondweed into the test tube.
- 2) Put the test tube in a beaker and pour in the water (containing bicarbonate of soda).
- 3) Look for bubbles coming from the cut end of the pondweed. The bubbles will float upwards.
- 4) What do you think the bubbles are filled with?



Do you think that changing the amount of light a plant gets will affect photosynthesis?

You can investigate the effect of light strength on the RATE of photosynthesis (how quickly photosynthesis proceeds) by counting the number of bubbles of gas released per minute by the plant.

Look back at the equation for photosynthesis on the first page of this leaflet. The equation gives you the name of the gas that is being produced.

The gas bubbles are a by-product of photosynthesis, so the quicker they are produced, the quicker the rate of photosynthesis must be. Draw a picture of your experiment and use the table on page 4 to record your results.



## Investigating the effect of light on photosynthesis

by \_\_\_\_\_ (names)

**The equipment we will use:**

**How we have kept our test fair:**

**Our prediction:**

**Our results:**

Distance of light source from plant	Number of gas bubbles per minute
100 cm	
60 cm	
40 cm	
30 cm	
25 cm	

**We found out that:**