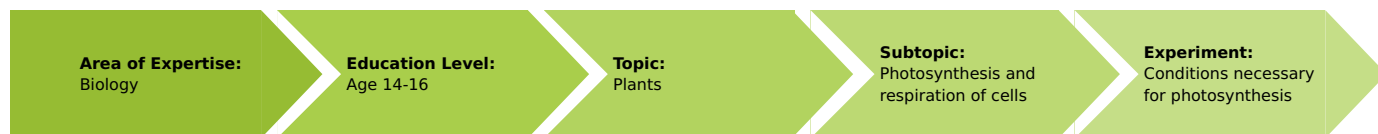


# Conditions necessary for photosynthesis (Item No.: P8011800)

## Curricular Relevance



### Difficulty



Intermediate

### Preparation Time



10 Minutes

### Execution Time



30 Minutes

### Recommended Group Size



2 Students

### Additional Requirements:

- Nasturtium pot plant
- Pins
- Cork disc

### Experiment Variations:

### Keywords:

Detection of starch, Assimilation

## Task and equipment

## Information for teachers

## Additional Information

Photosynthesis (assimilation of CO<sub>2</sub>) can be described as the ability of green plants to form organic carbon compounds from carbon dioxide and water with the aid of light energy. Sugar and starch are formed in this way via numerous intermediate stages. Photosynthesis is the most important biochemical process on earth as it supplies plants with the basic structural and energetic compounds without which life and growth would not be possible. Organisms that are incapable of photosynthesis live directly or indirectly off of the assimilation of green plants. Life in its present form is only possible because of photosynthesis.

## Hints on Set-up and Action

- To perform this experiment, two days are needed due to waiting periods.



## Hazards!

- Ethyl alcohol is flammable.
- Extinguish all flames before handling it!

# Conditions necessary for photosynthesis (Item No.: P8011800)

## Task and equipment

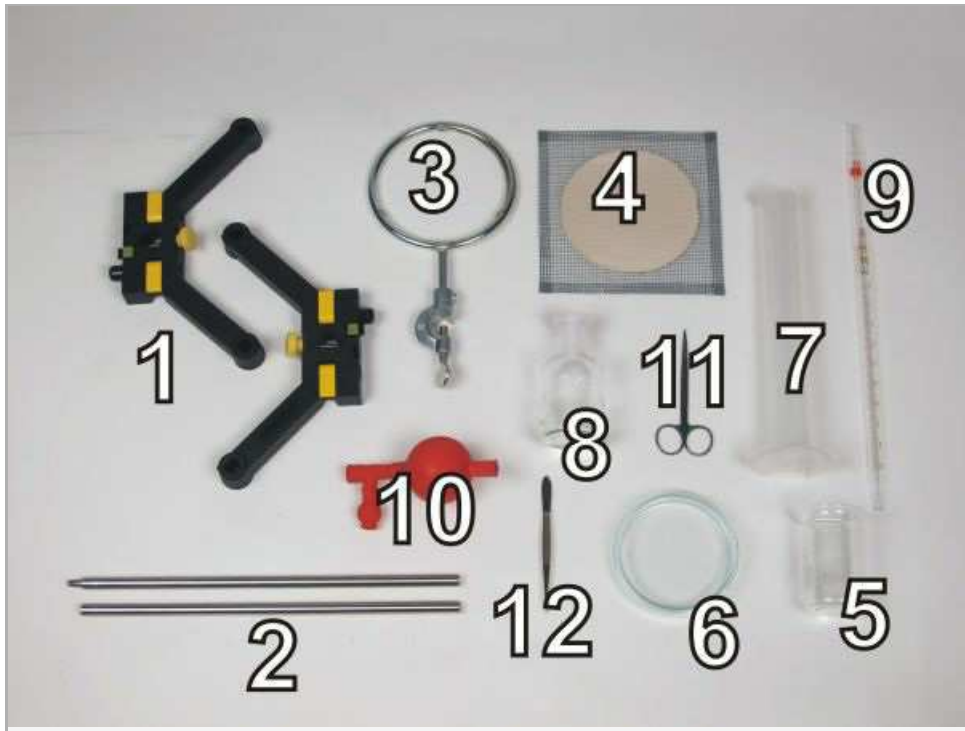
### Task

#### What does a plant need for photosynthesis?

Examine under which conditions a plant is able to form sugar and starch.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, l = 600 mm, d = 10 mm, split in 2 rods with	02035-00	1
3	Support ring, i.d. 130mm,w.boss	37722-03	1
4	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
5	Glass beaker DURAN®, tall, 100 ml	36002-00	1
6	Petri dish, d 100 mm	64705-00	1
7	Graduated cylinder 100 ml, PP transparent	36629-01	1
8	Bottle,nar.mouth,100ml,clear,p.st	41101-01	1
9	Graduated pipette 10 ml	36600-00	1
10	Pipettor,bulb,3 valves, 10ml max.	47127-01	1
11	Scissors,straight,pointed,l 110mm	64623-00	1
12	Tweezers,straight,pointed,120mm	64607-00	1
	Butane burner, Labogaz 206 type	32178-00	1
	Butane cartridge C206, without valve	47535-01	1
	Iodine potass.iodide sol., 250 ml	30094-25	1
	Denaturated alcohol (spirit for burning), 1000 ml	31150-70	1
	Water, distilled 5 l	31246-81	1
Additional material			
	Nasturtium pot plant		
	Pins		
	Cork discs		

## Set-up and procedure

### Hazards!

- Ethyl alcohol is flammable.
- Extinguish all flames before handling it!



In the evening, pin two pairs of 30 mm cork disks to two leaves of a well developed nasturtium pot plant (Fig. 1). Make sure the two disks, one on top of the leaf and one on the bottom, cover each other exactly (Fig. 2).



Fig. 1



Fig. 2

The following morning place the plant where it can receive the maximum light, if possible, the partly darkened leaves should be exposed to direct sunlight for a while. If there is no sun, place the plant under a bright lamp. After 3 - 4 hours heat water to boiling in a 100 ml beaker using the support base, rod, ring and wire gauze (Fig. 3).



Fig. 3

Pluck the partly darkened leaves from the plant and put them in the boiling water to die. After one minute take out the leaves with a pair of tweezers and put them in a 100 mm Petri dish filled with 96 % Ethanol (ethyl alcohol) (Fig. 4).

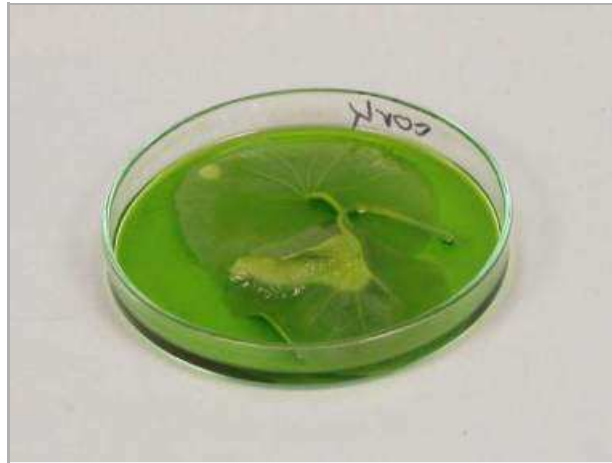


Fig. 4

After 1 - 2 hours the leaves should have become almost colourless. Rinse them in water (Fig. 5), put them in a clean Petri dish and pour Lugol's iodine potassium-iodide over them. Note your observations in the report.



Fig. 5

## Report: Conditions necessary for photosynthesis

### Result - Observations

What changes can you observe after the use of Lugol's iodine potassium-iodide solution?

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### Evaluation - Question 1

The Lugol's iodine potassium-iodide solution proves the presence of starch (blue-violet colouring). Which part of the leaves is blue-violet?

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## Evaluation - Question 2

What is needed for the formation of starch, i.e. assimilation of carbon dioxide?

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