

Biology

It's a green world! (Part 1)

— The air that I breathe

(Germany)

Background

This is a series of photosynthesis experiments suitable for both junior and senior secondary level students. Using simple techniques, students demonstrate that during photosynthesis, plants

- consume carbon dioxide,
- require light and chlorophyll
- produce starch and oxygen.

You will need

- ✓ 2 empty clean 0.5 l bottles/glasses (e.g. milk, yoghurt) with screw cap,
- ✓ ten large fresh leaves (beech, hornbeam, cherry, etc.),
- ✓ straws,
- ✓ lime water,
- ✓ tablespoon

Follow these steps:

1. Students work in groups of two.
2. One of the bottles is filled with the leaves.
3. The same person then exhales several times into both bottles with a straw for two minutes.
4. Both bottles are closed and placed in the sun for half an hour (the more time available, the better).
5. Then four tablespoons of lime water are added to both bottles. The bottles are closed as quickly as possible and shaken vigorously.

So what happened?

The lime water in the bottle with the leaves is clearer than the lime water in the bottle without leaves. This is because plants use carbon dioxide during photosynthesis.

The result depends very much on the exhalation technique; care must be taken to keep the residual opening of the bottle as small as possible, keeping the bottle upright since carbon dioxide is heavier than air. It is advisable to cap the bottles after exhaling into them.

