

The function of the root



Biology

Plant Physiology / Botany

Physiology of plants

Biology

Plant Physiology / Botany

Water & Mineral Balance



Difficulty level

medium



Group size

2



Preparation time

10 minutes



Execution time

40 minutes

PHYWE
excellence in science

Teacher information

Application

PHYWE
excellence in science

Experiment setup

When plants have poorly developed roots, or like cut flowers, no roots at all, they are unable to absorb enough water and nutrients and therefore wilt. Even with a sufficient water supply, they will start to wilt after a while. Without sufficiently developed roots, or without roots at all, the plant is not able to absorb enough water and nutrients. The main tasks of roots are the absorption of water, the absorption of inorganic nutrients and the anchoring of the plant body in the soil.

Other teacher information (1/2)

PHYWE
excellence in science

Prior knowledge



Students should be familiar with the structure and function of roots. They should also already be familiar with the nutrient and water supply of plants.

Scientific Principle



Roots not only give the plant support in the soil, but also provide it with water and nutrients. To obtain more meaningful results, this experiment should be carried out over a period of at least 2-3 days.

Other teacher information (2/2)

PHYWE
excellence in science

Learning objective



Students should realize that there are large differences in water uptake when a rooted and an unrooted plant are directly compared.

Tasks



Have students compare a rooted plant and an unrooted plant over a 2-3 day period based on the water level in the test tube.

Safety instructions

PHYWE
excellence in science

- The general instructions for safe experimentation in science lessons to be applied to this experiment.

PHYWE
excellence in science

Student Information

Motivation

PHYWE
excellence in science



Experiment setup

When plants have poorly developed roots, or like cut flowers, no roots at all, they are unable to absorb enough water and nutrients and therefore wilt. Even with a sufficient water supply, they will start to wilt after a while. Without sufficiently developed roots, or without roots at all, the plant is not able to absorb enough water and nutrients. The main tasks of roots are the absorption of water, the absorption of inorganic nutrients and the anchoring of the plant body in the soil.

Tasks

PHYWE
excellence in science



Why do vegetable plants do not grow well if they have poorly developed roots?

Compare plants with roots against plants without roots and learn how they absorb water.

Equipment

Position	Material	Item No.	Quantity
1	Test tube, 160 x 16 mm, 100 pcs	37656-10	2
2	Test tube rack f. 6 tubes, wood	37685-10	1
3	Laboratory pen, waterproof, black	38711-00	1
4	Liquid paraffin, thick, 250 ml	30180-25	1

Set-up and procedure

PHYWE
excellence in science

- Place two test tubes in the stand.
- Place a rooted shoot in one test tube and an unrooted shoot in the second test tube. Both shoots must match as closely as possible in the number and size of their leaves.
- Fill both test tubes to about 1 cm below the rim with water, pour on some paraffin oil so that no water can evaporate on the surface. Mark the water level with a felt-tip pen.
- Observe the water level for at least 2-3 days.



Mark the water level with a felt pen

PHYWE
excellence in science

Report

Task 1

Drag the words to the right place.

When plants have poorly developed [], or like cut flowers, [] at all, they are unable to absorb enough [] and nutrients and wilt. Even with an adequate water supply, they will start to [] after a while. Without adequately developed roots, or no roots, the plant is unable to take up enough water and nutrients. The main functions of roots are the [] of water, the absorption of inorganic nutrients, and the anchoring of the plant body in the [].

wilt

soil

no roots

roots

water

absorption

 Check

Task 2

Choose the correct statements.

- In a direct comparison, the plant without roots evaporated significantly more water than the plant with roots.
- The plant with roots began to wilt after some time, despite the fact that the stem was in the water.
- The plant without roots began to wilt after some time, despite the fact that the stem was in the water.
- In a direct comparison, the plant without roots evaporated significantly less water than the plant with roots.

 Check

Task 3

Choose the correct statements.

- The infused paraffin oil prevents water from evaporating over the water surface. Thus, only water that is absorbed by the plants can be released again via the leaves.
- The infused paraffin oil is toxic to the plant without roots and causes it to wilt.
- The infused paraffin oil ensures that even the plant without roots can absorb water.

✓ Check

Slide	Score/Total
Slide 12: Roots	0/6
Slide 13: Plant with and without root	0/2
Slide 14: Paraffin oil	0/1

Total  0/9

👁 Solutions

🔄 Repeat