

The lime content of the soil



Biology

Ecology & environment

Soil examination



Difficulty level

easy



Group size

2



Preparation time

10 minutes



Execution time

10 minutes

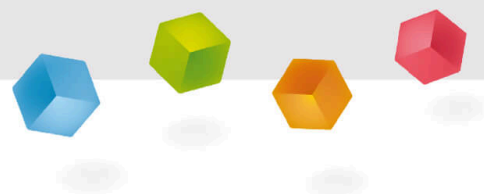
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PHYWE

Teacher information



Application

PHYWE



Experiment setup

The lime content of the soil is important for plants in various respects. On the one hand, it influences the soil properties - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as an antagonist of potassium in swelling processes and also in a certain way as a building material for the plant.

Other teacher information (1/2)

PHYWE

Prior knowledge



Students should be familiar with the various biological, chemical and physical processes that take place in the soil. Particular attention should be paid to the relationship between potassium and calcium.

Scientific Principle



When hydrochloric acid meets lime, a reaction takes place that produces a gas (carbon dioxide). This causes foaming, which the students should observe.

Other teacher information (2/2)

PHYWE

Learning objective



Students should recognize that there are differences in the amount of lime that is present in the soil.

Tasks



Have students bring in various soil samples from the area and use hydrochloric acid to detect the lime present in the sample.

Safety instructions

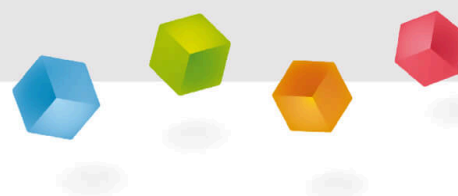
PHYWE



- Hydrochloric acid is corrosive! Wear gloves and protective goggles! Avoid contact with skin and eyes.
- The general instructions for safe experimentation in science lessons apply to this experiment.
- For the H- and P-phrases please refer to the corresponding safety data sheets.

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Student Information



Motivation



Experiment setup

The lime content of the soil is important for plants in various respects. On the one hand, it influences the soil properties - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as an antagonist of potassium in swelling processes and also in a certain way as a building material for the plant.

Tasks



How much lime is in the soil?

Investigate the lime content of garden soil, sand and other soil samples using a chemical reaction.

Equipment

Position	Material	Item No.	Quantity
1	Watch glass, dia.60 mm	34570-00	3
2	Pipette with rubber bulb	64701-00	1
3	Hydrochloric acid, approx. 5% 250ml	30315-25	1
4	Spoon, with spatula end, 180 mm, plastic	38833-00	1
5	Protecting glasses, clear glass	39316-00	1

Set-up and procedure

PHYWE

- Place a small amount of the soil sample on a 60 mm diameter watch glass (Fig. 1).
- The soil sample may be fresh or air dry and should occupy approximately a 25 mm diameter circular area on the watch glass.
- Drop 3-5 drops of 5% hydrochloric acid from the pipette onto the soil sample. Observe the reaction.
- Proceed in the same way with the remaining soil samples (Fig. 2).



Report

Task 1

Drag the words to the right place.

The of the soil is important for plants in various respects. On the one hand, it influences the - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as a (antagonist) of in swelling processes and also in a certain way as a building material for the plant.

lime content

soil properties

counterpart

potassium

✓ Check

Task 2

PHYWE

Choose the correct statement.

- ☐ If lime is present, the soil sample will freeze when hydrochloric acid is added.
- ☐ If lime is present, the soil sample will begin to burn when hydrochloric acid is added.
- ☐ If lime is present, the soil sample will turn green when hydrochloric acid is added.
- ☐ If lime is present, the soil sample will foam when hydrochloric acid is added.

✓ Check

Task 3

PHYWE

Choose the correct statements.

- ☐ The more the soil sample foams when hydrochloric acid is added, the more lime is present in it.
- ☐ The more the soil sample foams when hydrochloric acid is added, the less lime is present in it.
- ☐ The foaming of the soil sample is a reaction between the hydrochloric acid and the lime, which produces, among other things, carbon dioxide (CO₂).

✓ Check

Slide	Score / Total
Slide 12: Lime content	0/4
Slide 13: Lime	0/1
Slide 14: Foaming of the soil sample	0/2

Total  0/7

 Solutions

 Repeat