Germination and oxygen

Biology | Plant Physiology / Botany | Germination, growth, development

Difficulty level	Group size	Preparation time	Execution time
medium	2	10 minutes	40 minutes

This content can also be found online at:

http://localhost:1337/c/612ca017552ac900039f200a

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Teacher information

Application

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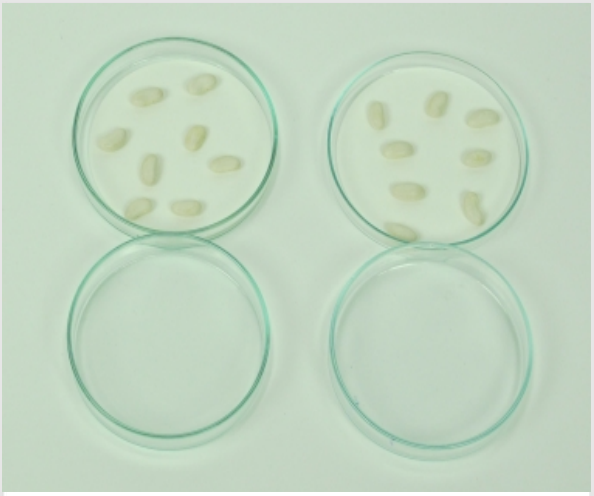

Experiment setup

Seeds must absorb water and swell before germination. Without water, germination is not possible. In flooded fields, there is enough water available for the seeds because they are in the water. Nevertheless, they do not germinate.

This experiment will help students realize that seeds need air as well as water to germinate.

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Other teacher information (1/2)

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Prior knowledge

Students should have already covered seed structure and seed plant reproduction in class.

Scientific Principle

In addition to water, seeds also need air to germinate. To obtain meaningful results, this experiment should be carried out for at least a period of 4-5 days.

Other teacher information (2/2)

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Learning objective

Students should realize that seeds need air as well as water to germinate, otherwise germination is impossible.

Tasks

Have students investigate why seeds that are completely submerged in water do not germinate.

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Safety instructions

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

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Student Information

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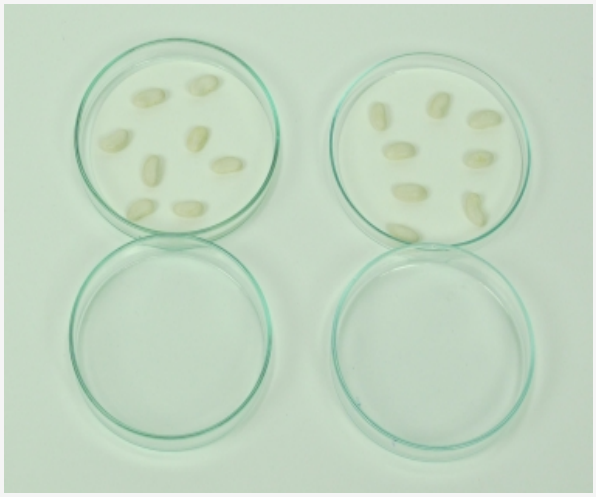
Motivation



Experiment setup

Seeds must absorb water and swell before germination. Without water, germination is not possible. In flooded fields, there is enough water available for the seeds because they are in the water. Nevertheless, they do not germinate.

This experiment shows you that seeds need air as well as water to germinate.

Tasks

Why do the seeds not come up in flooded fields?

Investigate why seeds that are completely submerged in water do not germinate.

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Equipment

Position	Material	Item No.	Quantity
1	Circular filter,d 90 mm,100 pcs	32977-03	1
2	Beaker, 250 ml, plastic (PP)	36082-00	1
3	Petri dish, d 100 mm	64705-00	2

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Set-up

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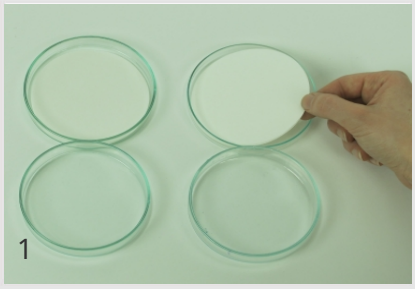
- Place three round filters of 90 mm diameter in each of two Petri dishes of 100 mm diameter and spread them on the bottom of shells smooth (Fig. 1).
- Place 5-8 dry bean or pea seeds in each tray (Fig. 2).
- Fill both bowls with water, one so far that the seeds are just covered by it, the other up to the edge.



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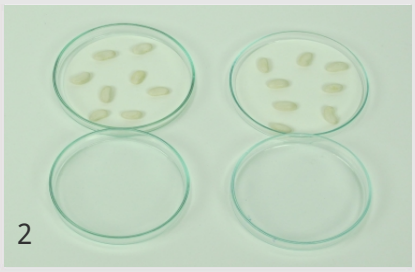

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Procedure

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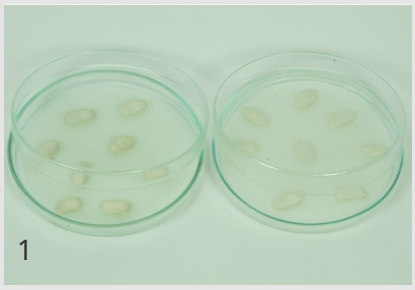
- Place the lids on the trays at an angle so that air can enter (Fig. 1) and allow the seeds to soak for about 24 hours.
- After about one day, the seeds in the tray, which is not filled to the brim, have absorbed most of the water. They have swollen and are now lying in the air on a moist surface (Fig. 2).
- Always add enough water to this bowl so that the seeds are always on very moist round filters, but not (or only very little) in the water.
- The seeds in the bowl filled to the brim with water are also swollen after 24 hours, but are still completely in the water. Fill this bowl with enough water so that the seeds are completely covered with water. Observation time: 3-4 days.



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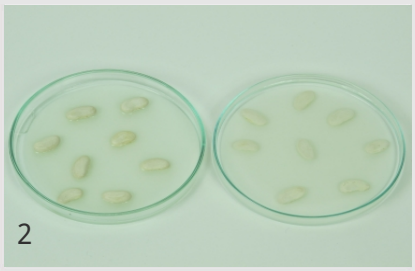

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Report

Task 1

Drag the words to the right place.

Seeds that lie in the soil or on the ground in flooded fields _____ germinate. This is because they are only surrounded by water and cannot absorb _____ from it, which is necessary for _____. This is a problem in _____, among other things: if the water in the field cannot drain away, the seeds are under water and cannot _____.

germination
germinate
agriculture
oxygen
do not

Check

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Task 2

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Choose the correct statement.

- ○ Seeds need water and air to germinate. The time of germination is predetermined by a built-in genetic clock and cannot be influenced.
- ○ For germination seeds need neither water nor air.
- ○ For germination seeds need only water.
- ○ For germination seeds need only air.

Check

Task 3

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Why do the seeds not germinate in the bowl, which is completely filled with water?

- ○ Because no fertilizer has been added to the water. Without this, germination is not possible, because important nutrients are missing.
- ○ Because the seed is defective. Other seeds would have germinated.
- ○ Because in addition to water, they also need oxygen for germination, which they absorb from the air.
- ○ Because the water makes the seeds swell. This destroys them.

Check

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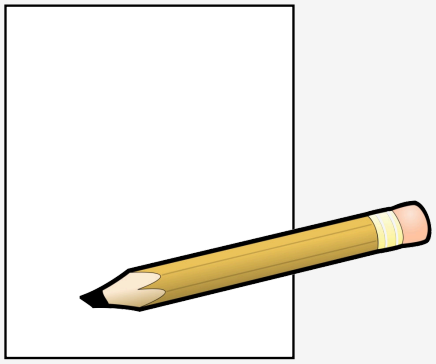
Task 4

Draw and label a seed that has sprouted.



Slide	Score / Total
Slide 13: germination of seeds	0/5
Slide 14: Germination of seeds with water and air	0/1
Slide 15: Shelled seed	0/1

Total 0 / 7

Solutions Repeat

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