

# What Grows There?

Based on Amsel, S. (2009) *What Grows There? Science and Children*, 47(1), 44-47.

## Preparation

The students will gain experience with and insight into the growth of plants as a counterweight to the typical focus on animals. They will carry out fieldwork in the locaSI environment – on a small plot of land close to the school or on the school grounds – for example in the spring. Each plot is 1 by 1 meter. Over the course of six weeks, students will become familiar with the typical plant species in their local area and gain some understanding of how plants succeed in their habitats. Before the course, the school area must be checked for maximum species diversity, and the school's gardeners/janitors must be informed, so that the selected areas can be allowed to stay untouched for a period of six weeks. Also check that no pesticides are sprayed, that the area is free of poisonous plants, and that it is not frequently used by the other students at the school. The plots can be marked with dibbles or stakes in each corner. The students are divided into groups of 3 to 4, to take advantage of the social dynamics for more learning.

**Target audience:** 10-13 years old.

**Time use:** 6 weeks.

## About this activity

This activity is part of a series of activities developed by the Danish research project called *Natural Technology*. The purpose of the project is to investigate technology in combination with nature, such as the potential of smartphones in children and teenagers' experiences in nature. You can read more about the project here: <https://naturligteknik.dk/en/>

*Natural Technology* is affiliated with the interdisciplinary organization Center for Children and Nature and is supported by Nordea-fonden.

*Natural Technology* is anchored in the research program 'Future Technology, Culture and Learning', located at the Danish School of Education at Aarhus University.



## Questions for pre-phase and post-phase

- What would be the advantage of a plant growing faster than its neighboring plants? (Fast-growing plants dominate the growing area, receive more sunlight and overshadow slower growing species).
- What are the four conditions that plants compete for in their habitat? (E.g. sunlight, water, soil, space, food sources and pollinators).
- Why do plants bloom? (The flowers attract pollinators).
- When a plant has been fertilized with pollen, what will it subsequently produce? (Fruit containing seeds).
- When a plant has completed its flowering cycle and has produced seed, what does it do? (It dies if it is one year old).
- What would be the advantage for a plant that grows up later in the season? (Slow-growing plants utilize habitat resources after the fast-growing plants have completed their life cycles).
- How many plants can you think of that grow wild where you live? (Variable answers).

Show students how to measure plant heights and complete their data sheets.

## COURSE OF TEACHING

### FIELD WORK

Each group member has a specific role as measurer, data recorder, plant identifier, or quality controller, and the roles switch for each observation period. The teacher assists the groups with any problems that may arise when working in the field. Let each fieldwork period last approx. 30 minutes and provide paper for observation data, tape measure, ruler, identification key, etc.

On the first day, all plants on the plot must be identified. If they cannot be identified, they must be marked with a small stick and assigned a number until the plants grow further, when their species can usually be determined.

#### Teacher:

- Help students record their observations.
- Remind them that they must note the time of year, whether there are plants in bloom, and whether there are pollinators.
- As time goes on, the students will become better and better at observing and recognizing, so that they can begin to derive conclusions from their observations.
- Help students focus on specific parts of the plant when sketching them, e.g., the elements that are salient for the identification key.

#### Student:

- Observe the area 1-3 times a week – to the extent that time can be allocated to the project.
- Identify plants on the plot, even if you do not know the names.
- Feel free to use both a paper identification key, where different kinds of observable traits can help determine species, and/or a plant app, such as PlantNet, which can identify plants via image recognition.
- Measure the height of each type of plant (not all plants) and record it in a data sheet (use smartphones if necessary).
- Note when a plant flowers.
- When the plants have flowered, outline them.
- The resulting plant sheet with height on the y-axis and time on the x-axis contains information about the height of each species, and marks when the species blooms.

## AT THE END OF THE FIELDWORK

### Teacher:

- Gather the students for a discussion about their experiences. Ask questions like:
  - Which plant is the tallest?
  - Which plant flowered first?
  - Which plants occur most frequently on your area?
  - Does your tallest plant appear to have stopped growing?
- Introduce the idea that plants compete with each other for sunlight and area and that growth rate is a factor in plant survival in their habitat.
  - Did the fast-growing plants take up space from the smaller plants?
- Help students analyze their data sheets. The students must be able to tell:
  - How much plant species grew in relation to each other.
  - How quickly plant species grew and flourished in relation to each other.
  - Whether the plants continued to grow after they had finished flowering.
  - Which plants outperformed the others with regards to sunlight and area during the field period.

## POST PHASE

### Teacher:

- Ask the pre-phase questions to the students again and let them answer them again.
- Have the students present their plots to younger students and explain the knowledge they gathered.
- Have students organize a plant tour for other students and their parents.
- Create a wall decoration for the school hallway where students paint their local plants including plant information.
- Have students publish their findings and reflections online.

Learning objectives: This course unit uses technology to develop the students' insight into the scientific method, to increase connection to nature through the use of the local environment and to give insight into the types of plants and animals inhabit the local environment, as well as how the questions under investigation are connected. The implicit goal is to build the students':

- 1) Relationship with their immediate natural environment.
- 2) Insight into common bird, plant and tree species.
- 3) Insight into how biological groups (biotic factors) relate to abiotic ones.
- 4) Attachment to the location.

