



Learn photosynthesis with Reach for the Sun – VEGA Teaching Scenario

The scenario in a nutshell:

Topic: Photosynthesis

Subject(s): Biology and Science

Age / Grade: 11 + / 5

Short description of the game:

Reach for the Sun is a single-player resource management game in which you control a plant, growing it across a season in the attempt to make as many seeds as possible before winter comes. Your three main resources – water, nutrients, and starch – are used to expand your plant from a little seed into an extensive network of roots, leaves, and flowers. Roots and leaves are used to generate more resources, and flowers are used to produce seeds, which are also used as a currency outside of levels to unlock new types of plants, as well as improvements for the garden such as fertilizer, a watering can, and a praying mantis to fend off pests.



Introduction to the scenario (*incl. possible applications, alternatives, risks, and possible challenges*):

- The same group has to continue on the same log-in to be able to continue the game where they left off.

Learning outcomes for this scenario:

- comprehend the life cycle of a plant and how it relates to seasons
- perceive which resources the plant needs to survive and multiply
- understand how photosynthesis provides the plant with energy for growth
- learn about the anatomy and function of the plant
- understand the reproduction and pollination of the plant
- practice cooperation in pairs
 - **Cooperative Groups:**
 - Teachers will have already set norms for working in groups:
 - Take turns
 - Everyone share
 - Look at the speaker
 - Actively listen
 - Nodding
 - Asking questions for clarification
 - Respect others' thinking
 - Think before speaking
- develop self-evaluation skills

Selection of learning outcomes from the Finnish Curriculum:

- awaken and maintain the student's interest in the environment and the teaching of environmental science and help the student to realize that all subject areas in environmental science are important to him. (M1)
- encourage the student to phrase questions about different subject areas and to use them as a starting point for research and other activities (M4)
- offer the student opportunities to practice working in a group by participating in different roles and social situations, inspire the student to express themselves and listen to others and support the student's ability to identify, express and regulate their emotions (M10)
- guide the student to observe the environment, human activities and phenomena related to them with the help of concepts in environmental science and to develop their concept constructions from consisting of different preconceptions so that they better correspond to the exact use of the concepts (M12)
- guide the student to understand, use and create different models with the help of which one can interpret and explain people, the environment and related phenomena (M13)
- direct the student to investigate nature, identify organisms and habitats, think ecologically and help the student to understand the structure, life functions and development of man (M15)
- guide the student to investigate, describe and explain chemical phenomena, the properties and transformations of substances and lay the foundation for the understanding of the principle of the preservation of matter (M18)

[Formative assessment](#)

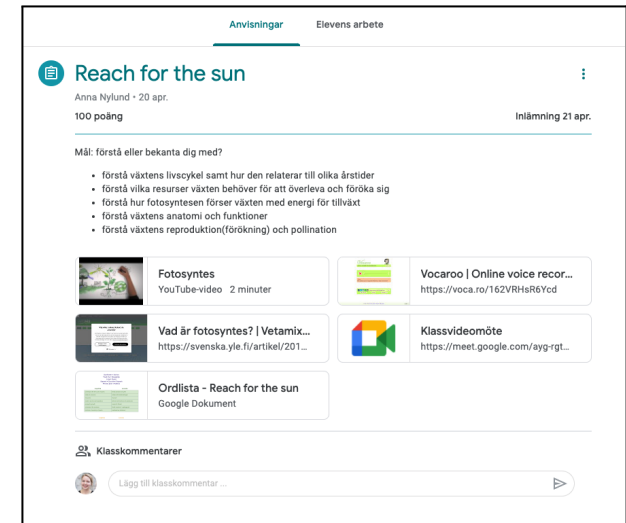
Number of students: Duration (estimated time/number of lessons): 20 students, 4 lessons á 45 min,

Prerequisites (necessary materials and online resources):

- computer with the game [Reach for the Sun](#)
- information about photosynthesis to mediate to the students (videos, books, pictures, etc.)

Before the program begins (preparatory work for teacher):

- Buy and download the game for every computer
- Get familiar with the game
- Search and collect information and material about photosynthesis
- Share the material with the students in eg. Google Classroom
- Divide the students into cooperative pairs
- The game is in English. Make a word list, eg. [Swedish to English wordlist](#).



The scenario

Part one (two lessons x 45 min)

Lesson 1:

Start with introducing the phenomena of photosynthesis by asking questions, to get a perception of the students' prior knowledge.

For example:

- What does the plant need to survive?
- What do humans need to survive?
- Which are the similarities and differences?
- etc.

According to the discussion, draw conclusions about what photosynthesis is.

Watch a short educational video, from Youtube, about photosynthesis for example:

<https://www.youtube.com/watch?v=UPBMG5EYydo>

Awaken the students' interest in the game by letting them try the game without any further introduction. Let them play the rest of the lesson approximately 15 minutes level 1, Sunflower.

Short break.

Lesson 2:

Debrief, how is it going? Discussion with the whole group.

- What is the game about?
- In what way does photosynthesis appear?
- Is there anything you do not understand?
- Have you encountered any challenges? Solve the problems together.

Watch how the sunflower grows in real life. <https://www.youtube.com/watch?v=eKo5F87A8a0> (time 2:15 min)

Introduce the students to the word list. Let the students read through the word list in pairs and get familiar with the vocabulary.

After reading the list through let the students continue playing, for the next

The teacher's role is to guide the students further in the game and check up the understanding of the phenomena and the game, by asking questions.

When there are 10 minutes left, it is time to share and discuss. Discuss in the whole group.

- How far along did you get? What was the newest plant you got to grow?
- What differences did you notice between two different plants you have been growing.
- Did you have trouble with anything while playing? What? Where? Why?

Part two (two lessons x 45 min)

Lesson 1

Summarize the conclusions from the last lesson. Prepare the students for playing one last time, now with the knowledge they have earned.

During the students' play, the teacher continues to guide and ask questions.

Lesson 2

Evaluate, what have the students learned, cooperation, opinions and suggestions.

Here is an example of an evaluation form that you can copy.

<https://docs.google.com/forms/d/12isd3-3RxCxVlcBfKwBxC-DjW2Qp7AN9VsyxIYwB5E/edit?usp=sharing>