

Growing and Measuring Plants

Science activities and STEM challenges are great for kids! This activity provides an opportunity to explore plant growth (Science), use digital tools to record data (Technology), build a solution of their own design (Engineering), add an artistic extension (Art) and take measurements and create charts (Math).



Subject

Science and Math



Level

Elementary and Intermediate



Objective(s)

- Identify the factors that affect the growth of a plant.
- Determine the effect of the sun on the growth of a plant.
- Determine the effect of water on the growth of a plant.
- Determine the effect of air on the growth of a plant.



Extension(s)

If possible, deepen the STEM learning to STEAM learning by including an artistic aspect to the lesson. Ideas could include reading a poem or a short story about nature, doing a "Gallery Walk" of famous nature paintings, or having students imagine their plants as characters and illustrating a story on the growth process.

Material and Resources:



Teacher

Thaki laptop

Lentil seed or any other kind of seed available

Plastic bottles

Rulers



Students

Thaki laptops

Lentil seed or any other kind of seed available

Plastic bottles

Rulers

Lesson Activities:

Introduction (Warm-up activities)

🕒 Duration: 15 mins



Teacher Activities

Before the session, ask the students to bring as many empty plastic bottles as they can from home. Make sure to have 3 bottles for each student.

Start the class by identifying the objectives of the session. Ask your students the following question: “How do you think we can reuse these plastic bottles instead of throwing them out?”

Let the students brainstorm with their peers and collect their answers orally.

Tell students that in this session they will be using these bottles to create potting soil.

Share some [pictures](#) for inspiration and show students the chosen location for your classroom garden.

If any pre-teaching on plants, germination, and photosynthesis is needed, consider any of the following activities from **E-Learning for Kids “Science World”**:

- Grade 1; Arctic Ocean - [Build Your Own Plants](#), [Life Cycle of Plants](#), [Where Plants Grow](#), [The Many Uses of Plants](#)
- Grade 2; Pacific Ocean - [Animals & Plants in Their Habitats](#)
- Grade 3; Caribbean Sea - [Plants & Seeds](#)
- Grade 3; Arctic Ocean - [The Parts of a Plant](#), [Plants & Their Properties](#), [Plants Growth & Nutrients](#), [How Does Temperature Affect Plant Growth?](#)

For a full description of each activity within the sections listed above, refer to the [E-Learning for Kids - Science World content guide available here](#).



Student
Activities

Brainstorm and answer the questions.

Body

🕒 Duration: 30 mins



Teacher
Activities

Start the planting activity by explaining the steps students will follow in the next 2 weeks.

1. Day 1 - Planting the seeds (Today).
2. Next 10 days - Observing the growth of the seeds and taking measurements while changing many variables such as water, light, and air.
3. Day 11 - Analyzing the collected data and discovering the effect of these variables on the growth of the plant.

Step 1: Planting seeds

Have each student label each of their three plastic bottles with their name and a number or letter. Divide the students into 3 groups based on the table below and guide students on how to plant their seeds:

Group	Variable	Experiment
Group 1	Sunlight	Students plant seeds in each of their 3 bottles and adjust the conditions for each bottle according to the following: Bottle 1: exposed to a maximum amount of sun. Bottle 2: exposed to no sun by storing in a dark place. Bottle 3: exposed to a minimal amount of sun.
Group 2	Water	Students plant seeds in each of their 3 bottles and adjust the conditions for each bottle according to the following: Bottle 1: watered everyday. Bottle 2: never watered during the 10 days. Bottle 3: watered only 3 times during the 10 days
Group 3	Air	Students plant seeds in each of their 3 bottles and adjust the conditions for each bottle according to the following: Bottle 1: exposed to fresh air Bottle 2: exposed to no fresh air. Bottle 3: partially exposed to fresh air.

Step 2: Creating the tracking / measurement sheet

Depending on the number of students in the class and the amount of laptops available, students may need to work individually, in pairs, or in small groups.

Tell students they will observe and measure the growth of the plants everyday for the next 10 days while considering the role and effect of light, air, or water. To keep track of the plant's growth they will create a [tracking / measurement spreadsheet](#) using LibreOffice Calc and save it under their name or in their student folders. Explain the importance of making regular observations and recording data as part of the scientific method.

Ask students what they believe are the important indicators of plant growth that should be tracked. Take answers and if needed, provide guiding questions to lead students. Have students create fields in the tracking / measurement spreadsheet for those indicators. Suggestions include:

- At which day does the first seedling appear?
- What is the height of the plant?
- How much growth has taken place since the last measurement?
- How is the overall appearance of the plant; color, texture, does it look healthy?

Since students will need to access their tracking / measurement spreadsheet over the following ten days, it would be helpful to take note of which students are working on which laptops. This way, in the following days, you can facilitate and expedite the process of students using the correct laptop to access and update their trackers.

Step 3: Developing the hypothesis

Ask students leading questions, such as the following, in order to help them develop a hypothesis:

- 1) What are the conditions needed for healthy plant growth?
- 2) What are the conditions that might disturb plant growth?

Provide examples of hypotheses, like the below, to help students create their own. Explain to students that a good hypothesis must be both testable and falsifiable.

- Watering plants on a daily basis helps them grow.
- Watering plants twice a week slows down their growth.
- The absence of watering slows down the growth of the plants.

Have students document their hypotheses in the tracking / measurement spreadsheet for future reference during observation.



**Distance
Learning**


This lesson can also be adapted for distance learning by sending instructional information, images, and / or links via Whatsapp (or any other communication platform) and having students track results in a Google Sheet, in their mobile device's notes app, or any other app that suits learners' needs.



**Student
Activities**

- Label the bottles and plant the seeds.
- Create and save the Calc tracking / measurement sheet.
- Develop a hypothesis.

Growing and Measuring Plants Session 2

 **Body**

 **Duration: 30 mins**



**Teacher
Activities**

Step 4: Observing and Collecting Data

Ask students to track and record the growth of the plants by:

1. Taking pictures of their plant from their mobile phone if available or from the **Cheese** app on Thaki laptops.
2. Measuring the height of the plant using a rule.
3. Adding all the collected data to the [tracking / measurement spreadsheet](#) on a daily basis.

Show students how to use different features of Calc to organize and visually represent the data they collect. Simple features could include wrapping text, formatting fonts and borders, or using font effects such as color to distinguish between growth patterns of plants grown under different conditions in Bottle 1, 2, and 3. More advanced features of Calc such as value highlighting and conditional formatting can be used to teach students data automation rather than manual entry. For further guidance on the features of LibreOffice Calc, see the comprehensive Calc user guide ([English link here](#) - [Arabic link here](#)).

Step 5: Sharing results and validating or rejecting the hypothesis:

Show students how to organize the data collected into charts using the features of LibreOffice Calc. Have students present their findings to their classmates with the use of a projector if possible.

Ask students to draw a conclusion at the end of their presentation by validating or rejecting their initial hypothesis.



**Distance
Learning**

Alternatively, have students take daily photos and measurements with a ruler or tape measure and track their plant's growth in a Google Sheet, in their mobile device's notes app, or any other app that suits learners' needs.

If possible, have students prepare a presentation in Google Slides to share their findings.

Or, if students do not have Google accounts, prepare a brief tutorial video demonstrating how to make a screen capture video on a mobile device using a mobile app such as XRecorder or AZ

Screen Recorder. In the screen capture video, students can simultaneously record their voice while scrolling through the plant photos in their photo gallery and showing their findings in the tracking / measurement tool.



**Student
Activities**

Share results and validate or reject the hypothesis developed.