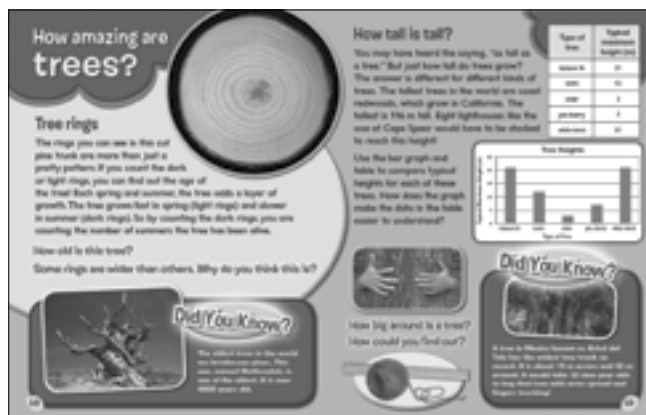


Observing and Recording Plant Growth



Focus: Students continue to investigate the factors that influence plant growth and health, and explore different ways to measure plant growth.

Specific Curriculum Outcomes

Students will be expected to:

- 46.0 identify and investigate life needs of plants and describe how plants are affected by the conditions in which they grow [GCO 1/3]
- 16.0 predict based on an observed pattern [GCO 2]
- 10.0 make and record observations and measurements [GCO 2]
- 32.0 follow safety procedures and rules [GCO 2]
- 11.0 construct and label concrete-object graphs, pictographs, or bar graphs [GCO 2]
- 47.0 distinguish between useful and not useful information when answering a science question [GCO 2]
- 22.0 identify and suggest explanations for patterns and discrepancies in objects and events [GCO 2]
- 30.0 respond to the ideas and actions of others and acknowledge their ideas and contributions [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe several ways to measure and record the growth of different plants
- observe images of unhealthy plants and suggest reasons why they might have failed to thrive

NOTES:

Attitude Outcome Statements

Encourage students to:

- consider their own observations and ideas when drawing a conclusion [GCO 4]
- appreciate the importance of accuracy [GCO 4]
- be open-minded in their explorations [GCO 4]

Cross-Curricular Connections

Math

It is expected that students will:

- demonstrate an understanding of measuring length (cm, m) by measuring and recording length, width, and height [3SS3]
- construct, label, and interpret bar graphs to solve problems [3SP2]

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- use a range of strategies to develop effective writing and representing and to enhance their clarity, precision, and effectiveness [GCO 10]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Student Magazine, pages 18–19 • BLM <i>Measurement Scavenger Hunt</i>	• large graph paper • metre sticks • small metric rulers • cloth measuring tape • metal measuring tape • modelling clay • digital camera		• bar graph • centimetre • metre

Safety

- Some seeds are toxic. Remind students to use appropriate senses (not taste) when exploring objects.
- If students use small metal trowels or other tools for planting, remind them to use care when doing so.
- Be aware of any allergies to seeds, nuts, or other samples you may plan to bring into the classroom.

Science Background

- Consistent systems of measurement are important in science because they allow scientists to record and communicate their observations in an

unambiguous way that will be understood by anyone trying to understand their experiment.

Possible Misconceptions

- Students may not incorporate the concept of “amount” into their understanding of plant needs. For example, they may believe that all types of plants require the same amount of water or that because water is good for a plant then more will always help it grow better. By using measured quantities of water for several different plants, and by carefully measuring the plants’ growth, students can make more nuanced conclusions than simply “plants need water.” Help students consider amount by discussing how much food people need, and whether eating too much food or too little food can be harmful.

ACTIVATE



Using Graphs

Share pages 18–19 of the Student Magazine with students. Discuss the various facts and measurements and the ways in which they are presented. Tell students you are going to make a class graph based on students’ favourite trees. On a large sheet of paper with a grid, write five different trees such as apple, maple, spruce, willow, and birch. Display pictures and describe each tree. Then ask students to vote for their favourites and explain their choices. Check off a square for each vote and outline the squares to make a bar graph displaying the data. Discuss with students how graphs can make it easier to understand and compare data.



Measurement Scavenger Hunt

If necessary, use objects in the classroom such as chalk, a desk, a book, etc., to demonstrate how to use various measuring tools to make an accurate measurement. Show students how to use cloth tape measures and metal tape measures as well as standard rulers. Provide copies of BLM *Measurement Scavenger Hunt* for students to record results as they search for and measure items around the classroom and determine classroom dimensions using metre sticks and small rulers.

CONNECT

Plant Needs Investigation, Part 2

Students continue to monitor the germination of their seeds and the growth of their plants. They take measurements relating to their question and record their measurements.

3. Think about the results. Make conclusions.

At the conclusion of their investigation, students should consider what they observed. Have students discuss their results in their groups. If they conducted a fair test, they should be able to summarize how changing one

variable affected their plants. For example, if students were varying the amount of water given to a plant, they may have observed that plants not given much water were shorter and had fewer leaves than those given more water. Plants given no water may have wilted, turned brown, or died. Plants given too much water may also have died. From these results, students could conclude that plants need the right amount of water to survive. They can quantify that amount for their plants based on the amount given to the healthiest plants.

Visit the groups during students' discussions and ask:

- **Which of your observations did you use to come to your conclusion?**
- **Which observations did not relate to your conclusion?**

Have students write their conclusions on large strips of paper and display them at the front of the classroom.

4. Share what you learned.

Have students present their conclusions to the class, describing orally the results of their experiments, and displaying any measurements, charts, or diagrams they made during the course of their investigation. They should tell which plants did well and which did not (or which seeds germinated or did not if they were investigating germination), compare growth, and describe what factors were different in those cases. Students should share what they learned about plant needs during their investigation. Encourage other students to ask questions and make comments about the students' findings. Record any new questions on the I Wonder Wall.



CONSOLIDATE

Graphing Plant Growth

Work with students in their investigation groups to help them use the data from their experiments to make a concrete-object graph, pictograph, or bar graph. Students can use data such as the height of their plants in centimetres, the number of leaves on their plants, the length of roots, or the number of days it took for germination to occur in different conditions. If different groups of students are investigating the same question, those students can pool their data to make a graph together. This is also an opportunity to look at patterns or discrepancies among their data. Display the finished graphs in the classroom.

Stop-Motion Video

Have students plan and execute a brief video, using stop-motion animation and clay models, about a plant and what happens when it is not watered and is left in the dark, but is then given water and exposed to sunshine. Alternatively, students could create a video comparing expected plant growth in different environments (e.g., desert, boreal forest, rainforest).

EXPLORE MORE

Using Graphing Software

Have students gather plant-related data at home, such as number and types of vegetables bought during a shopping trip, fruits eaten in a week, type and number of plants in a garden. Alternatively, they can find some plant-related data online such as the tallest plants or oldest trees. Help students use a spreadsheet or other program to create a simple graph such as a bar graph or pie chart. For example, students can create graphs using the graph option at <https://nces.ed.gov/nceskids/createagraph/>. Ensure they include a title and appropriate labels. Students can then print out and display their graphs.

Measurement Scavenger Hunt

Name: _____

Use a ruler to complete the scavenger hunt!

Find these items and measure them:

length of a crayon: _____ centimetres

length of your Science Journal: _____ centimetres

width of a chair seat: _____ centimetres

length of an eraser: _____ centimetres

(object of my choice) _____ centimetres

length of classroom: _____ metres

Find these items and identify them:

an object less than
5 centimetres long: _____

an object between
5 and 30 centimetres long: _____

an object larger than
30 centimetres: _____