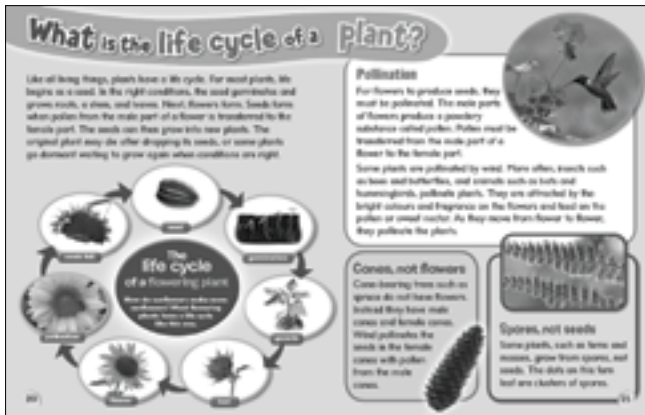


The Life Cycle of a Flowering Plant



Focus: Students draw upon their own observations of their plants as well as research and class discussion to explore the life cycle of flowering plants.

Specific Curriculum Outcomes

Students will be expected to:

- 48.0 observe and describe changes that occur through the life cycle of a flowering plant [GCO 1/3]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe what happens in each stage of the life cycle of a flowering plant
- illustrate the life cycle of a flowering plant

NOTES:

Attitude Outcome Statements

Encourage students to:

- work with others in exploring and investigating [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]
- 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 20–23 • IWB Activity 7 • BLM <i>Life Cycle Wheel</i> Literacy Place • <i>Life Cycle of a Plant</i> (Guided Reading, Level L)	• flowers with large stamens and pistils (e.g., lilies, tulips, or buttercups) • glue • old socks • tweezers • white poster board • students' Science Journals • card stock or paper plates • paper fasteners • students' Science Folders	• Invite an Elder or Indigenous Knowledge Keeper from a local Indigenous group to join the nature walk and talk about how the life cycles of plants affect or influence traditional activities. • Search for photos of the life cycle stages of a variety of plants online and in magazines. • Prepare envelopes containing the images of life cycle stages for individual plants. • Send a note home asking parents or guardians to send in old socks for the sock walk.	• pollen • pollination • pollinator • pistil • stamen • nectar

Safety

- Review safety procedures with students before going on a nature walk.
- Be aware of any allergies your students might have to plants and other items you plan to bring in.

Science Background

- Like all living things, plants have life cycles in which their life begins, they grow, they reproduce, and they die. Some plants go through their complete cycle in a few weeks while others may take years. The stages in a life cycle for a typical flowering plant are noted on the following page.

Life Cycle Stage	Description
seed	A seed can remain dormant for a long time. But when it falls on, or is planted in the ground, and receives the right amount of warmth, water, and (possibly) sunlight, it will begin to germinate.
germination	In germination, the seed absorbs water and swells. Its seed coat splits. The stem and small seed leaves (cotyledons) push up out of the earth and into the sunlight. A small root pushes down. Shortly after, the cotyledons fall off and real leaves begin to grow.
growth	As a plant grows, its roots spread and move deeper into the soil. Root hairs develop—these help to absorb water. The stem continues to grow in the direction of sunlight, and more leaves grow and develop.
flowering	Buds appear on the stem, and these develop into flowers. Flowers have male parts, called stamens, and female parts, called pistils. For a fertilized seed to form, powdery pollen grains must move from the stamen to the pistil in a process called pollination.
pollination	Some plants pollinate themselves, meaning the pollen moves from the stamens to the pistil of the same plant. But many have to be cross-pollinated, meaning the pollen must move from the flower of one plant to another of the same kind. For most flowering plants, pollination occurs with the aid of pollinators such as bees, birds, and bats. Flowers attract pollinators such as bees, birds, and bats in various ways, including bright colours and vivid patterns, and fragrance. The pollinators move from flower to flower, feeding on nectar or collecting pollen. Some pollen becomes attached to the animal, and is transferred to other flowers the animal visits.
production of seeds	When pollination is successful, a fertilized seed forms. At this stage, for some plants, the flower parts fall away and a fruit forms around the seed. In other plants, the flower releases the seed directly. Either way, the seed is released and then the life cycle can begin again.
dormancy	Annuals are flowering plants that live their complete life cycle in one year. The plant dies when the seeds fall. Biennials have a two-year life cycle, blooming in the second year of the cycle. Perennials are flowering plants that bloom year after year. The plant goes dormant in winter but regrows in the spring.

Possible Misconceptions

- Students may believe that all flowering plants have the same life cycle stages, but in fact there are many variations. Here are some examples:
 - Some flowering plants produce fruit (e.g. apple trees, tomato plants), while others do not (dandelion, sunflower).
 - Coniferous trees produce male and female cones, not flowers.
 - Mosses and ferns produce spores, not seeds.
 - Some plants make new plants using structures called runners, which are stem-like growths extending from the parent plant. New plants grow from the stem.

Expose students to as many different plant life cycles as possible, so they are aware of the variety of ways plants grow and reproduce. However, the focus of the teaching plan should be on the life cycle of flowering plants.

ACTIVATE

Human and Animal Life Cycles

Connect to students' prior learning in grade 2 by prompting students to think about and discuss how humans and other animals grow and change. Ask:

- **How does life begin for a chicken? A frog? A butterfly? A human?**
- **What stages does each animal go through during its life?**
- **Why are the stages in an animal's life called a "cycle"?**

Plant Life Cycles

After activating prior knowledge about life cycles, ask students:

- **Do plants have life cycles?**
- **How do you think the life cycles of plants compare to the life cycles of animals?**

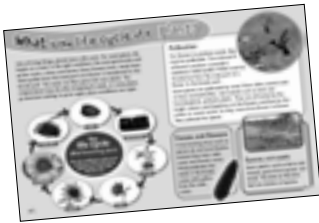
Have students read pages 20–21 of the Student Magazine. Encourage students to ask questions about the life cycle of plants and record these questions on the I Wonder Wall. Add the terms "life cycle," "pollen," "nectar," and "pollination" to the Word Wall.



Plants and the Seasons

Discuss with students the ways an apple tree changes through the seasons. In spring, the tree buds, grows leaves, and then forms flowers. Bees and other pollinators visit the flowers. In summer, the fruit begins to grow. In fall, the fruit ripens and is picked or falls to the ground, giving the seeds in the fruit a chance to grow into new apple trees. In winter, the leaves fall from the tree and the tree becomes dormant for the winter. Ask:

- **What is the first thing you would do if you wanted to grow tomatoes?** (Plant tomato seeds.)
- **In what season would you plant the seeds and why?** (The seeds should be planted in springtime, because the ground has thawed and there are many warm months ahead for the plant to grow.)
- **What happens to the tomato plant during spring?** (The tomato plant begins to grow in the spring. It germinates and grows leaves and a stem. Then flowers bloom on the plant. These flowers may be pollinated.)
- **What happens to the tomato plant during summer?** (The flowers develop into green fruit. The fruit grows and ripens in the summer, eventually forming red, ripe tomatoes.)
- **What happens to the fruit?** (It can be picked and eaten. Fruit that is not eaten will fall to the ground.)
- **What happens in winter and fall?** (The tomato plant turns brown and dies.)



Any seeds that fell to the ground inside the tomatoes may become dormant and sprout new tomato plants in spring.)

If possible, take a nature walk outdoors in a place with a variety of plants. Take note of different plants you see and describe what stages of their life cycle they are at. Invite an Elder or Indigenous Knowledge Keeper from a local Indigenous group to participate in this walk and talk about how the life cycle of plants affected or influenced traditional activities.

CONNECT

Life Cycle Sequencing

Source online photos of the stages of different plant life cycles. You may wish to consider using the following plants:

- tomato plant
- apple tree
- bean plant
- iris
- dandelion

Cut out the images of the stages and put them in envelopes.

On the day of the activity, show a time-lapse video of a plant life cycle. (There are many available online; try searching for “sunflower life cycle time lapse.”) Show the video all the way through, and then replay it, pausing at each stage. Have students describe what is happening each time you pause the video. Next, put students in groups. Distribute the envelopes and have students sequence the stages and justify their choices based on observations they have made of plants in the classroom and outside, plants in books, and plants in the video you showed.

Flower Part Displays

Bring in several different flowers that have large stamens and pistils, such as lilies, tulips, or buttercups. Have students draw or take photos of the intact flower, and then pull off the individual parts. They can mount and label the parts. Have students describe to other classmates what the role of each part is in making seeds. Add “stamen” and “pistil” to the Word Wall.

Sock Walk

Invite students to bring in an old sock, preferably wool. Tell them they will be taking a “sock walk.” Have each student put on the old sock over one of their shoes. As a class, take a walk outside in a grassy area, preferably near trees and other plants. On returning to the classroom, have students use tweezers to remove the seeds from their socks and a magnifying glass to examine them on white paper. (Save one or two socks with seeds on them for the last part of the activity.) In groups, students can make sketches in their Science Journals of the seeds and make predictions about what plants each seed would grow into. Pool the seeds and sort them. Glue the seeds, in their categories, to a piece of white poster board. Groups of students can

IWB Activity:

- Students can use Activity 7: *Build a life cycle!* (see the Teacher's Website) to create the life cycle of a pumpkin plant.



Word





then research to see if their predictions about the identity of the seeds are correct.

Share pages 22–23 of the Student Magazine with students. Ask:

- **What is the benefit of seeds sticking to plants and animals?**
- **What are some other ways that plants get around?**
- **Why is it important that seeds are able to spread away from the parent plant?**

Help students connect back to plant needs. If plant seeds can spread, they will not be competing with their parent plant for sunlight, water, food, space, etc.

If time permits, plant the socks! Take the socks that were set aside and plant them in a large pot with soil and water. (Have students help decide how to plant the socks based on their knowledge of plant needs.) Place the pot in a sunny place and see if the socks sprout.



Literacy Place Connection:

Read or revisit *Life Cycle of a Plant* (Guided Reading, Level L). Discuss the life cycle with students. Review the life cycle of a sunflower shown in the Student Magazine on page 20 and have students compare the two life cycles. Ask:

- **How are they similar?**
- **How are they different?**

CONSOLIDATE

Plant Life Cycle Observations

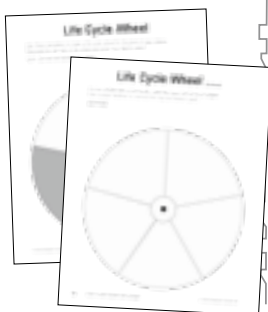
Students can use their observations of the plants they have been growing to produce a digital slide show telling about the life cycle stages of their plants. Students should include photographs and details of the observations they have made. They can include plans for further observation of their plant's life cycle, and predictions about what will happen next.

Plant Life Cycle Play

Place students in small groups. Have students write, practise, and perform a play that demonstrates the life cycle of a flowering plant of their choice.

Life Cycle Wheel

Have students use two pieces of card stock or paper plates and paper fasteners to make a labelled life cycle wheel for the plant of their choice. The bottom part of the wheel should show each stage. The top part of the wheel should include a window through which can be seen one stage of the life cycle at a time. (Use BLM *Life Cycle Wheel* as a template, if you





wish.) Students should research the life cycle of their plant in order to create accurate illustrations and labels. Students should decide on which five stages to include to show the life cycle. Completed life cycle wheels can be stored in the students' Science Folders.

EXPLORE MORE

Seed Vault

Have students research online to find out about the Svalbard Global Seed Vault. Students should find out the following about this seed bank:

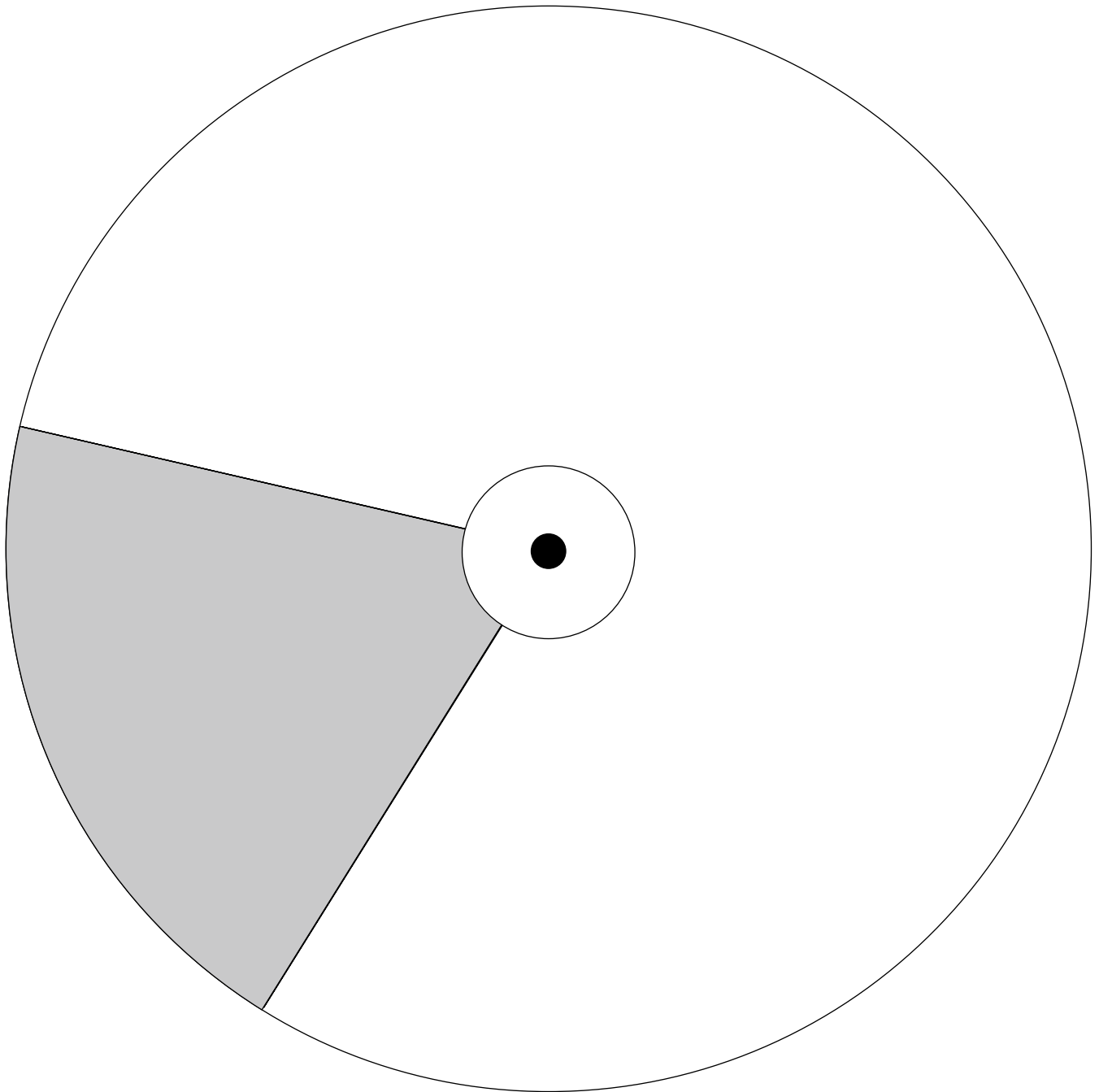
- **What is its purpose?**
- **Which seeds are preserved there and why?**
- **Where on the planet is it located? Why was it built there?**

Have students design their own mini-seed vault and present to the class to explain why they chose the seeds they did, as well as describe the purpose of the Svalbard Global Seed Vault and other seed banks.

Life Cycle Wheel

Use these templates to make a life cycle wheel for the plant of your choice. Decorate the top part of the wheel and write your plant's name.

TOP: Cut out one section as shown.



Life Cycle Wheel (Continued)

On the bottom part of the wheel, draw and label the life cycle stages.
Use a paper fastener to connect the top and bottom parts.

BOTTOM.

