

Grade 1 Science, Quarter 4, Unit 4.1

Characteristics of Plants

Overview

Number of instructional days: 16 (1 day = 45 minutes)

Content to be learned

- Observe and record external features that make up living things (e.g., roots, stems, leaves, flowers).
- Identify specific functions of physical structures of a plant (roots for water).
- Explain how a plant's structures help it survive in its environment.
- Observe that plants need water, air, and light to grow.
- Given a set of pictures, sequence the life cycle of a plant.
- Observe, draw, and label the stages in the life cycle of a familiar plant.
- Care for plants by identifying and providing for their needs.
- Experiment with a plant's growth under different conditions, including light and no light.
- Act out or construct simple diagrams (pictures or words) that show a simple food web.
- Identify which soil is best suited for growing plants.

Essential questions

- How do external features of plants help them survive in their environment?
- How do plants change over time?
- How do we care for plants?

Processes to be used

- Make and record observations.
- Observe, identify, and record external features of organisms.
- Identify structures and describe the functions of structures within a system.
- Observe and identify patterns of change.
- Demonstrate safe and ethical practices during classroom investigations.
- Conduct investigations using scientific processes, including asking questions, manipulating variables, recording observations, and drawing conclusions.

Written Curriculum

Grade Span Expectations

LS1 - All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS1 (K-4) - INQ+POC -1

Sort/classify different living things using similar and different characteristics. Describe why organisms belong to each group or cite evidence about how they are alike or not alike

LS1 (K-2) –1 Students demonstrate an understanding of classification of organisms by ...

1c observing and recording the external features that make up living things (e.g. roots, stems, leaves, flowers, legs, antennae, tail, shell).

LS1 (K-4) FAF -4

Identify and explain how the physical structures of an organism (plants or animals) allow it to survive in its habitat/environment (e.g., roots for water; nose to smell fire).

LS1 (K-2)–4 Students demonstrate understanding of structure and function-survival requirements by...

4a identifying the specific functions of the physical structures of a plant ~~or an animal~~ (e.g. roots for water; ~~webbed feet for swimming~~).

LS1 (K-4) SAE -2

Identify the basic needs of plants and animals in order to stay alive. (i.e., water, air, food, space).

LS1 (K-2)-2 Students demonstrate understanding of structure and function-survival requirements by...

2a observing that plants need water, air, food, and light to grow; ~~observing that animals need water, air, food and shelter to grow.~~

LS1 (K-4) POC -3

Predict, sequence or compare the life stages of organisms – plants and animals (e.g., put images of life stages of an organism in order, predict the next stage in sequence, compare two organisms).

LS1 (K-2)–3 Students demonstrate an understanding of reproduction by ...

3b sequencing the life cycle of a plant ~~or animal~~ when given a set of pictures.

3a observing and ~~scientifically~~ drawing (e.g. ~~recording shapes, prominent features, relative proportions, organizes and differentiates significant parts observed~~) and labeling the stages in the life cycle of a familiar plant ~~and animal~~.

LS2 - Matter cycles and energy flows through an ecosystem

LS2 (K-4) SAE –5

Recognize that energy is needed for all organisms to stay alive and grow or identify where a plant or animal gets its energy.

LS2 (K-2)–5 Students demonstrate an understanding of energy flow in an ecosystem by ...

5a caring for plants ~~and/or animals~~ by identifying and providing for their needs; experimenting with a plant's growth under different conditions, including light and no light.

LS2 (K-4) SAE –6

Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).

LS2 (K-2)–6 Students demonstrate an understanding of food webs in an ecosystem by ...

6a acting out or constructing simple diagrams (pictures or words) that shows a simple food web.

ESS 1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (K-4) FAF -6

Given information about earth materials explain how their characteristics lend themselves to specific uses

ESS1 (K-2) –6 Students demonstrate an understanding of properties of earth materials by...

6a identifying which materials are best for different uses (e.g., soils for growing plants, ~~sand for the sand box~~).

Clarifying the Standards

Prior Learning

In kindergarten and in a prior first-grade unit, students distinguished between living and nonliving things. They observed and recorded external features that make up living things. The students cared for plants by identifying and providing for their needs. They observed that plants need water, food, and air to grow. They began to identify specific functions of the physical structure of a plant. In addition, they practiced sequencing the life cycle of a plant when given a set of pictures.

Current Learning

Reinforcement Level of Instruction (content taught in prior grade or earlier in the year)

First-graders observe, identify, and record external features of living organisms. They care for plants by identifying and providing for their needs. In addition, they use pictures to sequence the life cycle of a plant.

Developmental Level of Instruction (content new to grade level)

Students in first grade observe, draw, and label the stages in the life cycle of a familiar plant. First-grade students experiment with a plant's growth under different conditions, including light and no light. Students act out or construct simple diagrams (using pictures or words) of a simple food web. They identify which soils are best for growing plants.

Drill and Practice Level of Instruction (content will not be taught in the subsequent grade level)

Students observe that plants need water, air, food, and light to grow. They sequence the life cycle of a plant when given a set of pictures. Students require extensive practice with acting out or constructing simple food webs using pictures or words; they will not do this again in second grade.

Future Learning

Second-grade students will continue to observe and record external features that make up living things. They will identify and sort based on similar and different external features, and will identify the specific physical structures of a plant. In addition, students will begin to scientifically draw the stages in the life cycle of a familiar plant. Students will experiment with a plant's growth under different conditions including light and no light. They will begin using information about a simple food web to determine how the environment meets basic needs. Second-grade students will identify which soils are best for growing plants.

Additional Research Findings

According to *Making Sense of Secondary Science*, children from all age groups did not consider a tree to be a plant, although they said "it was a plant when it was little." Over half did not consider a seed to be a plant. Also, many students do not view weeds or vegetables as plants (p. 23).

Primary children should begin to be aware of the basic parts of the food chain: Plants need sunlight to grow, some animals eat plants, and other animals eat both plants and animals. The key step that "plants make their own food" through the process of photosynthesis is very difficult for elementary students and should be saved for middle school. By the end of second grade, children should know that plants need to take in water and light in order to survive (*Benchmarks for Science Literacy*, p. 119).

When learning about plants, the basic experiences for primary school children should include planting seeds and watching plants grow. Students should also eat the edible portions of the mature plants and should be aware of the types of plants and other foods eaten by animals. At this time, students may observe different growing conditions, such as what happens when some plants don't get water or light, but carefully controlled experiments should be delayed until later, when students will better know how to conduct scientific investigations. Some of the earliest stories to be read to small children tell about life on the farm and what happens to food between the farm and store. By the end of grade 2, students should know that most food arrives at the store as crops or in the form of animals, which have eaten the crops (*Benchmarks*, p. 184).

To grow well, plants need enough warmth, light, and water (*Benchmarks*, p. 184). In addition, students should know that some animals and plants are similar in appearance or behavior, while others are very different from one another. Plants and animals have features that help them live in different environments. It's important to emphasize that stories sometimes give plants and animals attributes they really do not have (*Benchmarks*, p. 102).

According to the *National Science Education Standards*, during the elementary grades, children build understanding of biological concepts through direct experience with living things, their life cycles, and their habitats. These experiences emerge from the sense of wonder and the natural interest of children who ask questions such as, “How do plants get food?” and “What is the largest plant?” An understanding of the characteristics of organisms, life cycles of organisms, and of the complex interactions among all components of the natural environment begin with questions such as these. Making sense of the way organisms live in their environments will develop some understanding of the diversity of life and the ways all living organisms depend on the living and nonliving environment for survival (p. 127).

Because the child’s world at grades K–4 is closely associated with the home, school, and immediate environment, the study of organisms should include observations and interactions within the natural world of the child. The experiences and activities in grades K–4 provide a concrete foundation for the progressive development in the later grades of major biological concepts such as evolution, heredity, the cell, the biosphere, interdependence, the behavior of organisms, and matter and energy in living systems (*NSES*, p. 128).

As students investigate the life cycles of organisms, teachers might observe that young children do not understand the continuity of life from, for example, seed to seedling or larvae to pupae to adult. Young children think concretely about individual organisms. The idea that organisms depend on their environment is also not well developed in young children. In grades K–4, the focus should be on establishing the primary association of organisms with their environments (*NSES*, p. 128).

Notes About Resources and Materials

General Resources

Houghton Mifflin Science Discovery Works, Unit A

LS1 (K-4) INQ+POC 1a, 1c

- Teacher Guide, Lesson 2 (including poster book) pp. A24–31
- Teacher Guide, Lesson 3 (including poster book) pp. A32–39

LS1 (K-4) SAE-2 2a, LS1 (K-4) POC-3 3b, 3a, LS2 (K-4) SAE-6 6a

- Teacher Guide, Lesson 9 (including poster book) pp. A82–89
- *Houghton Mifflin Science Discovery Works*, Unit B

LS2 (K-4) SAE-5 5a

- Teacher Guide, Lesson 9 (including poster book) pp. B82–87

Books

Bash, B. (2002). *Tree of Life: The World of the African Baobab*. San Francisco, CA: Sierra Club Books.

Berenstain, S. and Berenstain, J. (1991). *The Berenstain Bears Grow-It!* New York, NY: Random House.

Bjork, C. (1988). *Linnea’s Windowsill Garden*. New York, NY: R&S Books.

- Carle, E. (1970). *The Tiny Seed*. New York, NY: Little Simon.
- Cherry, L. (1990). *The Great Kapok Tree*. London, England: Sandpiper.
- Cole, H. (1997). *Jack's Garden*. New York, NY: Greenwillow Books.
- Cole, J. (1998). *The Magic School Bus: In the Rain Forest*. New York, NY: Scholastic.
- Fowler, A. (2001). *From Seed to Plant*. Danbury, CT: Children's Press.
- Gibbons, G. (1993). *From Seed to Plant*. New York, NY: Holiday House.
- Heller, R. (1984). *Plants That Never Ever Bloom*. New York, NY: Putnam.
- Inches, A. (2002). *Corduroy's Garden*. London, England: Puffin Books.
- Jordan, H. (1992). *How a Seed Grows*. New York, NY: Harper Collins.
- Richards, J. (2006). *A Fruit is a Suitcase for Seeds*. Minneapolis, MN: First Avenue Editions.
- Royston, A. (1999). *How Plants Grow*. Portsmouth, NH: Heinemann.

Helpful Websites

- www.woodlands-junior.kent.sch.uk/revision/science/living.htm
- www.sciencekids.co.nz/plants.html
- www.bbc.co.uk/schools/ks2bitesize/science
- www.neok12.com
- www.classroom.jc-schools.net/sci-units/plants-animals.htm
- www.havefunteaching.com