



The Book Planter



Ag in the Classroom

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May 2023: *Gwendolyn's Pet Garden*

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Gwendolyn longs for a pet. What kind? How many legs? Two, four, ten—she's not picky! But her parents have other ideas and instead they give her...a box of dirt. "It smells like swamp," Gwendolyn says, but her parents say it smells of possibilities. And once Gwendolyn gets savvy about soil, sun, and shade, she finds they are right. The dirt starts performing some amazing tricks, and soon she has a whole pet garden of her own. It might not have any legs at all, but it was alive and Gwendolyn could talk to it, care for it, and watch it grow.



Engage¹

Ask students the following questions to begin a discussion and introduce the lesson:

- Do plants have specific parts that relate to their function?
- Do plants have specific needs for healthy growth?
- What is in a plant's environment? Are there living and nonliving things around them?

Activity 1: Thinking About Plants¹

Note to teacher: For this activity, you will want a variety of plants and plant materials. You will want to include things that are currently growing, such as a houseplant or even hydroponically grown lettuce that has the roots still attached (available in some grocery stores). You can also have a variety of fruits (apples, oranges, kiwi), vegetables (broccoli, carrots, lettuce, radishes), or grains (rice, barley, oats). To add diversity of plant types, you could also collect photos of plants that are not easily obtained or handled (either because of location or size, such as cactus or water lilies). The photos should show the plants that are living in their natural environment. For example, it would be better to have a picture of a rose bush than a picture of a rose in a vase. Include a variety of edible and non-edible plants.

- The Plants All Around You Video can be watched ahead of time for background information: https://www.youtube.com/watch?v=l_agr-F38tQ
1. Begin the lesson by displaying a variety of plants, vegetables, fruits, and grains (see Preparation Instructions for Activity 1). Ask the students what they notice about the materials on the table.
 2. Ask the students to sort the materials into categories. Ask the students to think about one way that they might be able to put the materials into categories. Have the students write their

categories on a piece of paper and make a list of what would fit into each of their categories. Allow about 2–3 minutes for this step. Students can work individually or in pairs. Possible categories might include:

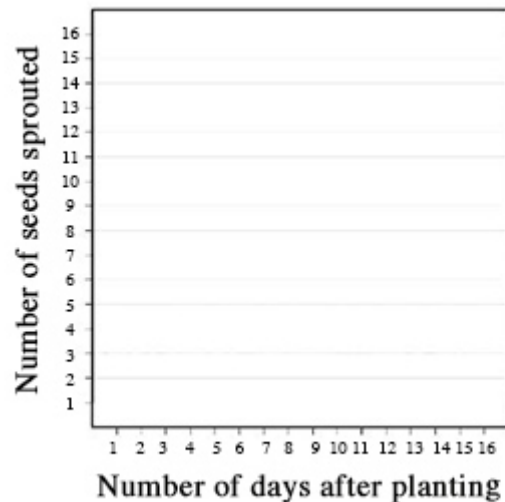
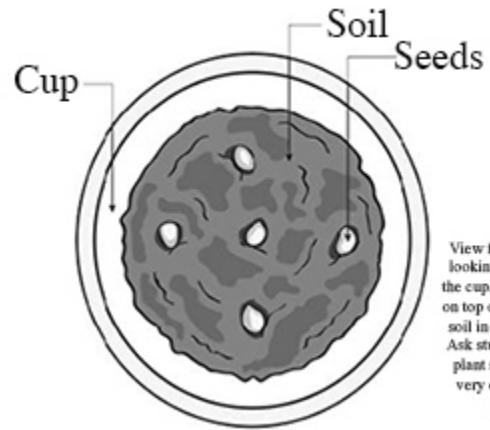
- a. Edible vs. non-edible materials
 - b. Living vs. nonliving (previously living)
 - c. Growing vs. not growing (currently)
 - d. Color
 - e. Vegetable vs. fruit
 - f. Tree vs. non-tree
 - g. Parts of the plant (leaves vs. roots, for example)
3. Propose to the class that it might be good to think more about sorting by growing vs. not currently growing. Ask, “What parts of a plant are necessary for a plant to grow?” (*roots, stems, and leaves*)
 4. Continue the discussion by asking the students to make a list of what a plant needs to be able to grow. Record the student responses on the board or chart paper. If the students have trouble getting started with this list, start off by asking if plants need light to grow. This should spark other ideas to add to the list.
 5. Write the word “environment” on the board or chart paper. Explain to the students that environment is a word that describes all the living and nonliving things surrounding an organism. Would the items listed in procedure 4 be part of a plant’s environment? Clarify that a plant’s environment includes soil, air, light, water, appropriate temperatures, and other plants, animals, and insects living around or on the plant. Some elements in the environment are required for plants to grow. For example, plants require water and light for growth. Other objects are in the environment but may not be required. For example, plants don’t always require the animals and insects that normally live in their environment to grow.
 6. Continue the discussion by asking students, “What happens if plants don’t have what they need to grow?” Follow with “What do you think would happen if they don’t have the right amounts of what they need?”

Activity 2: Growing a Garden¹

1. Ask the students where the food they eat comes from. After getting responses from several volunteers, follow this up by asking if anyone grows some of their own food.
2. Inform the students that they will start growing some plants to investigate how they grow and what makes them grow best.
3. Provide each student with a copy of [Master 1.1](#). Give each student a few seeds to examine. Ask students to draw a picture of their seed in the appropriate space and to write a few words to describe the appearance of the seeds.
4. Provide each student with cups (with drainage holes) and potting soil. Model for the students how to plant their seeds. Point out that the cups have holes in the bottom so extra water can drain out. Fill the cup half full with potting soil, and moisten the soil with the water spray bottle. Place five seeds on top of the soil. Draw the pattern for arranging the seeds on

the board or chart paper. Put a thin layer, about 1/4–1/2" (.635-1.27 cm) of soil on top of the seeds. Use the spray bottle to moisten the top layer of soil.

5. After the students plant their seeds, have them complete Part 2 of *Master 1.1*.
6. Over the next several days, allow students time to water, observe their seedlings, and record their data on *Master 1.1*.
7. In the space provided on *Master 1.1*, ask the students to draw pictures of their seed when it is first sprouting and then the seedling when it is about one week old.
8. If the students planted different seeds, have them compare the different kinds of seedlings. Ask them if they see differences in leaf shape, leaf size, color of stems or leaves, and so forth.
9. If each student planted the same type of seed in one cup, you can pool the data for one kind of seed from the entire class for analysis. Begin by collecting the data from each student on [Master 1.2](#). Then, use the data to construct a bar graph using a template similar to the one that follows. Discuss the data with the class to make conclusions about the time needed for seeds to sprout. The data should reveal that the seeds germinated over a range of days. Even though they were all the same type of seed, there were differences in the time it took for the seeds to sprout. It is also likely that some seeds didn't sprout at all; perhaps those seeds got damaged in some way or they weren't healthy. Just as in humans and all other species, there are differences between individuals. Guide the discussion using questions such as:



You can use an X to represent each seed that has sprouted. Alternatively, you can use a sticky note to represent each sprouted seed. This will form a bar graph of the class' pooled data.

- When did the first seeds sprout?
 - On what day did the greatest number of seeds sprout?
 - Did all seeds sprout on the same day?
 - Did all seeds sprout?
 - Why do you think some seeds didn't sprout?
 - Why do you think seeds sprouted at different times?
10. Ask students to draw some conclusions based on what they have learned from the seed growing activity. Some possible conclusions are:
 - Some kinds of seeds sprout more quickly than others.
 - Some seeds may not sprout at all.

- Different seedlings look different than others in their size, shape of leaves, color, and so forth.
- If you have more than one seed of the same kind, you can see differences between individuals (e.g., time to germinate or size may be different among individuals).

Sources

1. <https://maine.agclassroom.org/matrix/lesson/184/>

K-5 Subject Areas: Science, and Math

Science

- K.P.1 Understand the positions and motions of objects and organisms observed in the environment.
- K.P.2 Understand how objects are described based on their physical properties and how they are used.
- 1.E.2 Understand the physical properties of Earth materials that make them useful in different ways.
- 1.L.1 Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive.
- 1.L.2 Summarize the needs of living organisms for energy and growth.
- 3.L.2 Understand how plants survive in their environments.
- 4.L.1 Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.
- 5.L.2 Understand the interdependence of plants and animals with their ecosystem.

Math

- 2.MD.10 Organize, represent, and interpret data with up to four categories. • Draw a picture graph and a bar graph with a single-unit scale to represent a data set. • Solve simple put-together, take-apart, and compare problems using information presented in a picture and a bar graph.



Name _____

**MASTER 1.1,
MY GARDENING RECORD**

Part 1: The Seeds

Write the name of the seed: _____

Draw a picture of your seed.

Write two or three words to describe what your seed looks like.



Name _____

Part 2: Planting Seeds

I planted my seed on this date: _____.

How many seeds did you plant in your cup? _____

Draw a picture to show how you planted your seeds. Label each part on your picture.



Name _____



Part 3: Watching Seeds Sprout

Look at your pots each day. For each day that you observe your pots, write or draw the following information.

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____

Date _____
Number of days after planting: _____ Number of sprouts _____



Name _____

When you first see your young plants, draw a picture of what you see.

About one week after you first see your young plants, draw a picture of what you see.

Date _____



Name _____



**MASTER 1.2,
TIME FOR SEED SPROUTING**

Total Number of Seeds Planted by the Class: _____

NUMBER OF DAYS AFTER PLANTING	NUMBER OF SEEDS SPROUTED
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
Never Sprouted	