

MONDAY MORNING SCIENCE BLAST

CD Beans - Plant Growth - Life Science

What we call a plant, is any member of the kingdom Plantae. Plants are multicellular organisms which usually produce their own food from inorganic matter by the process of photosynthesis and that have more or less rigid cell walls containing cellulose; these include vascular plants, mosses, liverworts, and hornworts. Some older classification systems may include fungi, algae, bacteria, and blue-green algae all of which have plantlike characteristics such as cell walls and an ability to photosynthesize, but lack other important characteristics of plants.

What do plants need to grow? First of all, plants must have soil: water and minerals are absorbed from the soil through a plant's roots. Soil provides support for the plant and an anchor for its roots to grow in. Also, decaying plants (and animals) leave behind minerals in the soil that are essential for future plant growth. When you walk across your lawn and look down, realize that we know less about life in the earth under our feet than we do about the far side of the moon. Yet every plant and animal you can think of depends on this vast hidden ecosystem. Each shovel of soil holds more living things than all the human beings ever born. Lots of species are still waiting for scientists to identify and name them. This is a world where fungi lay traps for thread-like worms. Bacteria dine on toxic chemicals. The smaller the creature, the stranger are its habits.

Plants need sunlight to grow properly. A plant uses the light energy from the Sun to change the carbon dioxide and water within it into food substances (sugars), a process called photosynthesis. Only in light can a green plant make food. Plants also need clean air. Green plants take in carbon dioxide from the air and then use it during photosynthesis to make food. Dirty or smoggy air blocks the sunlight that plants must have in order to grow.

Plants must have water. Water is essential to all of the life on earth. No known organism can survive without water. A plant uses water to carry nutrients and moisture from its roots to its leaves, and food from its leaves back down to its roots. Think of it as the LAW for plants, *Light, Air and Water*, which all plants need for growth.

Finally, plants must have space in order to grow. Plants are found everywhere: deserts, mountains, arctic regions, forests, jungles, oceans, and even in cracks of sidewalks in big cities. If the space is small, the plants will be small and stunted. Big plants need big spaces for their roots and branches. In this lab, your students will be determining the stages of plant growth, in a new and novel way. You will need to plan accordingly to accommodate for the week-long observation period.

To begin, distribute the empty CD cases and instruct your students to fill the cases with potting soil as directed, adjusting the soil so the cases can be closed. Once this step is complete, students will open their cases and place 2 or 3 bean seeds in the soil, making sure the seeds are completely surrounded by the soil. Have students use a medicine dropper to add a few drops of water to the soil (adding the water at the top). They are to close their CD cases, taping the edges with masking tape as illustrated, then label their bean seeds A, B, or C. Now direct students to place their completed CD case planters

in a sunny window, using the clay as a stand so the CD case stays vertical. If the soil looks like it is drying out, students can use a medicine dropper to add water as directed.

Your students will commence to observe their bean seeds over the next seven days and are to begin recording their observations once their bean seeds have sprouted, taking care to measure and record the length of their plant/s, then complete the chart in the Data Section.

CD Beans

Adapted from materials developed by 2busybrunettes.com

QUESTION: What are the stages of plant growth?

MATERIALS:

bean seeds - 3	medicine dropper
CD case (clear plastic)	modeling clay
magnifying lens	potting soil
masking tape	water

PROCEDURE:

1. Lay the CD case down and fill the bottom two thirds (the part away from the hinge) with moist potting soil. Adjust the amount of soil so that you can close the case.
2. Open the case and place 2 or 3 bean seeds in the soil. Make sure the seeds are completely surrounded by the soil.
3. Use the medicine dropper to add a few drops of water to the soil (add the water to the top of the soil).
4. Close the CD case and tape the edges with masking tape as shown in the picture below. On the outside of the CD case, label each bean seed as A, B, or C.



5. Place the completed CD case planter in a sunny window. Use the clay to make a stand that will help to make sure the CD case stays vertical. If the soil looks like it is drying out, use the medicine dropper to add water by dropping the water through the small opening that runs along where the top of the case is hinged to the bottom.
6. Observe the bean seeds over the next 7 days. Begin recording your observations once the bean seeds sprout. Be sure to measure and record the length of your plant/s. Complete the chart in the Data Section.

DATA:

	SEED A		SEED B
Date Seed is Planted		Date Seed is Planted	
Date Seed Sprouts		Date Seed Sprouts	
Day 1		Day 1	
Day 2		Day 2	
Day 3		Day 3	
Day 4		Day 4	
Day 5		Day 5	
Day 6		Day 6	
Day 7		Day 7	

QUESTIONS:

1. What conditions are necessary in order for a seed to sprout?
2. When the seeds sprouted, what was the first part of the plant you could see? Explain why this part of the plant is the first part to sprout.
3. The bean is classified as a dicotyledon plant (the cotyledon is a seed leaf). What can you observe about your bean seed that explains this classification?
4. What color was the stem when it first sprouted?
5. When the plant sprouts, it has no chlorophyll to enable it to produce energy through photosynthesis. How does the plant get its energy during this time?
6. How many days after the first seed sprouted was it before the stem broke through the ground?
7. Use the magnifying lens and look closely at the tip of one of the growing roots. Describe what you see.
8. At the end of 7 days, which part of the plant was the longest? Why?
9. If these plants are planted in a pot where their growth is unrestricted and they receive adequate sunlight and water, what do you predict will happen over the next few weeks? Plant the bean plants and see if your prediction is correct.