

Bean in the Bottle

Overview:

Youth will learn about hydroponics and build a water bottle planter.

Goals:

- Learn about the life cycle of a plant.
- Learn what plants need to survive.

Time Required: 1 hour

Materials:

- Scissors
- 1 empty 20-oz plastic bottle
- 5-6 inch long cotton string
- Water
- Garden Soil
- Bean Seeds (preferably germinated seeds from Bean is a Seed activity)

Procedure:

1. Carefully cut the water bottle in half, horizontally. Depending on the age of the child doing this activity, an adult may need to do this.
2. Assist kids with cutting a small hole in the bottle cap.
3. Cut a string that is about five inches long (or have strings pre-cut). Poke the string through the hole in the cap and tie a knot on the inside of the cap. Screw the cap back onto the top section of the bottle.
4. Now, fill the bottom-half section of the bottle with water.
5. Take the top half of the bottle and place it upside down, inside the bottom half of the bottle. The cap should not be touching the water. The string should be dangling down into the water.
6. Fill the top half of the bottle with soil. Press a bean seed into the soil and cover with about ½ inch of soil.
7. Place your Bean in a Bottle in a sunny location either inside or outside, and watch your bean grow! Don't forget to change out the water when it begins to change color.
8. Have students draw a picture of their bottle planter on their worksheet.
9. Encourage students to continue to make observations of their plants every few days.



Bean in the Bottle

How it works:

In the Bean in a Bottle activity, the string wicks water up into the soil to keep the plant moist. Water is made of cohesive and adhesive properties, which means that it “sticks” to itself and other special materials. This allows the water to be absorbed into the string; once the string has been completely soaked it will result in water droplets being left in the soil, where it can then be absorbed by the plant.

This activity also teaches about hydroponics. Hydroponics is the process of growing plants in perlite, gravel, or liquid, with added nutrients but without soil. Because it does not use soil, hydroponics may be key to farming in space or in a Martian colony.

Common problems / Additional guidance:

- Put down a plastic table cloth, or complete the activity outside to help with cleanup.
- With younger groups, prep bottles (cut in half, poke holes in lids) ahead of time.

Adapted from the following lesson:

- 4-H STEM Lab, Bean in the Bottle: <https://4-h.org/clover/activities/bean-in-a-bottle/>

Reflection Questions:

- How does agriculture relate to science and why is it important that these fields work together?
- What did you learn about indoor gardening?
- How does the water get to your bean?
- What are other ways to be active in agriscience in your home? In the city? Brainstorm ideas.
- How could these kind of planters be useful in a space colony?

Oklahoma State University, as an equal opportunity employer, complies with all applicable federal and state laws regarding non-discrimination and affirmative action. Oklahoma State University is committed to a policy of equal opportunity for all individuals and does not discriminate based on race, religion, age, sex, color, national origin, marital status, sexual orientation, gender identity/expression, disability or veteran status with regard to employment, educational programs and activities, and/or admissions. For more information, visit <https://eeo.okstate.edu>.

