

Materials Needed

- Beans
- A tablespoon
- 1 cup of water
- 4-5 small sealable plastic bags
- A rock
- A small handful of soil/dirt
- A piece of cotton or a napkin
- STEAM Journal
- Pencil/Pen
- Marker

Grade Range

3-5

Topics/Skills

Experimentation, plant growth, prediction

Learning Standards

NGSS: [From Molecule to Organisms: Structures and Processes](#)

Duration

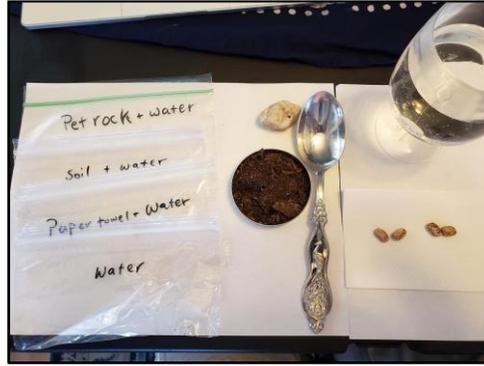
15 minutes

Prep Time

5 minutes

Beans and...

Pair Beans with Water and Random Objects and See What Happens



What do beans need to sprout? Is water enough or will they sprout faster with a combination of water and soil or water and other materials? Experiment with different ingredients to find out.

Activity Challenge

Germinate at least four beans with different materials in individual plastic bags.

Preparation

1. Define workspace and gather materials before beginning activity.
2. Agree on clean-up time and display area for **Beans and ...** project.

To Do

1. Add 1 tablespoon of water and 2-3 of the same type of bean into each plastic bag.
2. Put one additional item into three of the bags.
3. Label each bag with its ingredients: Beans and Water; Bean, Water and Soil; Beans, Water and Rock; Beans, Water and Napkin and any other combinations you wish to explore.
4. Place the sealed bags on the windowsill or a safe place that gets sunlight.
5. Check daily, adding more water if needed in 1-teaspoon increments.
6. Record your daily observations.

Observations

- Each day note any changes in each of the bags. Describe similarities and differences between the bags.
- Every 3rd day, sketch each bean.
- Note the conditions of each bag that contains a sprouted bean. Did the bean in the bag sprout with just water?

- Not all beans will sprout even in the perfect conditions. If the beans do not sprout, try again with different beans.

Extensions

- Try a similar experiment by putting only water in the bags and place each bag in an area that get different amounts of direct sunlight. Record your results.
- If the beans sprout, try planting them in a garden or flowerpots.

The Science behind the Activity

To germinate, beans only need water. They do not need sunlight but do need warmth which is why it helps to put them on a windowsill. Adding different materials in the “bean bags” should not impact the germination process unless they either help the seed retain water or absorb too much water. Often the best way to germinate seeds is to soak them overnight and then place them in a moist environment such as in a damp paper towel.

Plants, like all living things, require matter to germinate and grow. We know that water and light are needed for plants like beans to grow. This experiment will offer students a chance to rely on their observations, notes, and to some extent their imagination in order to determine which variables will support the germination and growth of a tiny plant.