What Do Plants Need to Grow?
Topic Life Science

Summary

Students will explore the importance of air, water and sunlight in the growth of radish seeds and pinto bean seeds into healthy plants. Students will compare and contrast the growth of the seeds in two different situations. One will be placed in a cool dark place and the other will be placed in a sunlit spot. Students will observe the changes in the seeds as they germinate and make observations on size, shape, color, and texture. Once the seeds germinate and the roots have developed they are placed in pots in a sunlit spot inside a jumbo size zipper bag that acts as a greenhouse to continue growth. Here they also get to see the water cycle: transpiration, condensation, precipitation, and accumulation. They will continue to compare the plants that are now both in the sunlight to see if the initial deprivation of light will have a lasting effect on the plant growth.

Grade levels (All, TK-2, 3-6)

Materials

- petri dish (blue)
- measuring tape (pink)
- magnifying glass (pink)
- spoon (pink)
- small plastic cup (red)
- science notebook or google slides
- 2 radish seeds (pink)
- 2 pinto beans (blue)
- string (yellow)
- 2 paper towels
- 4 small baggies or reusable plastic containers.
- 2 - 6 inch Jiffy pots/4 -2 inch Jiffy pots
- soil/can be gathered by student
- jumbo size zipper bag
- alternative to bags

Time for Lesson

- 4-6 - 10-30 Synchronous Minutes
- 8-10 - 15 Asynchronous minutes

NGSS Alignment

K LS 1.C

1-LS1-1

2-LS2.2

3-LS1.1

4-LS1.A

5-LS1.1

ELA Connection 

Using a table to organize information(seeds)

Using a table to organize information (plants)
Reading: Compare and Contrast Animals and Plants with Photosynthesis by Katie Clark

Writing Extended sentences

Lesson submitted by Laura Orabi

Math Connection

Measuring with centimeters/inches

Teacher Background Knowledge

[Plants Are Alive]

Lesson Instructions:

Day 1 30 minutes (Observation of seeds and preparing for next step)

1. Before you begin: have students wash their hands well with soap and water.
2. Then have them get their science notebook/paper/ open Google Slides, Science kits, three paper towels and a pair of scissors and return to their work spaces.
3. Students spread one of the paper towels on the work space
4. Have students take out the following materials from the science kit and place on the paper towel.:
    a. From blue bag:
        i. petri dish
    b. From pink bag:
        i. two small seeds (place in petri dish)
        ii. magnifying glass
        iii. measuring tape
        iv. spoon
    c. From orange bag:
        i. 2 beans (place in petri dish)
    d. From red bag
        i. one small cup
5. Students will take out their science notebooks/paper/Google Slides and draw the seeds. Have them use the magnifying glass to see the fine details of the seeds/beans. Then have them describe the shape, size, color, and texture of the seeds/beans. Have them use the measuring tape to measure the size of the bean, width and length. We Googled the name of the shape for the bean together, ellipsoid.
6. Once observation is complete discuss how long the beans have been in the bag. Is there any evidence that they have grown/changed while in the bag? Leave the beans in the petri dish overnight.
7. Have the students prepare the baggies for tomorrow. Cut the paper towels in half. Then fold the paper towel and make sure that it fits completely inside the baggie so that it can close securely.
8. Once all the paper towels fit into the bags or containers have students fill the small plastic cup with water. Using the spoon, have them add two spoonfuls of water to each paper towel and zip the bag closed. The paper towel should be moist not wet.(no puddles) You will put the rest of the materials away to use again tomorrow(next session).

Lesson submitted by [redacted] Orabi

Made in Hayward

Day 2 - 10 minutes(placing seeds/beans in germination bags)

1. Have the students wash their hands with soap and water.
2. Then take out their science notebooks, magnifying glass, measuring tape, petri dish with seeds/beans and the bags with the moist paper towels.
3. Observe the seeds/beans have they changed?
4. Have the students label the bags with #1 and #2, there will be 2 of each one for each seed/bean.
5. Have the students place one seed/bean into each bag making sure they have a 1 and 2 for each bean.
6. Zip bag closed, but do not need to push out all the air.
7. Place the #1 bags in a drawer or dark place and place the #2 bags in a sunlit spot inside the house.
8. Leave for two days.

Day 3 - 20 minutes (observation of seeds/beans)

1. Have students wash their hands with soap and water.
2. Have the seeds changed?
3. Gently remove the paper towel from the bag and place on top of the plastic bag.
4. Open the paper towel gently. Try not to touch the seeds.
5. Observe the seeds for shape, size, color, and texture-record in science notebook
6. Have the students pop their observations in the chat, or shout out. Use the Writing Extended Sentences chart to put the words into the parts of speech categories. You can have them add words to the chart.
7. Then use the words gathered to make stronger and longer sentences to describe what is happening to the seeds. They can record these in their notebooks.
8. Place seeds back into baggies carefully.
9. Put the #1 bags in the dark place and the #2 bags in the sunlit spot.

Continue doing this for 4-5 observation days extending over 10 days. This can be a synchronous or asynchronous activity depending on the grade.

NOTE: Use the Writing Extended Sentences tool synchronously. I have found it to not be helpful as an asynchronous activity as the richness of language gathered in a group far exceeds what one student with limited language skills can do on their own.

Day 4 - 10 minutes (seeds are fully germinated)

1. By now, the seeds should be germinated and have roots and a stem which may be difficult to measure. Teach the students how to use string to follow the stem and longest root and then measure the string with the measuring tape. Be careful not to disrupt the roots and dislodge them from the plant.
2. Compare and contrast the growth of the plants in the dark and light. How are they the same and how are they different. Did some of the seeds in the dark rot. Did some of the plants not grow or change at all. Take this time to talk about the importance of water, too much or too little effects plant growth. This could be

Lesson submitted by Laura Orabi

used to explain why some seeds never grow into plants while plants produce thousands of seeds each year.
3. There are a couple of videos linked on germination and plant growth above to use at this point.
4. Before we plant the seeds/beans, have the students place both bags in the sunlit spot overnight. In the morning, have them observe the beans. Are there any changes, especially in color? Have them fill the pots with soil.

Day 5 - 30 minutes (Planting the Seeds/Beans)

1. Take the bags and do the final observation.
2. It's time to plant. Have the students place the pots already filled with soil side by side in the jumbo ziploc bag. Water the soil until there is overflow into the bag. This will be absorbed by the jiffy pot and ensure that there is enough water in the environment to observe the water cycle and create the greenhouse effect.
3. Have students use the spoon and move the soil to the sides of the pot creating a hole for the seeds/beans to be planted.
4. If the roots have attached to the paper towel, have the students plant with the paper towel attached. Trim paper towel around roots.
5. Have students place both radish seeds in one pots, one on the right and one on the left. Then do the same for the beans. If using the smaller pots, they can place one in each pot. Make sure to note which is plant #1 and #2 in each pot.
6. Place all the pots in the sunlit space. Zip the bag closed. Leave for two days and begin observation of the plants in the pots.

This lesson can be extended for as long as you want to see plant growth. My students were amazed that the bean stayed attached to the plant as it grew and then shriveled away. As the beans grow they will need support. We used BBQ skewers or small sticks with the string tied loosely to support growth.

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Lesson Resources

Google slides: Observation Seeds/Beans Observation in Pots

Flipgrid

Primary Reading

Intermediate Reading Photosynthesis

Mystery Science Connection

External Links: Brain Pop Jr: Plant Life Cycles

How Does a Seed Become a Plant?

Seed Germination

Generation Genius: What do Plants Need to Grow

GetEpic Plants, Exploring Seeds

Diagram of a Bean Seed PDF

Bean Seed Dissection PDF

Writing Extended sentences

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Primary Modifications

- use a penny next to the seed and bean to describe the size of it in relation to the penny (larger, smaller)
- use a read aloud book, there are many on **youtube** about growing plants and seeds. None of them appealed to me as an upper grade teacher, however, they may appeal to you.
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Intermediate Modifications

- This lesson has been successfully done in 3-5 grade
- In class as well as Distance Learning

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