Activity 4: Leaf Observation and Printing

In this activity, learners will collect leaves from leafy greens in your garden or fridge for observation and analysis. They will collect data, determine their adaptations, and create a leaf print art piece. *Background information can be found at the end of this activity guide*

Activity

When deciding which types of plants to grow in space, there's a lot of variety to pick from! Plants that don't produce fruits or veggies might produce leaves that are edible and packed full of nutrients. If astronauts want to grow leafy greens in space, they should study some of the different types available. In order to investigate some of this variety, our project continues with an observation and analysis of leaves!

1. Gather your learners and the materials needed!
2. Begin with a discussion, using some of the questions below:
    a. *Why do you think plants have leaves?*
    b. *Are all leaves of all plants edible? Why/why not?*
    c. *Do you think all plants have the same types of leaves?*
3. With your learners, gather 3-6 different leaves from around the house or outside. Leafy greens, like romaine lettuce, cabbage, iceberg lettuce, spinach, arugula, etc. are the most relevant to this activity, but feel free to expand beyond that.
4. Record the items on your data sheet and make a quick hypothesis:
    a. *How might the leaves be similar or different from one another?*
5. Make observations about the leaves and record results on the data sheet:
    a. *Shape of leaf*
    b. *Color of leaf*
    c. *Texture of leaf*
    d. *Patterns on the leaf*
    e. *Patterns of veins running through the leaf*
    f. *Size of leaf**

*If using a ruler

Suggested Materials

- Data Sheet (printable version)
- 3-6 different types of leaves (romaine lettuce, cabbage, spinach, arugula, iceberg lettuce work best, leaves from outside can work too)
- Knife
- Writing utensils
- Ruler
- Magnifying glass (optional)
- Craft Paper
- Paint
- Sponges or paper towels
- Markers, crayons, or colored pencils (optional)

Safety

Adult supervision is recommended throughout this experiment. Some leaves will require tools to cut them open.

6. Discuss your observations using some of the following questions:
    a. *Were all of the leaves the same? How were they similar or different?*
    b. *How might these differences help the plants survive?*
7. Create a "leaf-print" art piece. Use a paint brush or sponge to coat leaves in a light layer of paint, then gently press them onto paper to make a pattern. Use different color paints, leaves, markers, and whatever else comes to mind! Work with your learners to create a work of art, tell a story, or create a picture.

By carefully analyzing plants' differences and adaptations, scientists can select which plants may have the best chance of surviving in space. This was true for seeds, as the first experiment highlighted. However, it is also important to study the *product* of the plant, the part we actually harvest and eat. Astronauts want to have as much of a healthy, balanced diet as possible. Studying a wide variety of plants and their value is important as plans for space travel continue.

Background

Why do plants have leaves? What do they help do?

Leaves are a source of photosynthesis. Photosynthesis is the process by which a plant takes in water, sunlight, and air and turns it into food and energy. Leaves are important to this process because they help increase the size of the plant, and how much it can photosynthesize.

How might leaves (and their different adaptations) help a plant survive?

Plants' leaves have different adaptations depending on where they grow, how much sunlight they get, and how much energy they need to survive. Leaves may vary in shape, color, or size because of their adaptations. For example, a plant that lives in a crowded forest that requires lots of sunlight might grow large, wide leaves to absorb as much energy as it possibly can.

Are there plants in other parts of our solar system already?

Currently, there is no evidence of plant life anywhere else in the solar system. As scientists search for planets beyond our solar system, called exoplanets, they are searching for elements that indicate life: water, air, warmth, etc. As of now the only plants known to exist in space are on the International Space Station!

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How do you think the leaves will be similar, or different, from plant to plant?

I predict...

Record your leaf observations:

Type of Food/ Plant	Shape	Color	Texture	Pattern	Vein Pattern	Size

***Optional*: Use the space below to sketch each plant's leaf:**

How were the seeds similar, or different, from plant to plant?

I observed...

How might these differences help the plants survive?

I think...