Lessons at a Glance

Kindergarten
Caring for Our Pet Plants: What Plants Need

Overview:

Students investigate the driving question, "What do plants need to grow and survive?" After creating garden agreements together, students begin the unit by investigating what objects in the garden are plants and what objects are not plants. Then they make observations of a healthy plant and a less healthy plant, and look for patterns in order to construct explanations based on evidence that plants need sun, minerals from soil, water and air in order to survive and grow. Students apply this knowledge to what seeds need in order to grow and prepare seed packets for future planting. During the spring, students sow their own seeds and care for their plants, while also making observations about how their plants change over time and protecting their plant from pests. Students deepen their understanding of what plants need to survive and grow by developing a model. They also celebrate by enjoying a garden vegetable they have grown. This unit is designed for students to make progress towards **Performance Expectation K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive**.

Caring for Our Pet Plants: What Plants Need	
NGSS Performance Expectation	**K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.**
Driving Question	**What do plants need to grow and thrive?**
Lesson 1	**Welcome to the Garden Classroom!** Students introduce themselves, create group agreements, and then go on a scavenger hunt in order to begin to form a personal connection with the Garden Classroom.
Lesson 2	**Pick the Plant** Students ask questions and look for patterns to begin engaging in argument from evidence about the characteristics of plants.
Lesson 3	**What Plants Need, Part I** Students make observations of the effects of resource deprivation on plants in order to construct explanations about what plants need in order to grow.
Lesson 4	**What Plants Need, Part II** Students develop a model in order to demonstrate that sun, minerals from soil, water, and air cause seeds to grow.
Lesson 5	**Pet Plants** Students record observations, and obtain and communicate information about their plant in order to determine how it changes over time.
Lesson 6	**Food Factories** Students construct explanations and engage in argument from evidence in order to determine the most plausible cause for holes observed in leaves.
Lesson 7	**Setting Seedlings in the Sun** Students look for patterns of pest damage in the garden and define pest-related problems, in order to transplant their Pet Plants into the garden and protect them from animals that obtain their food from plants.
Lesson 8	**Lettuce Eat Leaves** Students develop a model in order to recognize the ways in which plants, animals, water, sunlight, air, and minerals from soil interact in a system, and how animals, including humans, need plants to live and grow.

Pick the Plant

Objective: Students ask questions and look for patterns to begin engaging in argument from evidence about the characteristics of plants.

KINDER   INDOOR, THEN OUTDOOR   ANY SEASON   45 MIN

Lesson Summary

In this lesson, students classify objects on paper and in the garden according to whether or not they think they are plants. They look for patterns in their observations to develop a list of characteristics unique to plants and create a list of questions they have about plants.

Next Generation Science Standards

Disciplinary Core Idea

LS1.C. Organization for Matter and Energy Flow – All animals need food in order to live and grow. They obtain their food from plants or from other animals. <u>Plants need water and light to live and grow</u>.

Science and Engineering Practices

Engaging in Argument from Evidence – Engaging in argument from evidence in K-2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

Asking Questions and Defining Problems – Asking questions and defining problems in K-2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

Crosscutting Concepts

Patterns – Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Materials

- ❏ A "Mystery Box" such as a shoebox or other opaque box with a lid that says "Mystery Box!" on the outside.
- ❏ 5 small, random non-plant objects to put in the Mystery Box, such as a rock, a toy car, and the like
- ❏ 2 plants to put in the Mystery Box
- ❏ Chart paper or a whiteboard
- ❏ Markers
- ❏ 1 green, tan, and blue crayon for each pair of students
- ❏ 2 green popsicle sticks for each student
- ❏ 2 tan popsicle sticks for each student
- ❏ 1 Pick the Plant handout for each student
- ❏ 1 clipboard for each student

Preparation

- ❏ Write the headings, "**Plant Characteristics**" and "**Questions We Have About Plants**" on chart paper or a whiteboard in the garden.
- ❏ Photocopy one "Pick the Plant" worksheet for each student, and put each one on a clipboard.
- ❏ If necessary, color half of your popsicle sticks green.

Engage

1. Get your students thinking about plants. *Think of a plant that has been important to you. This could be a tree you've climbed, a plant you've picked fruit from, or a plant you see around home sometimes. Share about that plant with a partner.*

2. Build anticipation. *I'm going to pull an object out of this Mystery Box! Once you see it, if you think the object is a plant, give me a thumbs up. If you think it's not a plant, give me a thumbs down. Are you ready?!*

3. Pull an object out of the box, such as a toy car. *Do you think this is a plant?* Watch for students' thumbs up or down. Ask students to indicate if they'd like to share more: *Hold your thumb high in the air if you can share with us a reason why you think this is or is not a plant.* Call on students to explain their answers. Whether or not the first student got the answer right, ask: *Does anyone have a different idea?* Accept all ideas and welcome contradictory interpretations at this time.

4. As you continue with the Mystery Box, sort the objects revealed into 3 piles: Plants, Not Plants; and We're Not Sure If These Are Plants. Ask: *What questions do you now have about plants?*

5. Continue until students have discussed all of the objects in the box.

Explore

1. Give each student a Pick the Plant handout on a clipboard and a crayon.

2. Ask students to use a green crayon to circle all of the plants they can identify in the drawing, and a tan crayon to X out any objects they see that are not plants.

> ### Relevant Common Core Math Standard
> *CCSS.MATH.CONTENT.K.CC.B.5*
> Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

3. Have students count the plants they have circled. Ask them to write the number in the space provided at the bottom of the page. Assure students that you want to know what they think. You are not looking for a certain number.

4. Explain the next garden exploration activity to students: *Now we're going to head out into the garden and mark objects we think are plants and objects we think are not plants. I will give you each 2 green popsicle sticks. These are to place on or next to plants.* Demonstrate by placing a green popsicle stick next to a plant. *I'll also give you two tan popsicle sticks. These are to place near objects you think are not plants.* Demonstrate.

5. Have your students leave their clipboards at the meeting space and head out into the garden to identify objects that they think are plants and objects that they think are not.

6. As students are placing their popsicle sticks on plants and/or other objects, go around and ask them why they chose a particular plant or a particular object. *Why did you place this green popsicle stick near a squash blossom? Why is this tan popsicle stick next to this rock?*

7. As students finish placing their popsicle sticks, instruct them to show other students the objects they chose and to explain why they thought those objects were or were not plants.

Explain

1. Gather the class together and have students share out a few examples of objects they thought were plants. For each object, ask them, *What made you think that object was a plant?* As they share out, record their ideas under the heading, "**Characteristics of Plants.**" This might include things like, "plants are green, plants grow in soil, plants have leaves," etc. Highlight patterns. *I notice that a lot of the obects you thought were plants are green. Let's see what other patterns we can find.* After each student shares, ask: *Does anyone have a different idea about that?* If students disagree about something, help them rephrase their answers into questions to determine if their observation is a pattern that applies to all plants, or something unique to that one plant. You can write the resulting questions on the second chart under the heading, **"Questions We Have about Plants."** This list might include things like, "Are trees plants? or "Are all plants green?"

2. Ask if students have any other questions about plants. If so, list their questions on the chart paper as well.

3. Hang this list in your classroom or a covered area in your garden and use it throughout the plant unit to record students' questions and ideas about plants.

Whenever students discuss science with one another, they are practicing English Language Arts as well as Science.

Relevant Common Core English Language Arts Standard

CCSS.ELA-LITERACY.SL.K.1

Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

Elaborate and Evaluate

1. Have students return to their Pick the Plant handout. By referencing the information from the Characteristics of Plants chart, and using a blue crayon, ask them to make any changes they want by circling new plants they've found or crossing out circles around objects they no longer think are plants. (Using a new color simply allows you to see how their thinking has evolved). It's ok if the students are still unsure at this point because students will continue to revisit this idea in future lessons.

2. If time permits, go back to your three piles from the beginning of the lesson and re-classify according to your discussion.

Extensions

✦ Read aloud a story or informational text that includes a lot of plants and animals, such as *The Year at Maple Hill Farm* by Alice and Martin Provensen. Pause frequently to point to particular parts of the farm and ask students: *Is this a plant or an animal? How can you tell?* When you finish the story, ask students: *What was the main idea of this story?* You can find texts in your school's English Language Arts curriculum, or by using a free, searchable online library of nonfiction books and articles categorized by grade-level, such as that found at **readworks.org**.

   ✎ *CCSS.ELA-LITERACY.RI.K.1* – **With prompting and support, ask and answer questions about key details in a text.**

   ✎ *CCSS.ELA-LITERACY.RI.K.2* – **With prompting and support, identify the main topic and retell key details of a text.**

✦ Have students bring in pictures of plants (or grab some free magazines from your local library) to create a bulletin board display focused on plants. You may wish to have the students arrange the pictures according to type: tree, shrub, flower, and so on.

✦ Have students make a list of the names of plants they eat in a typical day. *What kind of food did you have for lunch? Let's see if we can figure out how many plants you ate for lunch today.* Help them trace the strawberry jam in their sandwich back to strawberries growing in the garden or the corn in their chips back to corn.
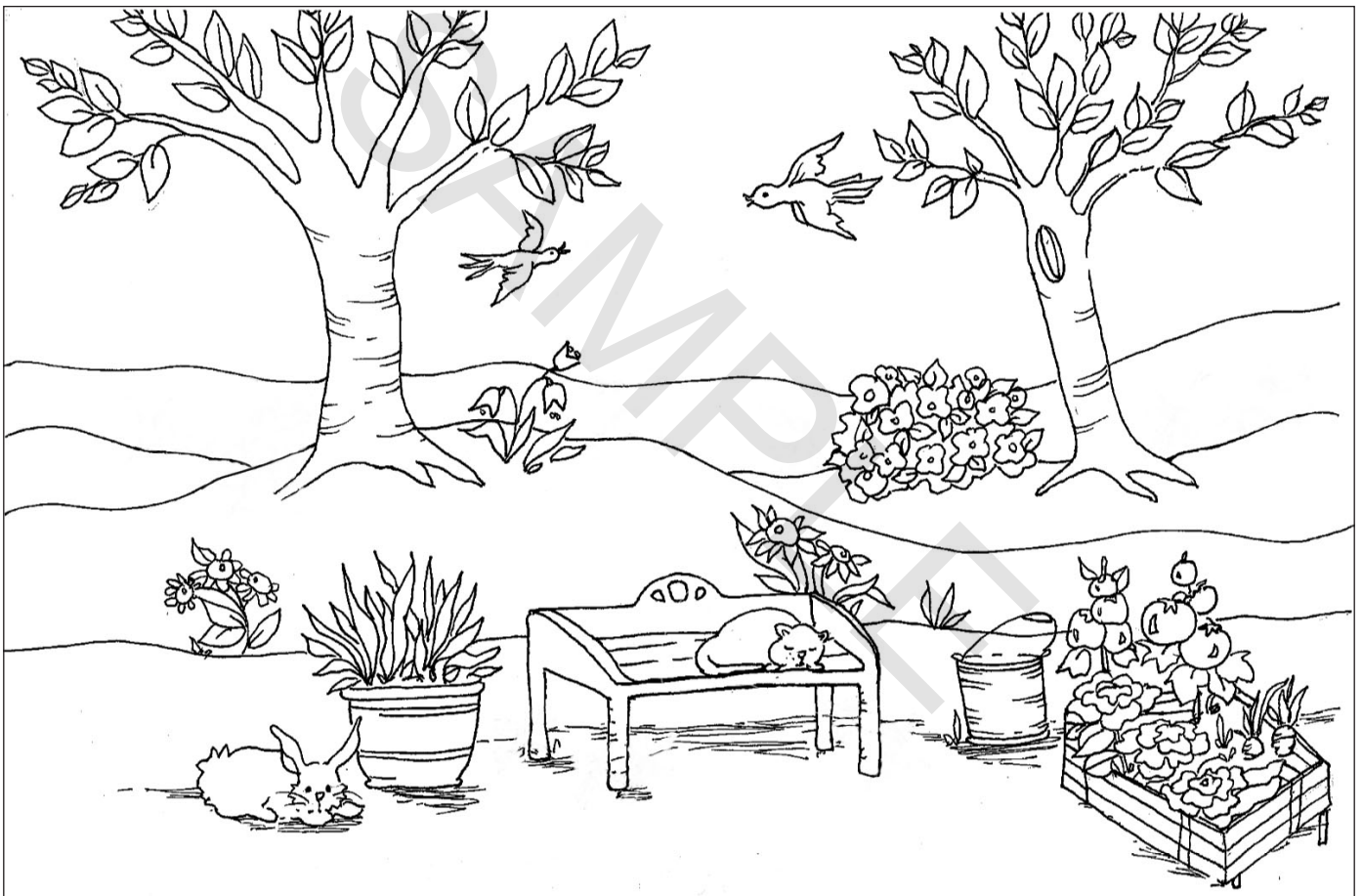
Rainy Day Option

You can teach this lesson indoors when necessary. In that case, simply collect 8-10 plants and 8-10 objects that are not plants and spread them across a big table where students can gather around to see them.

Name _____

Pick the Plant

○ Circle the plants.

✕ Cross out things that are not plants.

How many plants did you find? _____

Are trees plants? (Yes or No)