# Plants

## Lesson Synopsis:

In this lesson, students will learn about the structure and function of plants, with a focus on roots, stems and leaves.

## TEKS:

***1.6*** ***The student knows that systems have parts and are composed of organisms and objects.***

**1.6A** **Sort organisms ~~and objects~~ according to their parts and characteristics.**

**1.6B** **Observe and describe the parts of plants ~~and animals.~~**

**1.6D** **Identify parts that, when put together, can do things they cannot do by themselves, such as a working camera with film, ~~a car moving with a motor, and an airplane flying with fuel.~~**

***1.9*** ***The student knows that living organisms have basic needs.***

**1.9A** **Identify characteristics of living organisms that allow their basic needs to be met.**

**1.9B** **Compare and give examples of the ways living organisms depend on each other for their basic needs.**

## Process TEKS:

***1.2*** **The student develops abilities necessary to do scientific inquiry in the field and the classroom.**

**1.2B** **Plan and conduct simple descriptive investigations.**

**1.2C** **Gather information using simple equipment and tools to extend the senses.**

**1.2E** **Communicate explanations about investigations.**

# GETTING READY FOR INSTRUCTION

## Performance Indicator(s):

- Using picture cards or the real objects, students will observe the parts of plants and describe the parts: roots (as long or short), stems (as short, tall, thick or thin), and leaves (their color and as sharp, pointed, or rough). (1.6A, 1.6B; 1.9A)
  ELPS ELPS: 1C, 1E, 2E, 2I, 3D, 3H, 4E, 5B, 5G

## Key Understandings and Guiding Questions:

- There are many types of plants.
  - — How do we decide what is a plant? (and not an animal)
  - — What is the difference between a plant, shrub, vine or tree?
- Plants have parts that have functions that allow the plant to survive.
  - — How do the stems, leaves and roots help a plant survive?
  - — What is the function of stems, leaves and roots?

## Vocabulary of Instruction:

- plants
- trees
- shrubs
- vines
- roots
- stems
- leaves
- basic needs
- long
- short
- tall
- thick
- thin
- sharp
- pointed
- smooth
- rough
- color
- enter word

## Materials:

- book about plants
- 5 or 6 different small plants to be dissected (1 per group)
- tweezers (1 per group)
- hand lenses (1 per student)
- scissors (1 per group)
- trays (1 per group)
- labeled paper plates (stem, roots, leaves, flower)
- chart paper
- book about plant parts function)
- celery
- food coloring
- water
- cups (a wider base will help cup balance better)
- leaves from around the school (or the teacher could bring in leaves- these could be real or 'silk'
- crayons
- drawing paper
- stickers
- potted plant
- three similar plants –one with its roots removed and replanted, one with the roots covered up with plastic wrap, and one with no changes
- plastic wrap
- spray bottle

***Appropriate materials may be substituted as needed to incorporate district resources and availability.***

## Resources:

## Advance Preparation:

1. Gather plants for first activity.
2. Gather materials for lesson
3. Make copies of the handout:
   - **Pictures for Performance Indicator** (3-4 sets for class) printed on cardstock and laminated.

## Background Information:

Most plants have the same basic structure: roots, stems, leaves, flowers, and seeds. Roots anchor the plant to the ground. They absorb water and minerals from the soil. Stems support leaves and lift them to the sunlight. Stems also transport water and minerals from the roots to the flowers and leaves. Leaves are the food production sites of the plant. Stems transport food produced in the leaves to the rest of the plant. On the underside of most leaves are openings where gases are exchanged. Flowers must be pollinated for seeds to form. Pollen is usually carried by the wind or by animals. After pollination, a fruit will develop. Inside the fruit are seeds that will form new plants. There are two main types of seeds of flowering plants: monocotyledon (1 part) and dicotyledon (2 parts). Bean, pumpkin and sunflower seeds are easily separated into two parts (cotyledons). Corn and grass seeds only have one cotyledon. The basic needs of plants are air, water, sunlight, and warmth. Plants are important because they help meet the needs of people and animals.

## GETTING READY FOR INSTRUCTION SUPPLEMENTAL PLANNING DOCUMENT

Instructors are encouraged to supplement, and substitute resources, materials, and activities to differentiate instruction to address the needs of learners. The Exemplar Lessons are one approach to teaching and reaching the Performance Indicators and Specificity in the Instructional Focus Document for this unit. A Microsoft Word template for this planning document is located at www.cscope.us/sup_plan_temp.doc. If a supplement is created electronically, users are encouraged to upload the document to their Lesson Plans as a Lesson Plan Resource in your district Curriculum Developer site for future reference.

## INSTRUCTIONAL PROCEDURES

### Instructional Procedures

### ENGAGE

1. Begin the lesson by going outside and having a plant scavenger hunt. Have students take out their science journals and record with words and drawings the different types of plants seen while walking around the school.

2. When back in the classroom, ask:
   - **What is a plant?**
   - **Why do some plants look different from other plants?**
   - **What are some of the differences you observed?**

### Notes for Teacher

**NOTE:** 1 Day = 50 minutes
Suggested time: Day 1

**MATERIALS**:
- book about plants

**MISCONCEPTION:**
- Plants get their energy from the soil through roots, and that leaves take

## Instructional Procedures

- **Do they all grow from the same kind of seed?**
- **How do you know if something is a plant?**
- **How do we use plants?**
- **What do plants need to stay alive?**
- **Can we find anything in the classroom made from a plant?**

3. Read a book about the plants. (Use a book that discusses different kinds of plants.)

## Notes for Teacher

in water.
- Seeds are all *inside* fruit, are small objects, won't grow if taken from a fruit, and grass and trees don't have seeds.
- Leaves change color because they don't have much moisture, get dry, and turn brown.
- Plants do not grow in the winter, that plants hibernate like animals; nothing is alive in winter months.

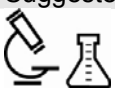

Have students draw the different types of plants they can find out on the scavenger hunt.

**Note:**
If the weather does not allow outside observations, provide students magazine or other types of pictures of different types of plants.

## EXPLORE

Suggested time: Day 2

Start the week by putting plants in different locations around the classroom (in the cabinet, in the Sun, in a refrigerator, one in a zip lock bag, and do not water one.) Students will be observing what happens during the elaboration part of this lesson.


**MATERIALS:**
- 5 or 6 different small plants to be dissected (1 per group)
- tweezers (1 per group)
- hand lenses (1 per student)
- scissors (1 per group)
- trays (1 per group)
- labeled paper plates (stem, roots, leaves, flower)
- chart paper
- book about plants

1. Show the class the tray with the different plants.
   Ask:
   - **What are these?**
   - **They all look different, can they all be plants?**
   - **Why do you think that they are plants?**

   Explain that they will be observing carefully them to discover if they are all plants.

2. Break the class into small groups (3 or 4) and have a different type of small plant for each group. Pass out hand lenses for students to use in observing their plants.

3. Have each group make observations and discuss what they notice about their plants. Each student should draw a diagram of their plant in their journal, labeling the parts that they know. Provide a list of possible words on a class chart or the chalkboard.


Have students create a page for plants. Have them draw a diagram of their plant and label the parts that they already know. This can be used to assess prior knowledge.

4. Have each group report to the class what they have observed about their plant. As a class, compare each plant.
   Ask:
   - **Are these plants? How do you know?**
   - **Why do some plants look different from other plants?**
   - **What are some of the differences between the plants?**
   - **Do they all grow from the same kind of seed?**

Note: A bibliography is attached to the lesson.

5. Read a book about plants. (Use a book that describes the functions of the

## Instructional Procedures

parts of plants.) Have a plant by you as you read the book and identify any parts as you read the book.

6. Have students meet in their small group again. Explain that they are going to take a closer look at the plants to understand how the parts are put together and how they work.

7. Have the small groups discuss how they would like to go about investigating their plant.

8. Have them create a plan of action. For example: One student will start by taking the plant out of the pot and removing the roots.

9. Have one person from each group collect supplies needed: tweezers, hand lenses and scissors for each group member and one tray for the group to share.

10. Have students begin to investigate the plants.

11. Have students sort the parts of the plants on labeled paper plates.

12. Guide students through the investigation by asking questions about what they are noticing and reminding to record what they are discovering in their science journals. (They may use the labels on the plates for models of words to use in their journals.)

13. Have groups rotate to observe and compare the different plants.

14. Have students meet as a whole class to discuss activity.

15. Record responses on chart paper.
    Ask:
    - **Are these plants? How do you know?**
    - **What is a plant?**
    - **Why do some plants look different from other plants?**
    - **What are some of the differences you observed?**
    - **Do they all grow from the same kind of seed?**
    - **How do you know if something is a plant?**
    - **How do we use plants?**
    - **What do plants need to stay alive?**
    - **Can we find anything in the classroom made from a plant?**

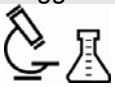
## Notes for Teacher

**Note:**
Students may tape samples of the parts that they are observing in their journals using clear packing tape.

## EXPLORE / EXPLAIN

Suggested time: Day 3

**Activity 1**



**MATERIALS:**
- celery
- food coloring
- water
- cups (a wider base will help cup balance better)
- leaves from around the school (or the teacher could bring in leaves- these could be real or 'silk'
- crayons
- drawing paper
- stickers

1. Ask:
    - **What do you think is the purpose of a stem?**

2. Group students with 3 or 4 in each group.

3. Have the groups vote on what food coloring they would like to use.

4. Give each group one cup. Have them fill it up with water.

5. Add food coloring to their cups of water. You will need to use at least 10-15 drops of color.

6. Show the students some celery. Explain how this is the stem of the plant.

## Instructional Procedures

7. Place a piece of celery with the bottom cut from the stalk into the colored water.

8. Have students predict what they think will happen to the celery. Write and draw their thinking in their science journal.

**Activity 2**

9. Ask:
   - **What is the purpose of a leaf?**

10. Have students go outside and collect leaves from different types of plants from around the school.

11. Take the leaves inside and place the leave under Manila paper.

12. Use unwrapped crayons to make leave rubbings.

13. Use the rubbing to make a diagram of a leaf. Label the parts of a leaf.

14. Use star stickers and stick some on one leave of a potted plant.

**Activity 3**

15. Ask:
   - **Why do plants need roots?**

16. Tell the students that they will be observing three different plants to discover the answer.

17. Display the three different plants. Have students observe, compare and label the plants.

18. Tell students that the plants will have parts missing. Have students predict what will happen to the plants throughout the week.

19. Students will observe and record changes in the health of the plants in their science journals.

## Notes for Teacher

- potted plant
- three similar plants –one with its roots removed and replanted, one with the roots covered up with plastic wrap, and one with no changes
- plastic wrap
- spray bottle

**Note:**
Students will continue with observations and conclusions tomorrow.

**Note:**
One instructional day is needed for set up and reflection in this activity. Students will make observations throughout the week. Have students water the plants every day for a week. Make sure that the plant with the roots covered with the plastic wrap has only its leaves watered. You can use a spray bottle for this.

## EXPLAIN

Suggested time: Day 4

**Activity 1**

1. Have students take out their celery. Go around and cut open the celery along the veins.

2. Have students observe the changes in the celery stalk.

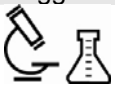
3. Record and reflect in science journals.

4. Explain how the stem takes the water from the roots and brings it up to the rest of the plant.

**Activity 2**

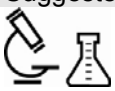
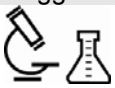
5. Take off the stickers every day to make observations throughout the week. The area under the sticker will no longer be green.

6. Explain how the plants use their leaves to make food from the Sun.



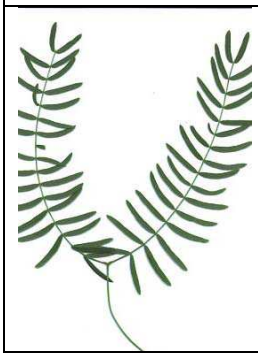
**MATERIALS:**

- celery from yesterday
- paper towel
- knife to cut celery
- cutting surface

| Instructional Procedures | Notes for Teacher |
|---|---|
| **Activity 3**<br>7. Explain how the roots soak up the water for the plant. The plant without roots cannot get water and will not be held safely in the soil without its roots, and the plant with the roots covered can not get water through the rest of the plant either. | |
| **ELABORATE** | Suggested time: Day 5 |
| 1. Take out plants that were put in different locations in the classroom at the beginning for the unit.<br>Ask:<br>• **What happened to the plants?**<br>• **Which ones grew well?**<br>• **Which ones died?**<br>• **What does this tell us about what plants need?**<br>• **What are ways that we use plant?**<br>• **How did this activity demonstrate the needs of plants?**<br><br>2. Make a class chart of plant needs. |  <br>**MATERIALS**:<br>• plants from earlier in week<br>• chart<br>• markers |
| **EVALUATE** | Suggested time: Day 6 |
| 1. Using picture cards or the real objects, have the students observe the parts of plants and describe the parts: Roots (as long or short), stems (as short, tall, thick or thin), and leaves (their color and as sharp, pointed, or rough). |  <br>**MATERIALS**:<br>• Handout: **Pictures for Performance Indicator** or real objects<br><br>**Note:**<br>This activity may need to be done 1-on-1 with the teacher, or you could have students have a set of each group of pictures, and students could complete a sort and then justify their categories. |

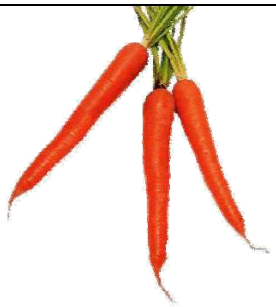
# Pictures for Performance Indicator (pp. 1 of 3)

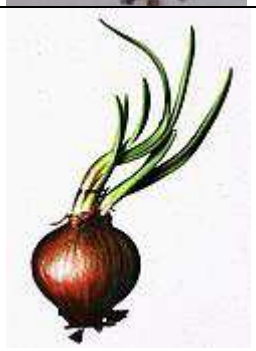
## LEAVES

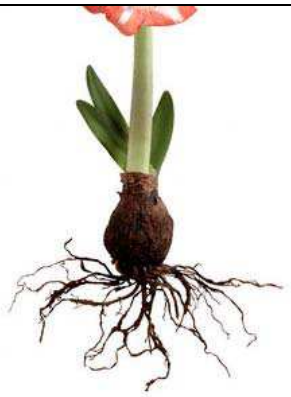


# Pictures for Performance Indicator (pp. 2 of 3)

# ROOTS







# Pictures for Performance Indicator (pp. 3 of 3)

## STEMS

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