

# MICROHABITATS

## **BIG IDEA 17: INTERDEPENDENCE**

### **BENCHMARKS AND TASK ANALYSES**

**SC.1.L.17.1** Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

The student:

- observes and recognizes that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

**SC.1.E.6.2** Describe the need for water and how to be safe around water.

- describes the need for water.

### **KEY QUESTION**

What do animals need to survive in their habitat?

### **TEACHER BACKGROUND INFORMATION**

The observation of populations of living things is essential to understanding the world around us. Pick a location and time of day most conducive to these observations. Consider returning to the sites on a weekly or monthly basis to see how populations and conditions can change over a long period of time.

### **MATERIALS**

#### **Per class**

yarn loop or hula-hoop  
hand lens  
pencil  
clipboard

#### **Per group**

binoculars or spotting scopes

### **SAFETY**

Discuss the importance of not touching wild animals or plants, while outside in the animals' habitat.

### **TEACHING TIPS**

Pick out an area on the school grounds that will show habitats of some wildlife. Examples would be bird nest, trees, bushes, ant hills, etc.

### **ENGAGE**

Ask students the following questions:

- *What do animals needs to survive?* (food, water, shelter, space)
- *What do you think of when you hear the word "wildlife?"*
- *Is wildlife found in our schoolyard?* (yes, be sure to note that insects are part of wildlife since they will likely see evidence of insects)
- *How could wildlife survive in our schoolyard?* (They would need food, water, shelter, and space.)
- *What kinds of animals do you think you might find if we looked outside?*

### **EXPLORE**

1. Take students outdoors and tell them to place their loop of yarn or hula-hoop on the ground as a border for the area of the schoolyard they will observe.

2. Tell students to look for evidence of wildlife in the area within their loop. Tell them to also pay attention to other things they see in their area that may explain how the wildlife survives in the schoolyard.
3. Remind students to use their magnifiers to investigate their area.
4. Students should be drawing their observations in their science notebooks.
5. At the end of the designated time period, direct students to meet and return to the classroom to report what they found.

### **EXPLAIN**

Have each group present its findings. Ask students the following questions:

- *What types of wildlife did you see?*
- *What evidence of wildlife did you find? (shelter)*
- *What was around the habitat that helps the animal survive? (what type of water/food)*
- *How did that compare with what you expected to find?*

### **EXTEND AND APPLY**

Compare each group's findings.

- Which group observed the most wildlife? The least?
- Why might we have different numbers or types of wildlife in different areas? (availability of food, water, shelter, and space)

### **ASSESSMENT**

Depth of entries in student journal- observations should be drawn clearly and labeled, if appropriate.

# PLANT FUNCTIONS

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**SC.1.N.1.1** Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

The student:

- raises questions about the natural world.
- explores questions about the natural world with a team of students through free exploration and generates appropriate explanations for what was observed.

### **KEY QUESTIONS**

What is the main function of a plant stem?

What do plants need to survive?

### **TEACHER BACKGROUND INFORMATION**

The main function of a stem is to support the leaves and flowers of a plant and to connect them with the roots, which supply water, minerals, and nutrients. Plants absorb water through their roots in the soil. As water evaporates from the leaves, a vacuum is created that pulls the root water upward through the stem to the leaves. This principle is the same as sipping through a straw. (The narrowness of the tubes through which the water travels also contributes to this capillary action.)

### **MATERIALS**

#### **Per pair of students**

fresh celery stalk with leaves  
clear cup of water  
red food coloring  
magnifier  
drawing paper  
plastic knife  
straws  
2 cups of drinking water (for students to sip with the straws)  
3 *Slurp!* Worksheets

#### **Teacher**

plant

### **SAFETY**

Always follow OCPS science safety guidelines.

### **TEACHING TIPS**

1. The celery experiment should be started in the morning and observed during the day. Keep it overnight.
2. Discuss the physical features of celery so students know what to draw.

## **ENGAGE**

1. Give each student a drink with a straw. Allow them to sip.
2. Ask: *What happens to the water when you drink from a straw?*
3. Tell students there is a plant part that acts much like a straw. Show a plant to the class.
4. Ask: *Which plant part do you think that might be? Why do you think so?*
5. Tell students they will do an experiment to help them decide.

## **EXPLORE**

1. Divide the class into pairs. Distribute materials to each pair.
2. Have groups fill a cup 2/3 full of water and add a few drops of red food coloring.
3. Show students how to use a plastic knife to cut off the bottom of a stalk of celery. (You may choose to do this ahead of time.)
4. Have the students examine the celery stalk including the bottom and discuss what it looks like.
5. Distribute and discuss the *Slurp!* record sheet #1. Allow time for students to draw what the celery stalk and the bottom of the celery look like now and to make predictions about what will happen to the celery stalk and record the predictions on the record sheet.
6. Have the students label the containers with their names and place the celery stalk in the cup. Set the cups out of the way, but in a location where they can be observed.
7. Students should observe the celery at given intervals during the day. Any movement of the color up the stem of the celery should be recorded by coloring the stalk of celery pictured on record sheet #2. (If feasible, record time to the nearest hour to support the math task analysis for first grade.)
8. When the observations are complete, have students cut off a small portion from the bottom of the stalk. Students can use a magnifier to see little dots of color. Have them draw a picture of the celery stalk and the cross-section of the celery stalk on the *Slurp!* record sheet #1.

## **EXPLAIN**

1. Bring the class together to discuss their observations.
2. Ask: *What did you observe?*
3. *What are the little dots of color on the bottom of the celery stalk?* (These are the tubes that carry the water through the plant.)
4. Cut the celery lengthwise and allow students to try to follow a tube up the stalk to a leaf.
5. Cut leaves off of the stalk. After students have observed the leaves, ask: *Has the color reached the plant leaves?*
6. Ask: *How did the water get pulled to the leaves?*
7. Ask: *How could the water going up the stem help the plant?*
8. Ask students what other functions of the plant stems serve? (Stems support the leaves and flowers of the plant.)
9. Have students explain on the *SLURP!* record sheet #3 what happened to their celery after one day.

## **EXTEND AND APPLY**

1. Ask: *Do animals need water? Do they get water the same way as plants?*
2. Ask: *Do humans need water? Do they get water the same way as plants?*
3. Take students on a stem walk. Look for a variety of plants.
  - a. Ask: *Which part of the tree is the stem?* (The trunk and the branches) *Can you find the stem on a vine? Grass?*
  - b. Make a partial cut in a new celery stalk halfway up the stalk.
  - c. Place the stalk in colored water.

- d. Leave overnight.
  - e. Discuss their observations.
4. Leave a stalk of celery out of water overnight. Ask students to predict what will happen to the leaves and stem.
    - a. Have them observe the celery the next morning. (It will be wilted.)
    - b. Ask: *Do you think we can freshen the celery again? How?* (Add water and it will be fresh again.)
  5. Provide students with pictures of foods. In small groups, have them decide which foods we eat that are obtained from stems or that are stems we eat. Examples include asparagus, potatoes, rhubarb, green onion, and sugar from stems of sugar cane. Potatoes are an example of an underground stem called a tuber.

### **ASSESSMENT**

Use the *SLURP!* record sheets to determine if students understand the purpose of stems. Students should include that the stem carries water and nutrients to the leaves.

## SLURP!

Draw a picture of your celery.

Draw a picture of the bottom of your celery.

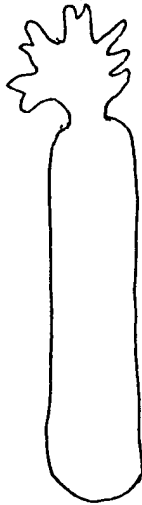
Predict what will happen to the celery after it has been placed in the colored water.

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**SLURP!**



Time \_\_\_\_\_

Time \_\_\_\_\_



Time \_\_\_\_\_

Time \_\_\_\_\_

## SLURP!

Draw a picture of your celery stalk after one day.

Draw a picture of the bottom of your celery stalk after one day.

Explain what happened to your celery after one day in the colored water.

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# SPROUTING SEEDS

## **BIG IDEA 17: INTERDEPENDENCE**

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The student:

- observes and recognizes that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

**SC.1.E.6.2** Describe the need for water and how to be safe around water.

- describes the need for water.

**SC.1.L.16.1** Make observations that plants and animals closely resemble their parents, but variations exist among individuals within a population.

The student:

- observes that plants closely resemble their parents.
- observes that variations can exist among individuals within a population.

**SC.1.N.1.1** Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

The student:

- raises questions about the natural world.
- explores questions about the natural world with a team of students through free exploration and generates appropriate explanations for what was observed.

**SC.1.N.1.2** Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

The student:

- uses the five senses as tools to:
  - make careful observations.
  - describe objects in terms of number, shape, texture, size, weight, color, and motion.
  - compare own observations with observations of others.

**SC.1.N.1.3** Keep records as appropriate - such as pictorial and written records - of investigations conducted.

The student:

- keeps records, such as student-drawn illustrations, science notebooks, or digital media, of investigations conducted.

### **KEY QUESTION**

How do plants grow?

### **TEACHER BACKGROUND INFORMATION**

Nearly all trees, shrubs, and vegetables started as seeds. A seed is actually a container or case, which contains plant life. Seeds have three main parts in common: the seed coat, a tough outer covering; the embryo, a “baby” plant inside the seed; and the cotyledon, the food supply surrounding the embryo. The food supply is the seed’s only source of nourishment as it pushes up through the soil and begins to grow into a young plant. Plants need light for growth, but seeds do not. Seeds are planted underground where it is dark, and they use their own stored energy for growth.

When a plant is just beginning to peek out from the seed, it is said to be sprouting. Once a seed begins to sprout, it needs the right amount of water and a suitable temperature. Water causes the seed to expand. Germination is the process through which the embryo inside the seed begins to

grow. As a seed germinates, it develops roots that grow downward, a stem that pushes up to the light, and leaves.

## **MATERIALS**

### **Teacher**

packets of seeds (vegetables, flowers, herbs)  
bag of assorted seeds  
chart paper  
Related literature:  
*The Tiny Seed*, Eric Carle  
*The Garden in the City*, Gerda Muller  
*Growing a Plant*, Benchmark Education Co.  
*The Garden* from *Frog and Toad Together*

### **Per Student**

1 milk carton  
soil  
magnifier  
clear tape  
student science journals  
centimeter ruler  
crayons  
plastic or styrofoam shallow tray  
1 piece of drawing paper

## **SAFETY**

Always follow OCPS science safety guidelines.

## **TEACHING TIPS**

- This learning event requires patience and persistence. Note those students experiencing particular success or difficulty in these tasks.
- Clean milk cartons and poke three holes in the bottom of each using a pencil prior to beginning this activity.

## **ENGAGE**

1. Pass assorted seeds around the room to each table.
2. Ask: *Do you think that these seeds are alive? Why or why not?*
3. Ask: *How could we find out if they are alive?*
4. Ask: *If they are alive, or could be, what do you think would make them start to grow?*
5. As a class, brainstorm a list of the things students think seeds need to sprout. List these on a class chart.

## **EXPLORE**

Preparing the plants:

1. Place assorted packets of seeds at each table.
2. Explain to students that they will be “adopting” seeds from one of the packets. Ask students to pick one packet of seeds.
3. On a chart, record each student’s selection.
4. Give each student a magnifier, a tray, crayons, and a piece of drawing paper.
5. On the drawing paper, have each student write his/her name; the name of the seed found on the seed packet; create a drawing of the seed from observing it; and a drawing of the plant on the front of the seed packet, which the seed will become.
6. Each student will take a prepared, clean milk carton; fill it 2/3 full of soil; place three holes in the soil with a pencil (about 1” deep); and plant three seeds in the soil.
7. Students will label their seed container with their name and the name of the plant. On one side they will tape the seed packet to the carton.
8. Read to the class either *The Tiny Seed* by Eric Carle or excerpts from *The Garden In the City* by Gerda Muller.
9. Ask: *What things do seeds need in order to grow?*
10. Ask: *How can we provide for our seeds?*

11. Ask: *Do you think seeds need to be moist or dry in order to sprout?*
12. Ask: *What have you observed that makes you believe this?*

#### Plants Sprouting:

1. Allow students to place their seeds in a location they choose; water their plants as they feel necessary; and record all observations in student science journals.
2. Read the story called “The Garden” in *Frog and Toad Together*. After reading the story, discuss some of Toad’s ideas about how to “wake up” seeds.
3. Ask: *Do you think yelling might wake seeds up?*
4. Ask: *How will we decide when seeds have sprouted?*
5. Ask: *As seeds begin to sprout, record in student science journals how many days it took.*

#### Plants Growing:

1. Students will water plants daily and record all observations about the plants (shape, height, number of leaves, color) in their science journals.
2. Have students compare their observations with those of others.
3. Ask: *How do different plants appear similar and different?*
4. Show students photos of the plants they are growing as adult plants.
5. Ask: *Do your plants look like their parents?* (note that the plant should look similar to the plant from which the seed came from)

### **EXPLAIN**

Through questioning and discussion, develop the concept of what plants need for growth. Ask the following questions:

- *Did your seeds grow?*
- *How did you take care of them?*
- *Did you water them often? How often?*
- *Did all of the seeds grow at the same rate?*
- *Where did you place your seeds in the classroom? Why did you select that spot?*
- *What can you tell us about growing plants?*
- *Can you explain why you think some plants are taller than others?*
- *Why are some plants not as green as others?*
- *Why have some plants not grown very much?*
- *Would you do anything differently if you were to adopt another seed?*

### **EXTEND AND APPLY**

1. Take the class on a nature walk of the school grounds. Ask them to observe the conditions of various plants. Discuss some possible reasons why some plants are thriving and others are not.
2. Determine if the direction seeds are planted (vertically, horizontally, diagonally) affects the direction the stem of the sprouts will grow. Place seeds on a moist paper towel in a plastic zip lock bag with each seed placed in a different direction. Observe any differences.
3. Watch seedlings as their roots grow by placing them in a “pillow pack” garden. This consists of a gallon-size zip lock freezer bag filled  $\frac{3}{4}$  of the way with soil and zipped shut. Set the bag on its side and punch three or four holes on both sides of the bag. Plant seeds, or seedlings, in the holes of one side and place the other side in a large Styrofoam meat tray in which you will add water. As the seed sprouts and becomes a seedling, the clear bag will provide the student with an inexpensive viewing site for the growing root system.
4. Read *Growing a Plant*.

5. Invite a person who works with plants to talk with your class (e.g., horticulturalist, nursery person, landscaper).
6. Do all plants grow from seeds? Are there other ways to grow plants? Read *The Plant Sitter* by Gene Zion and discuss. Create plant cuttings, grow bulbs, grow potatoes using the eyes of potatoes to support further learning.

### **ASSESSMENT**

Teacher assessment through observation should include the following criteria:

- Tasks have been completed by the student.
- Student journal entries should show growth and understanding.
- Student demonstrates understanding through successful completion of the activities and in class discussions.
- Data collection and organization of data was effective.
- Use of science tools enhanced their learning.
- Science safety rules were observed.

# WHAT DO PLANTS NEED TO GROW?

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### **KEY QUESTION**

What do plants need to grow?

### **TEACHER BACKGROUND INFORMATION**

In order for students to understand the needs of plants, they must be able to first identify plants. A plant is an organism that contains a stem, leaf, root and sometimes a flower. The flower produces seeds. The stem supports the plant and carries food and water to the other parts. The leaf makes food for the plant. The roots hold the plant in the ground and absorb water and minerals from the ground.

Plants need air, water, light and space in order for them to be healthy and grow properly. If a plant is deprived of one of its essential needs its growth may be stunted or it will die. Some, not all, plants need soil.

### **MATERIALS**

#### **Class**

potting soil  
small pots or 7-8 ounce Styrofoam cups  
gallon sized storage bag

#### **Per student**

science notebooks (one per student)

cardboard box (shoe box sized)  
labels

**Per group:**

pot or Styrofoam cup

**SAFETY**

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**TEACHING TIPS:**

1. In order for students to understand the needs of plants, they must be able to first identify plants. A plant is an organism that contains a stem, leaf, root and sometimes a flower. The flower produces seeds. The stem supports the plant and carries food and water to the other parts. The leaf makes food for the plant. The roots hold the plant in the ground and absorb water and minerals from the ground. Plants need air, water, light and space in order for them to be healthy and grow properly. If a plant is deprived of one of its essential needs its growth may be stunted or it will die. Some, not all, plants need soil.
2. Prior to the lesson, the teacher should obtain eight identical plants such as Pansies, Salvia, Coleus or any annual bedding plant. These can be purchased at any local nursery or department store with a nursery. Plant seven of the plants in 3 ½" (or 8 ounce up) pots and one in a 2" (or 3 ounce cup) pot. Label plants as follow:
  - Water
  - No water
  - Light
  - No light
  - Space
  - No space (This is the plant in the 2" pot or 3 ounce cup.)
  - Air
  - No air
3. Experimental plants are the plants that are being manipulated. Control plants are the plants that are not being manipulated. Place the plant labeled no water next to the plant that says water. Do not water the plant labeled no water, water the control plant regularly. Put a cardboard box over the plant labeled no light allowing no light to seep inside. Place the plant labeled light next to it. Water both plants regularly. Place the plant labeled no space next to the plant labeled space. Water both plants regularly. Place the plant labeled "no air" in a zip lock bag and remove as much air as possible. Place the plant labeled air beside it. Water both regularly.

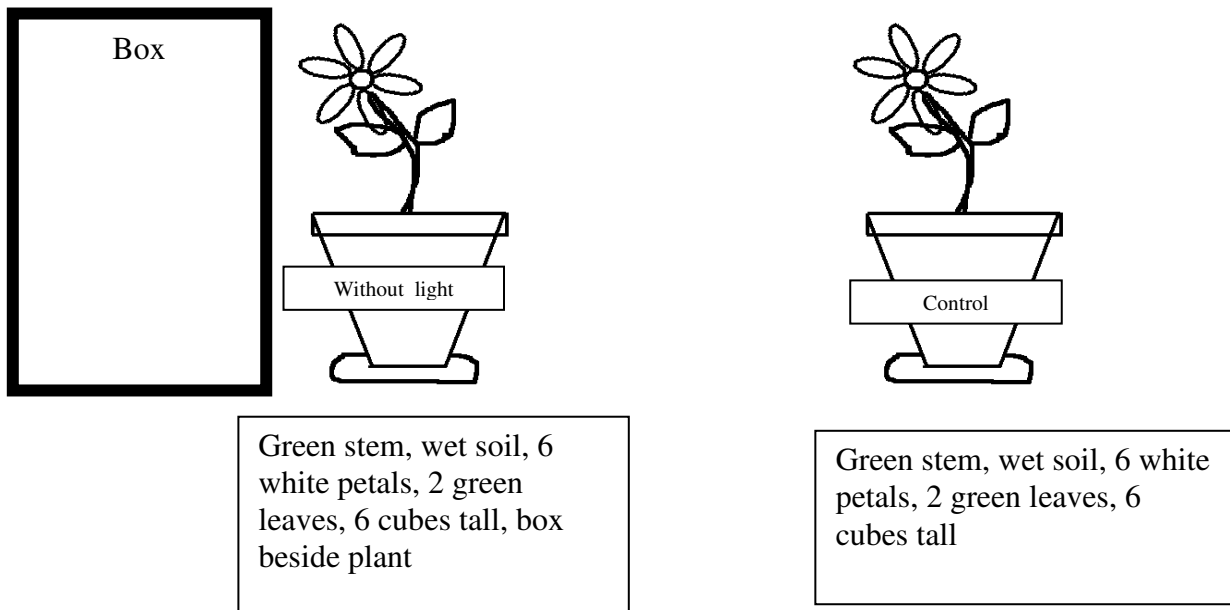
**ENGAGE**

Discuss and list on the board what students think a plant needs for survival. After students respond, explain that we will investigate whether plants need air, water, light and space to survive.

**EXPLORE**

1. Set up the experiment as follows (also in Teaching Tips):
  - Experimental plants are the plants that are being manipulated. Control plants are the plants that are not being manipulated.
  - Place the plant labeled no water next to the plant that says water. Do not water the plant labeled no water, water the control plant regularly.
  - Put a cardboard box over the plant labeled no light allowing no light to seep inside. Place the plant labeled light next to it. Water both plants regularly.

- Place the plant labeled no space next to the plant labeled space. Water both plants regularly.
  - Place the plant labeled “no air” in a zip lock bag and remove as much air as possible. Place the plant labeled air beside it. Water both regularly.
2. Have students observe and note changes in their science notebook throughout the process.
  3. Have students observe the plant labeled light and the experimental plant labeled no light. On large paper, show students how to draw the two plants and label any differences. (It is important to model this on paper so that it can be displayed in your classroom. Students will use this to complete their daily observations).



*Example: Day 1 8/11/09*

4. Because making observations on all eight plants will be overwhelming for students, it is strongly recommended that students be assigned only one experimental/control plant group. Allow students to make daily observations. Observations can be made in the morning, after lunch, and/or when work is finished early. Students will become “experts” for their plants and should be given opportunities to share their data with the class.
5. Students record daily observations of the changes that occur such as color, size, leaves falling, leaves becoming brittle, rotting. Encourage students to use non-standard units of measurement to record plant growth. Remind students of their leaf descriptions as daily observations are done (Lesson 1). It may be helpful to continue modeling the process until students can independently make observations and record data.
6. Consider the reading and writing abilities of your students. Some students may only be expected to draw and label their observations while others may provide more detailed data.

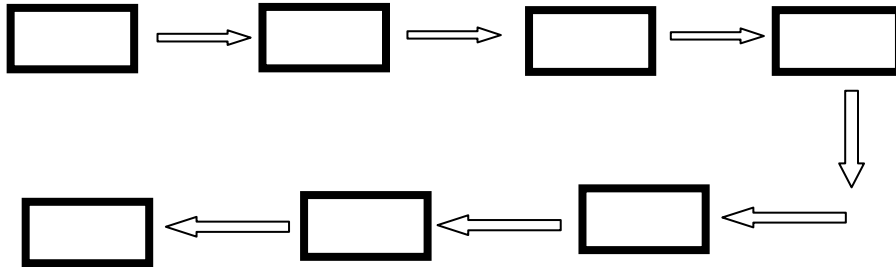
**EXPLAIN:**

- Ask: *What was the difference between the plant that received water and the one that did not receive water?*
- Ask: *What was the difference between the plant that had light and the one in the box?*
- Ask: *What was the difference between the plant that had space and the one that had no space?*

- Ask: *What was the difference between the plant that has no air and the one that had air?*
- Ask: *What does this tell you about what plants need to survive?* (Refer back to the key question)

### **EXTEND AND APPLY**

- Students write script for a television commercial telling how to take proper care of a plant. Commercials will include information learned from the experiment and will be presented orally to class.
- Students will use their notebook entries to create a flow chart showing the results of the experiment. (See flow chart below.)



### **ASSESSMENT**

Notebook entries, drawings, observation

#### *Rubric:*

The following three-point rubric may be adapted to your county's grading scale to evaluate students' work during these lessons.

- **3 points:** Students were highly engaged in class discussions; were able to demonstrate a clear understanding of the vocabulary and give correct examples appropriate to the lesson
- **2 points:** Students participated in class discussions; were able to demonstrate a basic understanding of the vocabulary and give mostly correct examples; drew pictures that were somewhat appropriate to the lesson.
- **1 point:** Students participated minimally in class discussions; were unable to demonstrate a basic understanding of the vocabulary and could not give examples of lesson. Pictures were incomplete and/or did not clearly identify lesson objectives.