

## Basic Needs of Plants: Grade 1

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### Lesson Overview

In this lesson, students will understand plants have basic needs that provide energy in order to grow and be healthy. Each plant has a specific environment where it can thrive. There are distinct environments in the world that support different types of plants. These environments can change slowly or quickly. Plants respond to these changes in different ways.

### Alignment

#### Science Standards

1.L.5 The student will demonstrate an understanding of how the structures of plants help them survive and grow in their environments.

- 1.L.5B.1 Conduct structured investigations to answer questions about what plants need to live and grow (including air, water, sunlight, minerals, and space).

#### Science and Engineering Practices

1.S.1A.2 Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

1.S.1A.3 With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.

1.S.1A.4 Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.

#### Math Standards

1.MDA.1 Order three objects by length using indirect measurement.

1.MDA.2 Use nonstandard physical models to show the length of an object as the number of same size units of length with no gaps or overlaps.

1.MDA.3 Use analog and digital clocks to tell and record time to the hour and half hour.

## Standards for Mathematical Practice

5. Use a variety of mathematical tools effectively and strategically.
  - a. Select and use appropriate tools when solving a mathematical problem.
  
6. Communicate mathematically and approach mathematical situations with precision.
  - a. Express numerical answers with the degree of precision appropriate for the context of a situation.
  - c. Use appropriate and precise mathematical language.
  - d. Use appropriate units, scales, and labels.
  
7. Identify and utilize structure and patterns.
  - b. Recognize mathematical repetition in order to make generalizations.

## Crosscutting Concepts (from the SDE instructional unit resources document)

- Patterns
- Cause and Effect
- Systems and System Models
- Structure and Function
- Stability and Change

<https://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/elementary-instructional-units/1-life-science-plants-and-their-environments/>

(see page 3 of document above)

## Additional Resources/Connections

### SC Department of Education Links:

<https://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/elementary-instructional-units/1-life-science-plants-and-their-environments/>

[https://ed.sc.gov/scdoe/assets/File/instruction/standards/Math/1st\\_Grade\\_Support\\_Document-3\\_11\\_27\\_17.pdf](https://ed.sc.gov/scdoe/assets/File/instruction/standards/Math/1st_Grade_Support_Document-3_11_27_17.pdf)

### Other Recommended Resources:

Specific to this lesson:

- Needs of the Plant Song, Harry Kinder Music,  
<https://www.youtube.com/watch?v=dUBIQ1fTRzI>
- Growing Plants,  
[http://www.bbc.co.uk/schools/scienceclips/ages/5\\_6/growing\\_plants.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml)

## Plants Resources

- Plant Resources for Teachers - *TeacherVision*, <https://www.teachervision.com/plants>
- USDA Plant Database, <https://plants.usda.gov/java/>
- Plant Songs and Fingerplays, <http://www.angelfire.com/la/kinderthemes/pfingerplays.html>
- Story Jumper, Online books on Plants, <https://www.storyjumper.com/book/search/g/plants>
- Interactive Sites for Education: Plants, <http://interactivesites.weebly.com/plants.html>
- Growing Plants, Sid the Science Kid, <http://pbskids.org/video/sid-science-kid/1568868836>

Websites about SC plants – Add these to the resources section.

<http://scnps.org/>

<http://herbarium.biol.sc.edu/scplantatlas.html>

<https://www.gardenguides.com/89761-native-plants-south-carolina.html>

<http://scnps.org/wp-content/uploads/2012/04/CoastalNativePlantList.pdf>

<https://www.state.sc.us/forest/refree.htm>

## Connections

### **Content Area (2 or more) Connections**

- Science
- Mathematics

### **Content Connections**

As students examine the basic needs of plants in their environment, mathematical concepts and skills help them compare the effects needs such as sunlight have on plant growth for example. Measurement plays a key role in comparing and analyzing the effects.

### **Active Learning Strategies (for Purposeful Reading, Meaningful Writing, and Productive Dialogue)**

- Turn and Talk  
[http://www.s2temsc.org/uploads/1/8/8/7/18873120/motivating\\_and\\_engaging\\_strategies.pdf](http://www.s2temsc.org/uploads/1/8/8/7/18873120/motivating_and_engaging_strategies.pdf)
- Graphic Organizer (T-Chart)  
[https://www.s2temsc.org/uploads/1/8/8/7/18873120/graphic\\_organizer\\_strategy.pdf](https://www.s2temsc.org/uploads/1/8/8/7/18873120/graphic_organizer_strategy.pdf)

## Computational Thinking

Students are engaged in computational thinking as they discover the effects of sunlight and darkness on plant growth. They are observing and analyzing results, discussing and explaining phenomena.

*Computational thinking (CT) is a problem-solving process that includes (but is not limited to) the following **characteristics**:*

- Logically organizing and analyzing data
- Representing data through abstractions such as models and simulations
- Identifying, analyzing, and implementing possible solutions with the goal of achieving the most efficient and effective combination of steps and resources

*These skills are supported and enhanced by a number of dispositions or attitudes that are essential dimensions of CT. These **dispositions or attitudes** include:*

- The ability to communicate and work with others to achieve a common goal or solution

## Lesson Plan

**Time Required** –45 minutes for initial lesson: Time for observations and recording of data on alternate days for several weeks

**Disciplinary Vocabulary** – air, water, mineral, space, sunlight

### **Materials Needed:**

- Two identical healthy flowering plants
- Measuring cup
- Water
- Plant Food
- Prepared data chart
- Markers
- Student Science Notebooks
- Pencils
- Yarn
- Non-standard units of measure (paper clips, unifix cubes, etc.)
- Analog clock
- Index cards or post it notes

**Formative Assessment Strategies:** Turn and Talk, T-Chart, Teacher Observation, Student Dialogue

**Misconceptions:**

Students tend to give plants human characteristics, especially when it comes to considering what plants need to grow. They may describe plants as eating, drinking, or breathing, or believe that plants need things that are provided by people. This may be an unintended consequence of having students grow and care for plants.

The role of sunlight and minerals in plant growth seems to be especially difficult for elementary students. For example, students may view sunlight as useful but not essential for plant growth.

<b><i>Students may think...</i></b>	<b><i>Instead of thinking...</i></b>
Sunlight is helpful but not critical.	Sunlight is essential for plant survival.
Sunlight helps plants grow by keeping them warm.	Chloroplasts in the plant absorb the sun's energy for use in photosynthesis.
Soil provides a support structure and food for plants.	Some plants grow in soil-free environments. Plants take up water and minerals from soil, but not "food."
Plants need things provided by people (water, minerals, sunlight)	While people often care for plants (especially those indoors), plants as a whole are not dependent on people for their needs.

**Safety Note(s):** Students should never put plants in or near their mouth.

**Engage**

- The teacher will show two identical healthy plants to the class. The teacher will ask students to discuss what they observe about the plants.

- The class will begin discussing what they know about what makes plants grow and be healthy.
- Ask the students questions similar to these: (NOTE: Turn and Talk to be used here: [http://www.s2temsc.org/uploads/1/8/8/7/18873120/motivating\\_and\\_engaging\\_strategies.pdf](http://www.s2temsc.org/uploads/1/8/8/7/18873120/motivating_and_engaging_strategies.pdf))
  - What do we need to do to here in the classroom to keep these plants healthy?
  - What do plants need in order to grow and be healthy? (Air, water, minerals, space, and sunlight should be included in the discussion.)
  - What can you do to prove that plants need sunlight to grow and remain healthy?
  - What can you do to prove that plants need water to grow and remain healthy?

### Explore

- Explain to the students that they are going to investigate what happens when one plant receives sunlight but the other does not. Emphasize to the students that only the amount of sunlight should be changed while giving both plants everything else they need.
  - Determine how many hours of sunlight the plants get each day – Calculate to the nearest half hour. Refer to an analog clock to determine and count hours. Students will use their own science notebooks to record the day (number or date), time, data and illustrate the plants. Student work should be similar to the following chart: (NOTE: Graphic Organizer: T-Chart to be used here: [https://www.s2temsc.org/uploads/1/8/8/7/18873120/graphic\\_organizer\\_strategy.pdf](https://www.s2temsc.org/uploads/1/8/8/7/18873120/graphic_organizer_strategy.pdf))

Day	Beginning Time	Ending Time	Sunlight (Observations)	No Sunlight (Observations)
			(Illustrations)	(Illustrations)

- Observe both plants every other day for several weeks (a minimum of 3-4 weeks).
  - You may choose to use yarn – cutting a new piece weekly to compare the heights –
  - Use the yard to compare to non-standard units of measure such as paper clips or unifix cubes
  - Include this information in the T-Chart. *NOTE: Students should write the type of unit of measure with the number found. For example: 4 paper clips or 5 cubes.*
- Record data on both the class chart and in their student notebooks.

### Explain

- Each day that observations are made, have students discuss what they observe with each plant. (The plant in the sunlight will be thriving and remain healthy, whereas, the plant that was placed in the dark, will begin to wilt and the leaves may even begin to appear yellow.)

- At the end of the specified time period discuss the data from both their notebooks and the class chart.
- Order the plants in each category (sunlight, no sunlight) from shortest to tallest. For each category, record the height of each plant using non-standard units (paper clips, unifix cubes, etc) then write the height on an index card or post-it note beside or taped to each plant or shelf by the plant. Look at the numbers and how the numbers are either staying the same (equal) or increasing each time (adding).
- Explain to the children that plants have **basic needs** and, for most plants, those needs are **air, water, minerals, sunlight** and **space**. ***Make sure students understand which plant parts provides these needs – the roots, stems, leaves, etc.***