Science 3-5: Plants and The Florida Heat

Intended Audience: Students with significant cognitive disabilities

# **Standards:**

SC.3.L.14.2 Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.

SC.3.N.1.1 Raise questions about the natural world, investigate them individually, and in teams through free exploration and systematic investigations, and generate appropriate explanations based on these explorations.

SC.3.N.1.3 Keep records as appropriate, such as pictorial, written or simple charts and graphs, of investigations conducted.

SC.4.L.16.2 Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.

SC.4.L.17.1 Compare the seasonal changes in Florida plants and animals to those in other regions of the country.

SC.4.N.1.4 Attempt reasonable answers to scientific questions and cite evidence in support.

SC.4.N.1.6 Keep records that describe observations made, carefully distinguishing actually observations from ideas and inferences about the observations.

SC.4.N.1.7 Recognize and explain that scientists based their explanations on evidence.

SC.5.L.15.1 Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others dies and move to new locations.

SC.5.N.1.6 Recognize and explain the difference between personal opinion/interpretation and verified observation.

# **Learning Objectives:**

1. Students will investigate how plants respond to heat.
2. Students will explain how the temperature in Florida affects different types of plants.
3. Students will describe how changes in the environment affect the survival of plants.

# **Vocabulary:**

1. plant: a living thing with roots, leaves, a stem, and often, flowers that is grown from a seed
2. heat: an increase in temperature, hotness
3. temperature: how hot or cold something is
4. carbon dioxide: what plants breathe in
5. chloroplasts: makes the leaves of a plant green

**Materials:**

* Readworks passage: [Miss Johnson's Plant Experiment](https://www.readworks.org/article/Stories-About-Growing-Plants/4ae8d134-0b0c-4620-9556-037916e752c5#!articleTab:content/contentSection:7141d6ab-1b31-43ef-b958-75d708226359/)
* Chart paper and markers or other means to document student responses
* 2 plants of the same type, similar size and maturity
* Outdoor space in the sun for a plant for student observation
* Prepare/find prior to instruction: student log or organizer to chart observations
* Prepare prior to instruction: visual supports for academic content
* Prepare prior to instruction: Sequencing cards or sentences summarizing the passage Miss Johnson’s Plant Experiment, if needed for students to access the passage

# **Essential/Guiding Questions:**

1. How do plants respond to heat?
2. How does temperature affect the growth behavior of plants?
3. What environmental changes affect plants in Florida?

**Lesson Presentation:**

**Activating Prior Knowledge:**

1. Show students two plants that are the same type, size and maturity.

2. Ask: What do you see when you look at these two plants? (How are they alike/different?, color, quality of the soil, etc.) Answer will vary. Chart student responses.

3. Tell students that there is a way to change the qualities/appearance of these plants so they no longer are similar.

**Modeled instruction:**

1. Read the passage Miss Johnson’s Plant Experiment. Summarize the passage for students and tell them that they are going to re-create the experiment in the passage.

2. Show students the 2 plants again and explain the observation chart/organizer. Model an appropriate written response on the chart knowing that some students will have an adult to scribe for them.

3. Tell students that they are going to observe the two plants for two weeks and record what they observe in each plant.

4. Group students in to pairs or small groups.

5. Place one plant outside and place the other in a dark spot in the classroom.

6. Assign a student to water both plants with the same amount of water two times per week. (This can be a rotating task each week.)

7. Ask the questions: How do plants respond to heat/Sun? How does temperature affect plants?

8. Again, model a written observation on the chart while observing each of the plants. Share with the group.

**Supported/Guided instruction:**

1. Re-read the passage Miss Johnson’s Plant Experiment. Ask the questions: How do plants respond to heat/Sun? How does temperature affect plants?

2. Review the steps needed to engage in investigation and observation.

3. Provide support to students as they begin observing.

4. Observations will be completed with support over a two week period.

**Independent Work:**

1. Students will work independently, in pairs or small group to discuss their findings. Questioning by students will vary: What did you notice about the plant outside? What did you notice about the inside plant? What stayed the same? What happened to the plant that was outside in the sun?

2. Reconvene as a whole group to share out.

3. Chart findings on chart paper or a large graphic organizer.

**Small Group Suggestions:**

1. Students can read the article, How Plants Work (see additional resources), identifying main idea and key details.

2. Have students in small groups or pairs summarize Miss Johnson’s Plant Experiment

orally or with sequencing cards or sentences.

3. Students can watch additional videos or read additional text to dig deeper into content.

4. Students can plant seeds or beans to watch the growth process in different environments. Additional plans are available on multiple internet sites.

**Assessment:**

1. Students will make observations about the changes in plants and share their findings
2. Students will draw a conclusion about the effect of heat and temperature changes on plants.

3. Teachers should utilize district created rubrics to score student work.

**UDL:**

**Multiple means of representation:**

1. Students can document their observations on graphic organizers or orally with an adult to scribe.

2. Students can draw a picture sequence to show the difference in the plants over a week’s time.

3. Students can work individually, in pairs, or in a small group.

4. Students can work independently with peer or adult supports.

**Multiple means of expression:**

1. All students should have access to expressive language/technology that is appropriate for their specific need.

2. Expression may come in the form of verbal responses, signed responses, pointing/gestures, eye gaze, or through the use of a low or high tech device.

3. Text to speech options are available for computers on the Word app, iPads and other hand held devices. Google Chrome offers free extensions, such as Selection Reader and Select and Speak-Text to Speech, and apps, such as Text to Speech, Text to Speech with Google Drive, and TTS Reader- Unlimited Text-to-Speech.

4. Speech to text options are also available from Google. Extensions include Voice Note II-Speech to Text, Online speech recognition, and Co: Writer Universal. Voice Note II is also available as an app; Speech notes-Speech to Text Notepad is available as well. Microsoft Word also has speech to text options.

5. Additional information about text to speech and speech to text options are available through your district Assistive Technology Department.

**Multiple means of engagement:**

1. Provide students with choices of how to interact with materials.

2. Provide students or small groups with various places in the classroom in which to work, i.e. floor, desks, at the board.

3. Limit distractions in the work areas.

4. Encourage collaboration with peers in partners or small groups.

5. Allow students to work independently.

6. Allow students to be positioned for maximum learning engagement.

7. Provide students with additional materials, if necessary.

8. Provide supervision to students when working with plants.

**Assistive Technology Recommendations:**

1. All students should have a means of expressive communication and a way to be actively engaged in learning.

2. Response modes may include, but are not limited to: eye gaze, gesturing or pointing to pictures/words/phrases, signing, low tech devices (GoTalks, etc.), or dynamic devices (iPad, etc.)

3. Lesson vocabulary, photos/pictures and graphic representations should be created and/or printed prior to the lesson to provide all students with an opportunity to be engaged in discussion.

4. When possible, provide students with text to speech options. Articles and passages from Readworks.org have this option.

5. If students are writing in response to text or writing as a means of sharing information, provide students with alternates to pencils. Speech to text and alternative pencils should be considered. Find more information about alternative pencils here: [Alternative Pencils](http://alternativepencils.weebly.com/)

**Technology Needed:**

* Smartboard, doc camera (if passage needs to be displayed without a SmartBoard)

**Additional Resources:**

* Video: [How Plants Respond to Gravity](https://www.youtube.com/watch?v=tV302_wuK_8) (if students are ready to dig deeper)
* Readworks passage: [Magic Tomatoes](https://www.readworks.org/article/Stories-About-Growing-Plants/4ae8d134-0b0c-4620-9556-037916e752c5#!articleTab:content/contentSection:2f7a6bab-51bc-44b7-b4d5-c213dfad0d44/) (paired text with Miss Johnson’s Plant Experiment)
* District-provided science resources