

Plant Adaptations

Teacher's Guide

Subject: Integrated Science (Life; Earth-Space; Physical)

Topic: Plant adaptations

Summary: This lab introduces the different ways that plants adapt to their environment. Students will examine six different plants and look for distinguishing features that help each plant survive in its particular habitat.

After completing the field lab, students will be able to:

- Objective(s):**
1. Identify and describe plant adaptations, especially adaptations which allow plants to survive fire.
 2. Identify and describe the advantages and disadvantages of each type of plant adaptation.
 3. Identify and describe the difference between structural and physiological adaptations.

Ecosystem(s): Mesic flatwoods, scrubby flatwoods.

Equipment:

- Hand lenses
- Field microscope
- GPS receiver

Background:

- Vocabulary: prescribed fire, adaptation, physiological adaptation, structural adaptation
- Reference Material: <http://www.plantatlas.usf.edu/>,
- Equipment Training: GPS receiver (as needed)

Procedure (Engage; Explore; Explain)

1. Engage the students by asking a specific question that gets to the heart of the activity: Bring students around a saw palmetto in the recently burned area and ask: "How did this plant survive the fire that recently burned through this area?" Use the students' answers to ascertain what they already know, clarify any misconceptions, and then ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Let them know that they will be examining different characteristics or traits that help plants survive in their environment.
2. Read the prompt and fill-in your own hypothesis on the top of the student data sheet.
3. In your pre-determined area, complete the observations and measurements identified on the student data sheet.
4. After completing the lab, allow the students to answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

Sunshine State Standards:

Science: SC.D.1.3.1- 4; SC.D.2.3.2; SC.F.1.3.1, 7; SC.F.2.3.2, 3; SC.G.1.3.2,3; SC.G.2.3.2, 4; SC.H.1.3.4; SC.H.2.3.1

Language Arts: LA.A.1.3.3; LA.C.1.3.1, 4

Mathematics: MA.A.3.3.3

Social Studies: SS.A.6.3.2; SS.B.2.3.6, 9

Plant Adaptations

Student Data Sheet

General Information

Full Name:		Date:	
School (teacher):		Time:	
Latitude:		Longitude:	

Student Hypothesis and Rationale

Looking at the ecosystem around me, I expect to see more plants that are adapted to

(circle one: fire/predation/drought) because . . . _____

Field Observations/Measurements/Data

Circle the answer that coincides with your observations.

	Adapted to survive fire (examples: underground stem; well-protected stem; produces seeds or new leaves after fire)	Adapted to live without soil (examples: plants growing in trees)	Adapted to dry conditions (examples: thick waxy leaves; fleshy leaves; needle-like leaves; dormant in dry periods and revives after rain)	Adapted to protect itself from predators (examples: spines; thorns, sap; saw or toothlike features)
Prickly Pear	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
Wiregrass	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
Longleaf pine	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
Ball Moss ('air plants')	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
Saw Palmetto	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
Sand Live Oak	Yes / No -----	Yes / No -----	Yes / No -----	Yes / No -----
TOTAL 'Yes'				

Plant Adaptations

Assessment

1. Of the different types of plant adaptations you saw today, which type was observed most frequently? Which was observed least frequently?

2. Most adaptations we can see are structural and relate to the anatomy of the plant. Other adaptations - called physiological adaptations – relate to internal processes that can not be easily seen. Can you identify one internal adaptation that you discussed today?

3. Was your hypothesis supported by your data? Whether your hypothesis was supported or not, what can you infer from your observations, measurements, and results?

4. Imagine that instead of a dry and sandy area, the plants you observed existed in a very wet and windy area. How might they have been different?

5. Fifty years ago, fire was viewed as an unnecessary evil and was stamped out whenever possible. Now we have realized that many ecosystems need to be burned regularly. What differences would you see in this area (mesic flatwoods) if they were never allowed to burn?

Portfolio Journal Prompt

Because plants can't move to avoid harsh environmental conditions, they have to have adaptations that allow them to survive in place. If you lived on a barrier island that was sandy, exposed to salt spray and strong winds and occasional flooding, what adaptations would you want to have. Before you begin writing, think about the environmental factors that you would need to be able to survive and come up with specific adaptations that might help you survive them.

Plant Adaptations



Wiregrass



Young longleaf pine



Ballmoss



Sand Live Oak



Pricklypear cactus



Saw palmetto