

Classifying “Air Plants”

Teacher’s Guide

Subject: Integrated Science (Life Science)

Topic(s): Plant characteristics; plant adaptations; classification of plants; epiphytes; symbiosis

Summary: Students will locate, observe, and classify six unique types of plants (vascular/nonvascular, seedbearing/spore producing, flowering/nonflowering, monocots/dicots). Students will use a dichotomous key to determine what type of plant is observed. Students will also determine if these plants exhibit the following: mutualism, parasitism, commensalism, etc.

Objective(s): After completing the field lab, students will be able to:

1. Identify distinguishing characteristics of major plant types
2. Determine distinguishing characteristics
3. Use dichotomous key

Ecosystem(s): Sandhills; Pine Flatwoods; Hardwood forest;

Equipment:

- GPS Receiver
- Plant Classification Ref. Chart
- Flagging tape
- Magnifying lens/glass
- Digital Camera (optional)

Background:

- **Reference Material:** Florida Science (Glencoe Grade 7) Chapter 9: Plants,
- **Vocabulary:** nonvascular, vascular, gymnosperm, angiosperm, monocot, dicot, symbiosis

Procedure (Engage; Explore; Explain)

1. Engage students by asking them what all plants need to survive? Once someone mentions “soil” stop them and show them an epiphyte. Ask them how plants can survive in trees and not on the ground. Use this brief discussion to let the students know they will be examining epiphytes (mostly) and learning about classifying plants and plant relationships
2. The students will use a dichotomous key to examine and classify plants into the following categories: 1) nonvascular (mosses), 2) seedless vascular (ferns); 3) seed vascular gymnosperms; 4) seed vascular, angiosperms, monocots (bromeliads); 5) seed vascular, angiosperms dicots (?)
3. The group will stop periodically at predetermined plants (e.g., Strangler Fig, bromeliads, ferns, mosses, etc.) to discuss the plant characteristics and use the dichotomous key to determine the plant type and to determine if there is evidence of symbiosis, etc.
4. Engage the students by asking a specific question that gets to the heart of the activity: If we found a plant and wanted to know what type of plant we have found, how are we going to find out what it is? (look at the characteristics of the plant)
5. Upon reaching the first stop, ask the students several questions to ascertain what they already know. What is vascular tissue? Why do plants need vascular tissue? What types of plants do not have vascular tissue? If we are looking to see if a plant has flowers and do not find any what else can we look for on the plant? (Fruit) What does parallel mean? What does a branching network look like? Clarify any misconceptions.
6. Ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Explain to them that the classification of plants is based on a number of important characteristics such as whether they are vascular (have tubelike structures for the movement of water, nutrients and other substances through the plant) or not, whether they have seeds or spores, and whether they have seeds that are not protected by a fruit, etc.
7. Explain that a dichotomous key is used to help scientists determine what an organism is. Ask the students if they know what a distinguishing characteristic is. We will identify distinguishing characteristics; then, answer yes/no questions to determine what the plant type is.
8. Explain to the students that they will observe and identify characteristics of five types of plants along the trail. They will compare their observations with a dichotomous key attached to their data sheet to determine what plant they found.
9. 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.F.1.3.1; SC.G.1.3.2, 3; SC.H.1.3.4; SC.H.2.3.1; **Language Arts:** LA.A.1.3.3 **Social Studies:** SS.B.2.3.9 **Mathematics:** **Climate Literacy:** 1-c **Ocean Literacy:**

Classifying Plants: Plant Types

Student Data Sheet

General Information

Full Name:		Date:	
Science Teacher:		Time:	
Latitude:		Longitude:	

Hypothesis:

If “air plants” depend on their host plant for a place to live, then their impact on their host pant would most likely be (choose one: positive, negative, neutral), because . . . _____

_____.

Field Observations/Measurements/Data

Plant #	Classification based on dichotomous key	Impact of observed plant on host and vice versa: positive: +; negative: -; or neutral: 0.		Symbiosis Type: +/+ Mutualism +/0 Commensalism 0/0 Neutralism 0/- Amensalism +/- Parasitism -/- Competition
		Plant “a” (observed)	Plant “b” (host)	
1				
2				
3				
4				
5				
6				

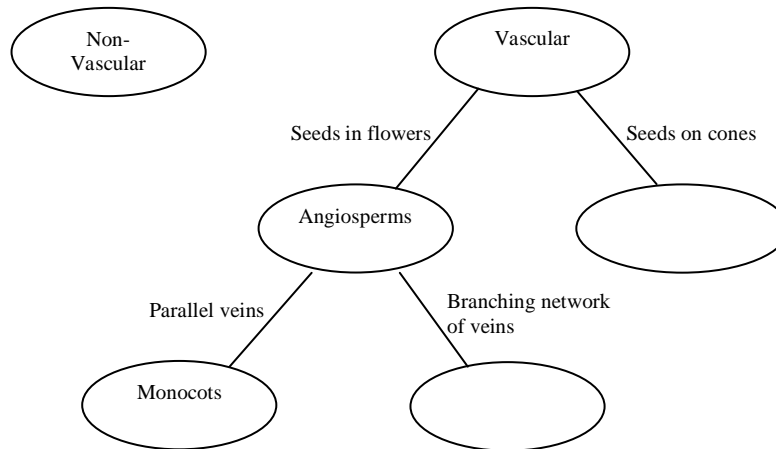
Dichotomous Key for Identifying Epiphytes

#1: Are the leaves of the plant smaller than 2 cm in length?	Yes: It is probably a nonvascular plant such as a moss No: Go to question #2
#2: Are spores visible on underside of leaves?	Yes: It is a fern No: Go to question #3
#3: Are seeds on scales in a cone?	Yes: It is a gymnosperm (like a pine tree) No: Go to question #4
#4: Are seeds in a fruit or are flowers present?	Yes: Go to #5 No: look again at question #3
#5: Are veins in leaves parallel to each other?	Yes: It is a monocot (like a palm) No: It is a dicot (like a strangler fig)

Classifying Plants: Plant Types

Assessment Questions

1. Complete the following concept map.



2. Seedless vascular plants produce spores instead of seeds. Of the different plants you saw today, which one(s) produced spores?

3. How many of plants that you observed had a positive, negative or neutral impact on their host?

Positive:

Negative:

Neutral:

4. Does your data support your hypothesis? Whether your hypothesis is supported or not, what can you infer from your observations?

5. If this lab was conducted in a dry habitat such as a desert, what types of plants would you expect to see more of? Why?

6. Think about what you learned in this lab. Has it generated any new questions? Write a new question about something you want to learn more about.

Classifying Plants: Plant Types

Plant Type Reference Chart



Example: Moss

Nonvascular, Seedless Plants: Small (usually only 2 cm to 5 cm in height); Green stems; reproduces by spores, threadlike roots; grows in damp areas.



Example: Fern

Vascular, Seedless, Plants: Reproduces by spores often found on the underside of the leaves; can be various sizes because they have vascular tissue



Example: Bromeliad

Vascular, Seed-bearing, Flowering, and Fruit bearing, Monocot: Flower parts in multiples of three; leaves usually narrow and long; parallel veins; seeds have one cotyledon



Vascular, Seed-bearing, Non-flowering, Non-fruit bearing: Vascular plants that produce seeds (usually found in cones), do not have flowers, and typically have needle or scale-like leaves



Example: Orchids

Vascular, Seed-bearing, Flowering, and Fruit bearing, Monocot: Flower parts in multiples of three; leaves usually narrow and long; parallel veins; seeds have one cotyledon



Example: Strangler Fig

Vascular, Seed-bearing, Flowering, and Fruit-bearing, Dicot: Flowering parts in multiples of four or five; leaves have a network of branching veins; seeds have two cotyledons.

