

# Classifying Plants: Plant Types

# Teacher's Guide

**Subject:** Integrated Science (Life Science)

**Topic:** Plant characteristics; plant adaptations; classification of plants

**Summary:** Students will locate, observe, classify, and recognize specific adaptations of five 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.

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

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

**Ecosystem(s):** Dunes

## Equipment:

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

## Background:

- **Reference Material:** Florida Science (Glencoe Grade 7) Chapter 12: Classifying Plants
- **Vocabulary:** nonvascular, vascular, gymnosperm, angiosperm, monocot, dicot, curved leaves, funnel-like leaves, thick, leathery leaves, succulent, surface area, stunted growth (salt cropping)

## Procedure (Engage; Explore; Explain)

1. The students will assemble at the pine tree near the parking lot of the park. Students will walk the Dune Interpretive Trail to observe certain plant characteristics.
2. The group will stop periodically at predetermined plants to discuss the plant characteristics/adaptations and use the dichotomous key to determine the plant type.
3. 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/adaptations of the plant)
4. 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? What type of adaptations would a plant have that lives in this type of environment (dry, well drained soil, hot) Clarify any misconceptions.
5. 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.
6. 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.
7. 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.
8. 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:	

### Hypothesis:

If non vascular plants need to be close to their water source, then there will be more

(choose one: vascular/ non vascular) plants in a dry habitat because...\_\_\_\_\_

\_\_\_\_\_.

## Field Observations/Measurements/Data

1a. No vascular tissue present .....lichen or moss

1b. Vascular tissue is present.....go to 2a

2a. Reproduction by spores..... Ferns

2b. Reproduction by seed.....go to 3a

3a. Seeds are on scales in a cone.....Gymnosperm

3b. Seeds are in a fruit or flowers are present.....Angiosperm...go to 4a

4a. Parallel veins in leaves.....Monocot

4b. branching network of veins in leaves.....Dicot

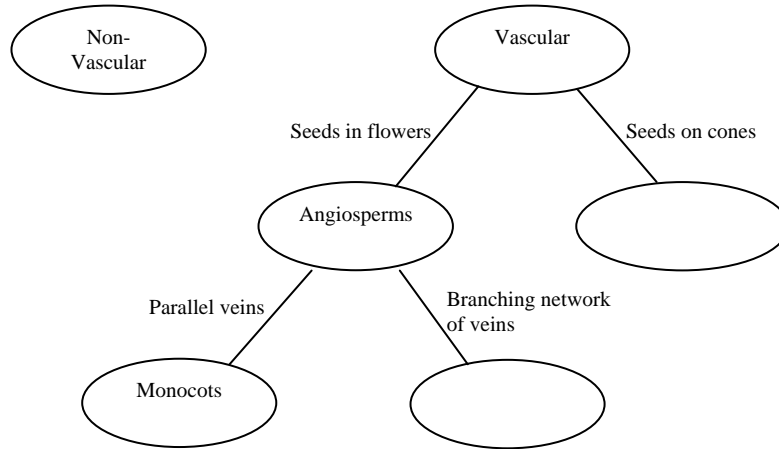
### Field Observations/Data

<b>Plant #</b>	<b>Plant Name</b>	<b>Determining Characteristic</b>	<b>Plant Adaptations</b>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

# 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?

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

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

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5. When observing nature with your school or with your family you may see interesting plants. What are some ways you can share the beauty of the plant or find the name of the plant later without picking the plant? Why is it harmful to if you pick the plants?

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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.

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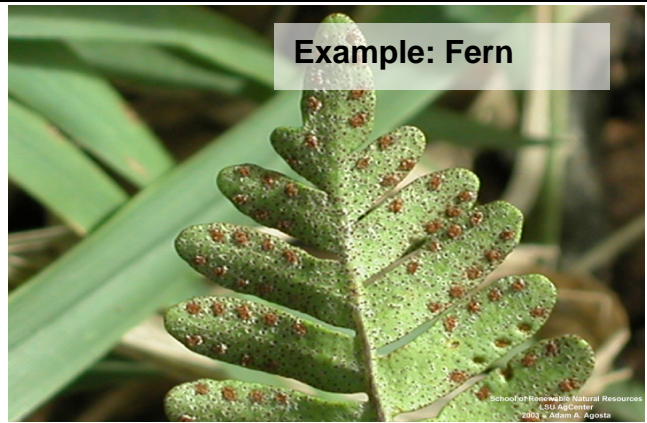
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## Plant Type Reference Chart



**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: Pine Trees**

**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: Palms**

**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: Magnolia Tree**

**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

**Plant-like Organisms (fungi and lichen)**



**Example: Fungi**



**Example: Lichen**

**Classifying Plants: Plant Types**

**Plant Adaptations Reference Chart**



The Sand Live Oak has waxy leaves that are curved downward, enabling the plant to reduce the amount of leaf surface area that is directly exposed to the sun. These adaptations help the plant to conserve water.

Saw palmettos have thick, flat leaves that are oriented vertically. This vertical orientation keeps most of the leaves parallel to the sun's rays instead of being perpendicular, allowing the plant to conserve water. Saw palmetto leaves also have a v-shape which collects rainwater and channels it toward the center of the plant.



Prickly-pear cacti are succulents, meaning that they have thick structures (the green part of the cactus) covered with a leathery "skin". The leathery skin protects the cactus from losing water through transpiration. Cacti can increase and decrease their size in response to water availability (they can fold and unfold like an accordion).