



Botanical Garden Programs: Reading Plants

MINI-ECOSYSTEMS:

Venus Flytrap Terrariums as a Study of Plant Adaptations



Grades 4–8

I. Introduction

In preparation for a school visit to the Huntington Botanical Gardens' Reading Plants tour, we will investigate the interesting adaptations of Venus Flytraps through the creation of a small classroom terrarium.

II. Objective

- ◆ To encourage the exploration of plant structure in order to learn about adaptation in different climates and environments.

III. Background

Plant Adaptations and Venus Flytraps

During your visit to the Huntington Botanical Gardens, your class will visit three different gardens: the Desert Garden, Lily Pond Garden, and the Jungle Garden. Each of these gardens represents a distinct ecosystem, where plants are adapted to the unique conditions of their local environment, from the arid and sunny climate of the Desert Garden, to the wet and shady Jungle Garden. We can learn a lot about a plant's survival in its environment by examining its shape, size, and structure. Depending on the light and water available in their environment, plants have developed special adaptations over many generations. The spines on cactus are modified leaves, so that while they can harness the sun's energy in photosynthesis, their small shape helps prevent water loss in dry, desert climates. Meanwhile, in a rain forest environment, plants often have extremely large leaves to maximize the sunlight they can capture from the shady forest floor. Venus Flytraps are particularly revealing plants, as they are uniquely adapted to their nutrient-poor bog environment. In their native environment, Venus Flytraps don't receive the nutrients (primarily nitrogen)

they need from the soil. Therefore, they have evolved their fascinating leaf structure to catch flies and other small insects to digest in order to gain these important nutrients. While we will be putting together a Venus Flytrap Terrarium, you may use different plants in your classroom to create terrarium with your students. You may want to create different environments in preparation for your visit to the Huntington. We recommend creating both desert and jungle terrariums in order to study the adaptations of plants in these distinct environments. Plants that are easy to find at a local nursery for the desert terrarium are: Jade, Aloe, Crassula, and small cacti. For the tropical terrarium, try Philodendron, Dieffenbachia, Croton, ferns, and begonias.

IV. Materials Needed

- ◆ 2-Liter clear plastic bottle
- ◆ scissors
- ◆ potting soil (peat and sand mixture)
- ◆ Venus Flytrap plant
- ◆ additional bog plants: baby's tears, pink polka-dot plant
- ◆ distilled water

V. Lesson Activities

1. Preparation

It is best to cut the plastic bottles in half ahead of time (in the horizontal direction). Cut slits in the top half so that it will fit around the bottom half. Discard the bottle cap.

2. Background Discussion

Guide your students through a discussion of plants—what all plants need (sunlight, nutrients, water), and different adaptations that allow them to grow and reproduce.

Light Show the bottles you prepared to the students. Discuss how the clear plastic bottle will allow light in to the terrarium and why this is important for the survival of the plants.

Water Cycle It is also a good idea to talk about the water cycle—how water is given off by the plants (transpiration), and how some of the water will cycle within the terrarium, condensing visibly on the surface of the bottle, and maintaining a more humid environment for the plants.

Soil Take the time to examine the soil you will use. Explore how it feels, what it is made of (the best soil for Venus Flytraps is a peat and sand mixture), how moist or dry it is.

2. Planting

Fill the bottom half of the bottle $\frac{1}{2}$ - $\frac{2}{3}$ full with soil.

Examine and discuss the plants you will be putting in the terrarium.

Arrange and plant the chosen plants. When transplanting, gently remove the plants from their old containers, taking care not to damage their roots. Dig a small hole where you will plant them, then place the roots in the ground and cover them with soil. Don't forget that plants grow and they will need a little space!

3. Caring for the plants

Water your terrarium, the soil should be kept slightly moist. Note: Venus Flytraps must have distilled water! The chlorine in tap water will kill them.

Find a sunny spot for your terrarium. It is best if it can be in filtered sunlight. Windowsills are great!

Check your terrarium periodically, observe the changes you see in the plants and watch for signs of the water cycle! Extra Tips on Venus Flytrap Care: Don't feed your Venus Flytrap. The Flytraps are skillful in trapping their own food, and extra feeding is not necessary. Avoid playing with the leaves because each leaf can only close 3-4 times before it dies. The leaves are important to the plant's survival. As your plant gets older, some of the leaves will die and turn black, just like any other plant. These leaves should be cut off with scissors — just cut the leaf, not the whole stalk.

VI. Discussion Questions

1. What do plants need to survive?
2. What is an environment? An ecosystem?
3. What are adaptations?
4. How can we learn about a plant's environment just by looking at the plant? When examining a plant: How would you describe this plant?
5. What do you notice about its leaves? Stems? Flowers?
6. What kind of an environment do you think this plant lives in?
7. How do you know?
8. Does this plant need a lot of water?

VII. Extension Questions

1. What kind of environment do we live in?
2. What kinds of plants can you find in your neighborhood that are native to Southern California?
3. How are these plants similar and different to the plants at the Huntington?
4. How would you compare the different plants in your neighborhood?
5. Why are plants important to people?
6. How do you use plants everyday?

VIII. Vocabulary

adaptation a change over time in an organism's structure or function that helps it better survive in its environment

aquatic growing in or near water

carnivorous plant:

a plant that digests insects of other small animals to gain the nutrients it needs

climate the rainfall, light, temperature, wind, and other weather elements that are normal to an area

desert a region with less than 25 cm (5 inches) of rainfall each year, usually with extremes in temperature and having very few but highly adapted plants

environment the physical and biological conditions around a plant or an animal, such as, amount of space in which to live, climate, other plants and animals, etc.

habitat the natural environment in which a plant or animal lives

photosynthesis

the process whereby plants capture the sun's energy in order to make starches and sugars needed for growth; plants combine carbon dioxide and water and release oxygen during photosynthesis productivity, and several layers of trees and plants

rain forest a tall forest in a climate of high rainfall, with several layers of trees and plants

transpiration the process in which water evaporates from the leaves of a plant to the atmosphere