



# DESIGN A PLANT

Design a plant based on rain forest adaptations



## GRADES 4-6

### KEY WORDS

- buttress trunks
- prop roots
- drip tips
- poison leaves or bark
- smooth bark
- hard bark
- thorny bark

### STANDARDS

- SCI.4.3.3
- SCI.4.3.4
- SCI.5.3.1
- SCI.5.3.2
- SCI.6.3.3
- SCI.6.3.4

## OBJECTIVES

- Students will design a plant that has adapted to survive in the tropical rain forest.
- Students will become familiar with at least four ways that tropical plants survive conditions of high temperature, high humidity, plant eaters, and decomposers.

## BACKGROUND INFORMATION

- There are plant survival strategies that have been noted by researchers in tropical rain forests. Some of these may be seen at the Fort Wayne Children's Zoo's Indonesian Rain Forest exhibit.
- Buttress Trunks: Flange-like root growth on the trunk or base of tall trees that help stabilize and support the shallow root system.
- Prop Roots: Long, above-ground roots that exude from the trunks of small trees and act as stabilizers.
- Drip Tips: Tips of leaves that come to a long and very pronounced tip and are thought to help shed moisture that would encourage fungal and bacterial growth on the leaf surface.
- Poison Leaves or Bark: The taste or smell of chemicals deters insects or other animals that might eat the leaves or bark.
- Smooth Bark: A feature that deters climbing plants from gaining a hold.
- Hard Bark: Deters boring and chewing insects.
- Thorny Bark: Deters climbing animals.

## PROCEDURE

- Make sure to go over the background information with the students.
- Have students think about how plants are able to survive in a warm, humid environment that encourages plant growth, yet also favors the growth of other creatures that eat and use the plants.

## RECOMMENDED ASSESSMENT

- Make sure that the students are including multiple adaptations in their plant design.
- Check the students' answers about their plants for accuracy.

## EXTENSIONS

- Have students create their plant in three dimensions using crepe paper, paper machè, clay, fabric, or other material.





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Name \_\_\_\_\_

## INSTRUCTIONS

1. Read "Conditions in a Tropical Rain Forest" below and think about how a plant could survive under these conditions.
2. Design a plant of your own that you believe would survive in the tropical rain forest. Draw and color the plant on a separate piece of paper.
3. Explain how your plant avoids the problems listed in "Conditions in a Tropical Rain Forest" and answer the questions at the bottom of the page.

## CONDITIONS IN A TROPICAL RAIN FOREST

A. Green plants use sunlight to make their own food in a process called photosynthesis. Note: In photosynthesis, the leaves of the plant remove carbon dioxide from the air while root systems draw up water.

When six atoms of carbon are formed in a chain, a molecule of glucose is formed. Glucose, a sugar, is food or energy that the plant needs in order to grow. Excess oxygen is returned to the atmosphere in the chemical process.

B. A lot of rain falls in the tropical rain forest (between 60-400 inches per year). Moisture combined with high temperatures creates high humidity, a condition that favors the growth of fungi and mold, as well as fast plant growth.

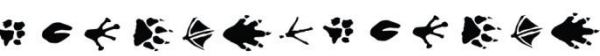
C. The nutrient layer of tropical forest soils is shallow. Most of the forest's nutrients are quickly decomposed or used up by the living plants and animals.

D. Plant roots are usually very shallow.

E. Trees and lianas that reach the canopy are often 65 feet or more in height. Emergents, the trees which rise above the canopy, are subject to strong winds, searing heat, and buffeting rains.

F. On the forest floor, light is very low, humidity is very high and temperature is more constant.

G. Millions of insects and other animals use the plants as shelter or eat the plant leaves and bark.





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## **AS YOU DESIGN YOUR PLANT, ANSWER THE FOLLOWING QUESTIONS:**

1. In what level of the forest does your plant grow?
2. Does your plant need a lot or a little sunlight to survive? How does it get this sunlight?
3. How does your plant obtain water?
4. Does your plant use any strategy to collect or shed water?
5. How does your plant obtain the nutrients needed to grow?
6. Does your plant perform photosynthesis?
7. How does your plant protect itself from insects and other animals?
8. Does your plant need to have a strategy to keep from blowing over in high wind?

