

20. DESERT PLANTS

Overview: This experiment will demonstrate the water conserving advantage of small leaves versus the large, broad leaves common in water-rich ecosystems.

Objective: Students will develop an understanding of the desert plant adaptation of small leaves.

Time needed: Several hours

Group Size: 2-4 or do the activity as a demonstration

Age appropriateness: 4th Grade and up

Site: Throughout the Garden

Background: Many desert plants have small leaves or no leaves at all. This cuts down on the amount of water a plant loses in transpiration. A plant with small leaves has less surface area exposed to the sun and wind than it would have if the leaves were larger. Some of these plants carry out most or all of their photosynthesis in their twigs and stems.

Materials:

Provided at the Garden

a warm to hot sunny day

Provided by the classroom teacher (one set for each group)

2 graduated containers that hold at least 1 quart of water

(a 2 quart pitcher works well)

2 quarts of water - 1 quart in each container

6 yogurt cups or containers of similar size

3-6 aluminum turkey pans

wax pencil

timepiece

Preparation:

Pre Activity: Plant leaves around the school campus could be observed and later compared to those in the Garden.

Procedure:

1. Fill each pitcher with 1 quart of water. Record the water levels by placing the pitcher on a table and lowering your head until your eye level is in line with the graduated line on the pitcher. Make sure the lowest level of the water (the meniscus) is even with this line. Mark this level with a wax pencil.
2. Set the yogurt cup and aluminum turkey pans out on the ground in the direct sun. Make sure that they are away from any foot traffic that could disturb them.
3. Pour one quart of water equally into the 6 yogurt cups. Pour the other quart of water equally into the 3 (or more) aluminum pans.
4. Wait a minimum of 2 hours. A greater time period allows for more evaporation and produces more dramatic results.

5. After at least 2 hours have past, carefully pour the water from the aluminum pans back into one of the pitchers and from the yogurt cups into the other pitcher. Record the new water level in each pitcher with the wax pencil.

6. Compare the water levels in each pitcher. Which "leaves" used the most water? Which "leaves" conserved water the best? Think about how often it rains in Yuma (how often this water would be replaced). At the rate the "leaves" lost water, how much water would they lose over the course of the day? A week? A month? Extended drought magnifies the need for water conserving adaptations.

Modifications:

Extensions: Investigate other adaptive characteristics desert plants have to the arid conditions (drought, leaf hairs, deciduous, ephemeral, photosynthesizing bark, long tap roots, succulents, etc.)

Reference List:

Nature Scope, Discovering Deserts
OBIS

Time of Year: Warmer temperature times are optimum.