Do Plants Sweat?

Core Content
2.2 Life Science
Structure and Function of Living Things

The Challenge

You have been hired by the local greenhouse for a summer job. On your first day on the job you notice the different shapes, textures, and sizes of leaves. You notice that the cactuses are outside in the bright sun and others are grouped together and are regularly sprinkled with water. You begin to wonder if leaf shape, texture, and size determined where your boss arranged the plants in the nursery.

Preassessment

1. Why is a forest more humid than a field or farmland?
2. Describe some differences that allow some plants to survive in desert conditions.

Performance Tasks

1. Why could the cactuses be placed outside and almost ignored while other plants need water on a regular basis?

2. What types of plants need to be watered more regularly and don't? What is the relationship between the leaf structure of the plants and the amount of water that is needed? What is the relationship between the leaf structure of plants and where plants are found in nature?

Lab Activity

Let's do a lab experiment. [Does the amount of surface area exposed to air affect the amount of water lost from that object?]

- Take 4 paper towels (same type-ask why)
- Weigh each towel. Record
- Put cc. 1 oz sm. of water on each towel. Weigh each
- Hang two towels on a "clothes line."
- Crumple 2 towels. Crumple as tightly as possible without squeezing out the water. Hang each crumpled towel.
-Weigh 3x and more during class period. Record.
- Compile all data onto a class chart.
-Can you now answer the question [Does the amount of surface area exposed to air affect the amount of water lost from that object (paper towel)?]
-Can you apply this information and explain the relationships in #2?

Lab Activity

-obtain at least 5-10 leaves (2 of same plant, thin, waxy) each category.

1. Tree (broad leaf)
2. Bundle grass (low surf to vol.) plant (grass, corn, oats)
3. Thin leaf house plant (geranium) (thin, non-waxy)
4. Fat, shiny leaf (aloe)
5. Bundle cactus needles or pine needles

-weigh each leaf/"bundle". Record.

-place 1 leaf/bundle from (1-5) in a baggy and seal baggy. (Why?)

-Place 1 leaf/bundle from (1-5) on a paper plate.

-Place in heating chamber for ____ time. Weigh 3 times. Record

-Compile all data onto a class chart.

-Can you now answer the question [Does the amount of surface area exposed to air affect the amount of water lost from that object?]

-Can you find examples of actual plant distribution where you see this principle in action?

-Can you predict the effect of seasons on each of the categories you studies?

-A maple leaf is similar in size to a geranium leaf. What factors (e.g. wax) other than surface area affect water loss?? Factors.

3. What is this water loss called?

4. Would any of these factors (discovered in your labs) affect landscaping? Landscaping in Arizona, Florida, Kentucky, Michigan, (_____ your state)? How?

OER

Use KIRIS Assessment, *Plants and Transpiration*.

[Show data/graph]

Three plants are grown in the same greenhouse with the same air temperature, amount of light, and amount of water. Data on the amount of water each plant loses through transpiration is displayed on the graph above.

For each plant, describe each of the following:

a. The pattern of water loss,
b. What the plant might look like, and
c. Where in the United States this plant might grow best and why.

Be sure to label your descriptions for plants 1, 2, and 3.