

Grade Level:
 9th Grade

Subject:
 Physics and Chemistry

Exhibit:
 #13 Demand Management
(Factors Involved in Water Evaporation)

Approximate Time Frame:
 2 hours *(more than one class period)*

Materials:

- different shaped containers to hold water
- pie pan
- salt
- sugar
- antifreeze
- bark
- sawdust
- grass clippings or turf

Lesson Plan - Where's My Water?



Science TEKS:

1. A Demonstrate safe practices during field and laboratory investigations.
1. B Make wise choices in the use and conservation of resources and the disposal or recycling of materials.
2. A Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.
2. B Collect data and make measurements with precision.
2. C Organize, analyze, evaluate, make inferences, and predict trends from data.
2. D Communicate valid conclusions.
3. A Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information.
3. B Draw inferences based on data related to promotional materials for products and services.
3. C Evaluate the impact of research on scientific thought, society, and the environment.
3. D Describe connections between physics and chemistry, and future careers.
3. E Research and describe the history of physics, chemistry, and contributions of scientists.

Related TEKS: Environmental Science, Biology

Vocabulary of Instruction:

- | | |
|-------------------|---------------|
| water evaporation | surface water |
| transpiration | desiccation |

Advanced Preparation:
Organize students' into groups

Instructional Procedure (5 E)

Engage: The students will prioritize water use by importance at an individual level, agricultural level and industrial level. Incorporate alternatives to water use. Design and complete a variety of lab exercises to help understand sources of water, water scarcity, and water conservation.

Explore: The first set up will determine water evaporation from surface water. These set ups can be left to evaporate for one day up to a week. Use different shaped containers that hold the same amount of water. The variable being tested here is the surface area exposed to the air. The different shapes will have different amounts of surface areas exposed to the air.

Use a pie pan of water in different situations including in the sun, under a fan in a refrigerator, in a humid environment, in an arid environment, bubble with an aerator.

Use a pie pan of water in the same situation such as at room temperature but use different solutes such as salt, sugar, antifreeze, and so on.

The second step involves different soil situations and how fast desiccation occurs. In each situation you can weigh the moist soil sample before the experiment and then weigh after to determine the water loss. Remember that one gram of water is equal to one milliliter in volume.

Different soil types from clay, sandy, loam or mixtures of each.

Covering the soil with different types of organic products such as bark, sawdust, grass clippings, or turf.

Planting different types of plants in the soil and covering the soil with plastic to allow only water loss through transpiration.

Explain: One of the contributions to water scarcity in the desert is desiccation of soil and evaporation of surface water. What are some of the major factors that contribute to this loss of water to the atmosphere? In this lab you will set up different scenarios and determine the amount of water loss from each scenario. The scenarios include different types of exposure of surface water and different types of soil moisture situations. The instructor can determine the number and types of situations the different lab groups will set up. If each different lab group sets up their own scenario they can report back to the whole classroom to determine the best and worse situations. Make sure the students develop a hypothesis on what they think will happen before they set up their lab.



What
are some
ways to
reduce
water loss
through
evaporation
and
desiccation?

Elaborate/Extend:

Questions:

What are some ways to reduce water loss through evaporation and desiccation?

How could you decrease water loss through evaporation and desiccation around your school, a farm, or at your home?

Use your data to estimate how much water is lost through evaporation on an average summer day from lake Ascarate in El Paso.

Estimate how much water is lost through desiccation after watering a ten acre park.

Evaluate: Closure of class will consist of student groups developing and presenting a statement about what they learned today and how it may change their ideas toward their water use and other water usage in the city.