

SNWA Goal 1 Objective 1.6; Goal 3 Objective 3.2, 3.4

CCSD Curriculum Essentials Framework

Science

It is expected that students will:

- (4) 1.4 observe and describe that different objects and materials may be composed of parts that are too small to be seen without magnification [NS 2.4.5]
- (4) 4.1 investigate and describe the variables that affect the survival of organisms within an ecosystem [NS 15.4.2]

Purpose: This activity introduces students to surface tension as one of the characteristics of water. It is important for students to investigate soap as a pollutant that can affect surface tension.

Time: 50 minutes

For each pair of students, you will need:

- wide container of water
- plastic pint basket (strawberries are sold in these)

You will also need:

- liquid dishwashing soap
- Transparencies:
 - Grade 4 - Insect
 - Grade 5 - Water Treatment Process
 - Grade 5 - Southern Nevada Water Cycle



Introduction

1. Ask students if they know of anything that can walk on water. Allow just a few minutes for responses. Share the overhead picture of the insect on water (see Grade 4 - Insect). Ask what they notice about the picture, especially where the tips of the legs touch the water. (Only the tips of the legs touch the water. There seem to be little dents in the water where the legs touch the water.)

Making Discoveries

2. Give every pair of students a small container of water and a plastic pint basket. Challenge them to float the basket on the water. The students should be able to observe a slight bulge in the surface of the water between the slats on the basket's bottom grid (meniscus).
3. When students have their baskets floating, ask, “How is this like the picture of the water insect we saw? The ability of water to hold tightly together is called surface tension.”

4. Go to each student pair who have a floating basket, ask them to observe carefully what happens next, and add about three drops of dishwashing soap to the container, dropping them in the middle of the basket. (The basket should sink.) Ask, “What would happen to the insect that we saw in the picture if there were soap in the water?”
5. Students write about their conjectures in their notebooks. Then ask volunteers to share their writing with the class.
6. Ask, “Are there times when we want to break the force of surface tension?” (When washing dishes, clothes or the car, the water will flow more easily into all the places that dirt collects.) “Where does the water go when we are finished washing things? When is it important that we don't disturb the surface tension of water? Why? What do you think is important to do to soapy water before it flows into the Las Vegas Wash, other streams and Lake Mead?”

Closing

7. Show the overhead of the water treatment process (see Grade 5 - Water Treatment Process). Focus on the site where chemicals are added to remove pollutants that are too small to be seen.
8. Give students the unlabeled illustration of the valley's water system (see Grade 5 - Southern Nevada Water Cycle). Using the overhead as a reference, have them label the different areas.
9. Show the picture of the treatment plant in the Las Vegas Valley and tell them where it is located. Ask, “How do you think surface tension applies to water treatment?”

Teacher note:

The “Flushing it Out” section of this unit includes information on a field trip to a water treatment facility.

Extension

Fill a bowl half full of water that has no dishwashing liquid in it. Sprinkle pepper on the water until the water is covered. You do not have to use a lot of pepper; simply sprinkle it lightly all over. The pepper should float on the surface of the water due to surface tension. Put a drop of soap on your fingertip. Touch the surface of the water; right in the middle of the bowl, with your soapy finger. Watch. The surface tension will break, and all the pepper will be drawn to the edge of the bowl, leaving the center of the water perfectly free from pepper.

Word Bank

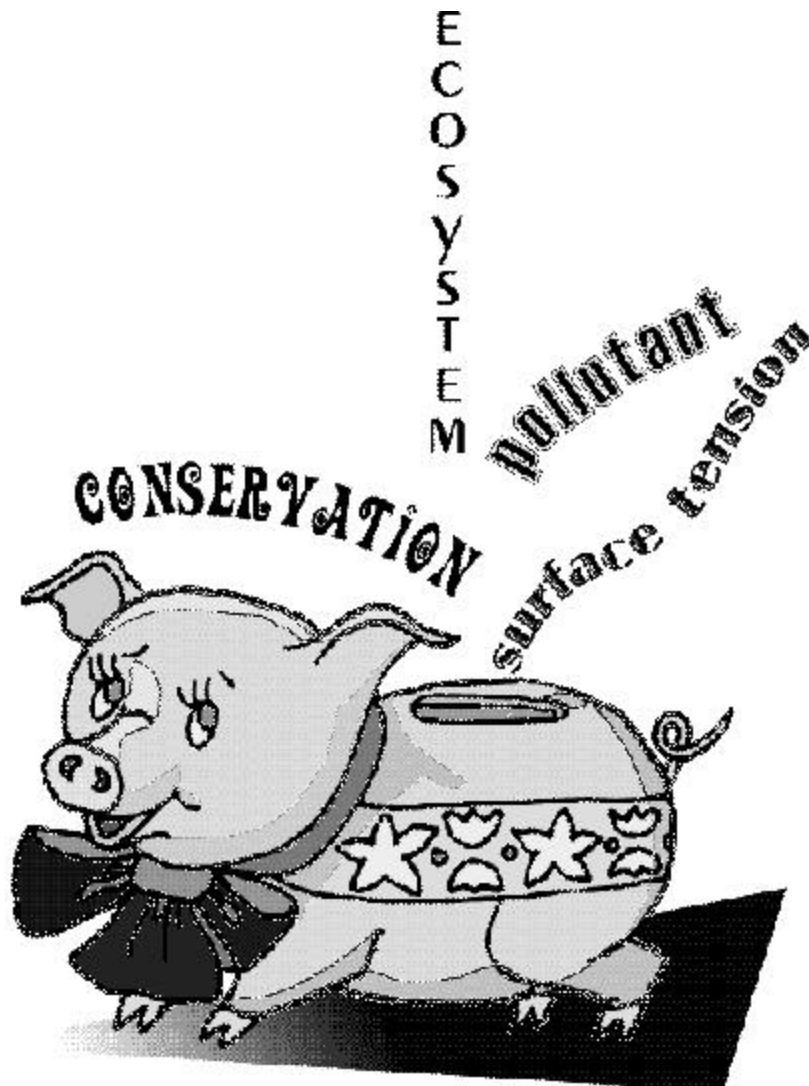
The teacher should introduce or review the following vocabulary with the students within the context of this lesson.

conservation: wise use and protection from depletion and pollution

pollutant: any substance suspended or dissolved in water that builds up in sufficient quantity to impair water quality

ecosystem: the relationship between all the parts (living and nonliving) within an environmental community

surface tension: a property of liquids in which the exposed surface tends to contract to the smallest possible area, as in the formation of a meniscus



Insect Walking on Water

