

Environmental Youth Connection Lesson Plan

Title: **Walking on Water: The Water Strider**

Submitted by: **Kristi Jackson**

Age level:

Natural Environment or Feature required for teaching activity:

Look for water striders in open nonmoving fresh water in spring through fall. Water striders go through hatches and may range from few to many in numbers.

Location: **Waupaca: South Park (water strider can be found in the canal between Mirror and Shadow Lake or in quiet areas of the lake)**

Other Unique Features of Site:

Facilities at location: **Bathrooms are located by the upper shelter.**

Accessibility:

A wheelchair accessible station can be set up along the paved pathway between the beach and the lower shelter on Shadow Lake.

Directions:

Driving time:

Walk time:

Bike time:

Other possible park locations for this lesson:

Silver Lake by the Chain Elementary School in Waupaca

Clintonville School Forest off of 45 on Knitt Road and Boy Scout Lane

Service opportunity:

Storm drain stenciling, river or lake clean-up, water monitoring

Related subjects:

Surface tension, environmental health,

Materials:

bug net,

sewing needles (must be absolutely dry)

soapy water made with dish soap

paper towels

tubs (3 gallon size)

napkins,

eye dropper

discard bucket

Lesson Objectives:

Explore and learn about

- surface tension
- water striders
- effects on surfactants on the environment
- water quality indicators and environmental health

District Instructional Objectives: (school reference)

Performance Standards:

Background Information:

This lesson plan will show students how they may directly affect the environment by connecting the sinking of the needle in polluted water with the destruction of water strider habitat.

A great internet link on water striders with pictures can be found at:
http://www.fcps.edu/islandcreekes/ecology/common_water_strider.htm

Management:

The water strider should be returned to its home on the water's edge. Natural items should not be removed. The student should be conscious of the water's edge, should stay on paths, and should avoid sensitive areas.

Procedure:

Observation and discussion: Fill a tub half full with lake water. Catch a one or two water striders with the bug net and put in the tub to observe. If possible, the tub should be in the sunlight. They should be returned to their habitat after observation. Observe Water Strider in natural habitat and/or tubs:

How would you describe the location of the strider in comparison to the water level? Is it swimming, floating, or on top of the water? (on top)

Is the water strider wet? (no)

Check out the shadows of the water strider that are cast on the bottom of the tub. Can you see how the water curves under the weight of the strider? (yes)

How is the water strider able to stay on top of the water? What property of water allows the water strider to stay on top of the water? (surface tension)

What are the predators of a water strider? (Fish, frogs, salamanders, newts)

http://www.fcps.edu/islandcreekes/ecology/common_water_strider.htm

What does it prey on? Is this bug an herbivore, carnivore, omnivore?
(mosquitoes and other bugs)

Demonstrate surface tension with a needle:

In a tub half full of lake water, (no striders in tub) gently lay a napkin on top of the water and immediately put a dry sewing needle on top of the napkin before the napkin gets completely wet.

Let the napkins thoroughly absorb water. Then, very gently push the napkin down into the water without disturbing the needle. The needle should use surface tension to stay on top of the water.

Observe the needle and the curvature of the water around the needle. Again, this can be observed in the shadow cast by the needle on the bottom of the tub.

With the eye dropper, carefully place one drop of surfactant, or soapy water, 4 or 5 inches away from the needle. The needle should shoot away from the point where the drop of surfactant was placed. If there are enough visible particles (i.e. duck weed or other organic material) on top of the water surface, then the students can observe the leading edge of the surface tension as it is breaking up. Depending on the concentration of the soapy water, a second drop may be needed. When the leading edge reaches the needle, the needle will drop to the bottom of the tub.

Review Lesson: Student Observations and Questions for Discussion

Discussion

- What is a water quality indicator and why would the water strider be one?

(A water quality indicator is an organism that can only exist in an environment that is "clean" enough for the organism to thrive. Certain chemicals being dumped into the water system will decrease surface tension, decrease water quality and decrease the amount of water striders. Water striders are water quality indicators because they can only exist if there is enough surface tension and, thus, they can indicate higher quality water with respect to surfactants.)

- What is going to happen to the water striders if we dump soapy water in a water system? Why is this important to the community?
(Surface tension decreases and water strider habitat destroyed. This has implications on environmental health, changes in ecosystem, etc.)

- What could happen to the populations of predatory species of the water strider and the species that the water strider preys upon?
(Example of answers: Predators of water striders may decrease (due to less food) or predators may prey more on another population (affect other populations.) Prey of water striders may increase, causing their other predators to increase.)

Independent Practice:

1. Define the following:

Surface tension:

Surfactant:

Water Quality Indicator:

2. How do surfactants affect surface tension?
3. What kind of laws or regulations impact the water strider?

Evaluation of lesson by students:

- What kind of laws or regulations impact the water strider?
(EPA and State regulations to keep our waters clean. These include constant monitoring of various sites near industry, wastewater treatment plants, and areas of water run-off)
- Can you identify a service component to this activity?
(Storm drain stenciling, river or lake clean-up, water monitoring)
- How could this activity be improved or supplemented?

Evaluation of lesson plan by teacher:

- How easy was this to use?
- Are there tasks missing or information that needs to be updated?
- Are there components or verbiage you would add or change to make this easier to use?