

Advanced Eco-monitoring

THEME

Eco-monitoring can help us understand the long-term effects of human activities on the health of Upper Dry Creek.

SUB THEMES

- 1) Aquatic habitats are living, breathing ecosystems upon which we depend for survival.
- 2) Some human activities can be harmful to aquatic habitats and those effects can be measured.
- 3) It is important to measure many different factors to see the overall picture.

VOCABULARY

Pollution, watershed, topography, turbidity, pH, dissolved oxygen, temperature, precipitation, substrate, producers, consumers, decomposers, abiotic, biotic, trophic levels

ACTIVITY MATERIALS

Map, waste buckets, pH strips and color charts, dissolved oxygen kits, thermometers, tape measure, yardstick, rain gauge, white tubs, nets, gravel sifters, collection jars, aquatic animal keys, creek flow gauge, GPS units, turbidity tube, clipboards, pencils, data sheets

INTRODUCTION

Introduce yourself and state the title of the activity. Preview the main points of the activity and give students an idea of what they will be doing. Conversationally state the theme and sub themes. Ask: **What is a watershed?** Explain that it is land that collects runoff from rain, snow, and springs. It then drains into a stream, river, or lake. Show the students the map of the Caney Watershed. Explain that it is important to understand that the different creeks, rivers, and lakes are connected. If something is polluting one part of the system, then it will eventually affect the whole watershed in some way.

Have the students stand up and take a closer look at the creek. Ask: **How can a creek like this one become polluted** (factories, sewage, agricultural runoff from livestock and pesticides, parking lot run-off, off-road vehicles, fertilizer run-off, etc.)? Ask: **How can pollution here affect the plants and animals that live in and around the creek? How would it affect people here?** Explain that plants could grow slower or not at all. That would mean less food and would harm the entire food chain. Fish and invertebrates within the creek could become sick, produce deformed off-spring or die. Also, since the creek is a part of a larger system of water, our source for drinking water could become polluted.

Teacher's Corner

Grade Level(s)

High School

State Performance Indicators

CLE 3210

-Inq.3: Determine appropriate tools to gather precise and accurate data.

-Inq.5: Defend a conclusion based on scientific evidence.

-2.2: Interpret the relationship between environmental factors and fluctuations in population size.

-2.4: Predict how various types of human activities affect the environment.

-2.5: Make inferences about how a specific environmental change can affect the amount of biodiversity.

-2.6: Predict how a specific environmental change may lead to the extinction of a particular species.

-5.2: Recognize the relationship between form and function in living things.

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ACTIVITY

Explain that students will be collecting data that will be used in a long-term study of the health of Upper Dry Creek. To see the overall picture, they will be measuring the physical, biological, and chemical conditions of the creek. Explain the different properties that are going to be tested as detailed below. Demonstrate how to use the equipment before breaking the group into three teams. Pass out clipboards, pencils, and data sheets for each team. Briefly explain how to complete the data sheet. Rotate the teams among the following three stations every 7-10 min:

- **Station 1:** Measure chemical properties of pH (measure of the alkalinity or acidity of the water), dissolved oxygen (the amount of oxygen in the water available to aquatic plants and animals, varies with temperature), temperature, and turbidity (cloudiness of the water from sediments).
- **Station 2:** Measure physical properties of creek flow, (the amount of water moving), creek depth and width, precipitation (rain, snow, etc.), substrate (material at the bottom of the creek, gravel, dirt, rocks, etc.), weather (condition of the atmosphere), and GPS location (longitude and latitude).
- **Station 3:** Measure biological properties of animal species pollution tolerance.

Bring the group back together for the discussion.

DISCUSSION

Engage students in a discussion about their results. Compare the results to the keys and diagrams located in the activity box so that they can get an idea of how healthy the creek is currently. Ask: **How would the results be different after a big rain storm? How would insufficient or too much oxygen in the water impact wildlife? How does erosion affect the creek?**

WRAP-UP

Let the group know that the activity is coming to an end. Conversationally review the theme and sub themes. Collect the data sheets.

BRINGING IT TO THE CLASSROOM

Using data provided in a spreadsheet (available at www.butternutvalleynaturecenter.com/DataSets.htm), analyze trends such as average dissolved oxygen, pH, and turbidity for each month. How do these averages change over a 12-month period? What could be causing those changes? Have the students create graphs of their findings.

ACKNOWLEDGEMENTS

- Copyright © 2008 Healing Stones Foundation. All rights reserved.
- Activity developed by Melissa Squirlock; March 2008.
- Volunteer Stream Monitoring. (1997). The Environmental Protection Agency: Office of Water.