

Teacher Instructions for Water Chemistry Inquiry and Chemistry Lab

Objectives

Students will:

- Learn about chemical properties that are used to assess water quality.
- Learn what human activities affect these chemical properties.
- Consider and discuss types of human activities that could influence water quality near the sampling site.
- Test the chemical properties.
- Determine whether the results are appropriate for aquatic life.
- Present information about chemical property and their test results to the class.
- Discuss and decide as a class whether the stream has chemical and physical properties conducive to aquatic life.

Time

60-90 minutes

Teacher Instructions

This inquiry can be done after students watch the Waterways Stream Chemistry Monitoring presentation, or it can be a stand-alone activity.

Overview

The inquiry includes 3 parts:

- Viewing a satellite image of the area draining to the stream to discuss possible pollution sources as a class.
- Doing the hands-on inquiry as a team activity, using the worksheet, chemical information card, and pollution cards.
- The lab test, as part of the team activity.

Preparation

Teachers will use this file to make the worksheet and cards for this inquiry. Using card stock and laminating the materials works best for multiple uses.

If students cannot go to a stream, the teacher should collect bucket(s) of water for the class on the day of the lab. While at the stream, the teacher should take the water temperature and the dissolved oxygen readings. Students can compare their results to the teacher's or just use the teacher's results for those two properties.

Teachers will use this file to make the worksheet and cards for the inquiry. It is helpful to print with card stock and laminate the materials works for multiple uses.

Materials:

Each student team should have:

- The student worksheet
- A set pictures of pollution sources
- An information card about the chemical property assigned to the team. (There are cards for 6 properties: dissolved oxygen, nitrogen, phosphorus, pH, turbidity, temperature, alkalinity.
- A graph relating the level of the team's chemical property to fish health.
- A test kit
- A water sample.

Specifics

1. Teachers show students a map (satellite image) of where the water was collected. The class discusses the land uses and land cover in vicinity of the stream. If the class has learned about pollution sources and the relationships of land uses to water quality, they can make a class hypothesis about whether the water chemistry will be suitable for aquatic life. (Resource: Opening Presentation: Watersheds, Land Use, and Sustainable Practices (Presentation: [PDF/PowerPoint](#))

2. The activity and labs are done in teams. Each team is assigned one of the chemical properties. The student worksheet will guide the students (and teachers) through the activity. The team will:

- learn about that property from the information cards
- identify possible pollution sources, using the pollution cards
- do the chemistry test for their property
- report on the property and their findings to the class, using the graphs.
- The class determines whether the water chemistry is conducive to aquatic life and states factors that contribute to their conclusion.