

Are We Just Fouling Ourselves?

Concepts

- Land use can contribute to pollution in the watershed.
- Pollutants become more concentrated as they move through the food chain.

Objectives

Students will be able to:

- Identify three major uses of land, and pollutants derived from these land based activities.
- Explain the ways in which pollutants move through the food chain and become more concentrated to some members of the food chain.

Duration

Enough time for research and to write a report

Method

Small group research, individual reports

California Science Content Standards 8th Grade

1. Geography Standard: how to use maps and other geographic representations, tools and technologies to acquire process and report information from a special perspective.

1d. use geographic tool and technologies to pose and answer questions about special distributions.

6th Grade

2. Shaping Earth's Surface
Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept:

2.a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.

2.b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.

Does the way we use the land affect us? Research land use and derivative pollutants in order to write a report. Also suggested as 6th grade activity, meeting standards for watersheds

Background

A watershed is defined as the entire land area which contributes surface runoff to a given drainage system (Slattery, 1995). Various types of land use, including agriculture and industry, contribute pollutants through runoff which eventually may travel through an entire watershed. As a pollutant travels through a watershed, it may come into contact with many organisms in a food chain. A food chain is a relationship in which one organism serves as food for another organism. The first stage of a food chain is referred to as the producer – the plants. Producers are eaten by primary consumers; primary consumers are eaten by secondary consumers; this food web continues to the apex predators which represent the top of the food chain. If one stage of the food chain is contaminated, the next stage will often consume large quantities of the organism, in turn becoming contaminated. This is known as bioaccumulation, in which an increase in the concentration of a chemical (or toxin) takes place as one moves up the food chain (Greene, 1998).

Activity

1. Divide students into cooperative learning groups of five or six. Provide each group with sufficient time to research the land uses of a certain area adjacent to a local watershed. Suggest using Ballona Creek Watershed, and other local watersheds.
2. Each group will then construct a map of the watershed and surrounding area, identifying and marking the types of land use in that area (a cow will represent agriculture, a smoke stack will represent industry, and a tree will represent a forest).
3. Student groups will then research the types of pollutants typically associated with the land use in their watershed.
4. Groups will also research the effects of these pollutants on the organisms indigenous to their watershed.
5. Each student will construct a food chain from the organisms found in their watershed and develop a report on ways in which he/she believes the pollutants found in their area will affect this food chain. Students will present their food chains and reports to the class in their research groups.

Extension

1. Draw a fish native to a local watershed. Provide information including size, coloration, predators and prey, and discuss the fish's position in the food chain.
2. Draw a poster illustrating aquatic life found in the local watershed and write a slogan/environmental message.

Materials

1. Pen/pencil
2. Poster board
3. Paper
4. Maps
5. Crayons/markers
6. Scissors

Preparation

Collect materials, provide resources for research

Additional Resources

- Watershed pollution: www.watershedwatch.net/prevent
- EPA Watersheds After the storm: www.epa.gov/weatherchannel/stormwater
- Clean Ships Clean Ports Clean Oceans: Controlling Garbage and Plastic Wastes at Sea
Committee on Shipborne Wastes, National Academy Press, 1995. ISBN: 0309051371