

Muddy Rivers, Murky Sound

ACTIVITY DESCRIPTION:

Observe the erosion and sedimentation process, how it disrupts stream life, and one method to prevent it.

OBJECTIVE:

- To gain an understanding of what erosion and sedimentation are.
- To learn why excessive erosion and sedimentation are harmful to fish and wildlife.
- To learn ways to prevent erosion and sedimentation around our homes and communities.
- To sharpen skills in science and language arts.

AGE GROUP:

Grades 6-8

MATERIALS:

- One or two large pans approximately 3 feet long, and 6 inches deep; the width can vary
- Enough fine sand to fill 1/2 of the pan to a depth of 2-3 inches
- Several large dixie cups
- A gallon milk container filled with water
- A carpet section as wide as the pan and 4 inches long, or a similar-sized block of grass with the roots and soil attached (turf)

Introduction:

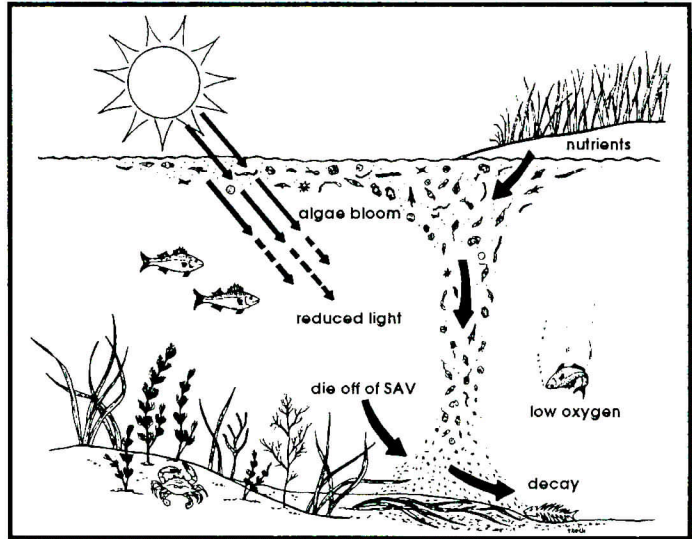
Erosion and sedimentation are natural processes. However, due to man's activities these processes have increased and degraded the quality of water in our streams for fish and wildlife. The purpose of this activity is to illustrate that erosion problems can be easily solved.

Erosion and Sedimentation

The impact of water on land often changes the landscape. Rain, stream currents, and wind-swept waves wear away sediment (small particles of soil and other matter) from the land in a process called erosion. The sediment is then carried further away, and often deposited at the mouths of rivers or other areas where water flow is slower. This natural process is called sedimentation. However, human actions which remove natural vegetation (construction and development of land, and poor farming practices) increase erosion and sedimentation in our waterways. In this way, the land is lost in some places and gained in others.

Sediments and Toxic Chemicals

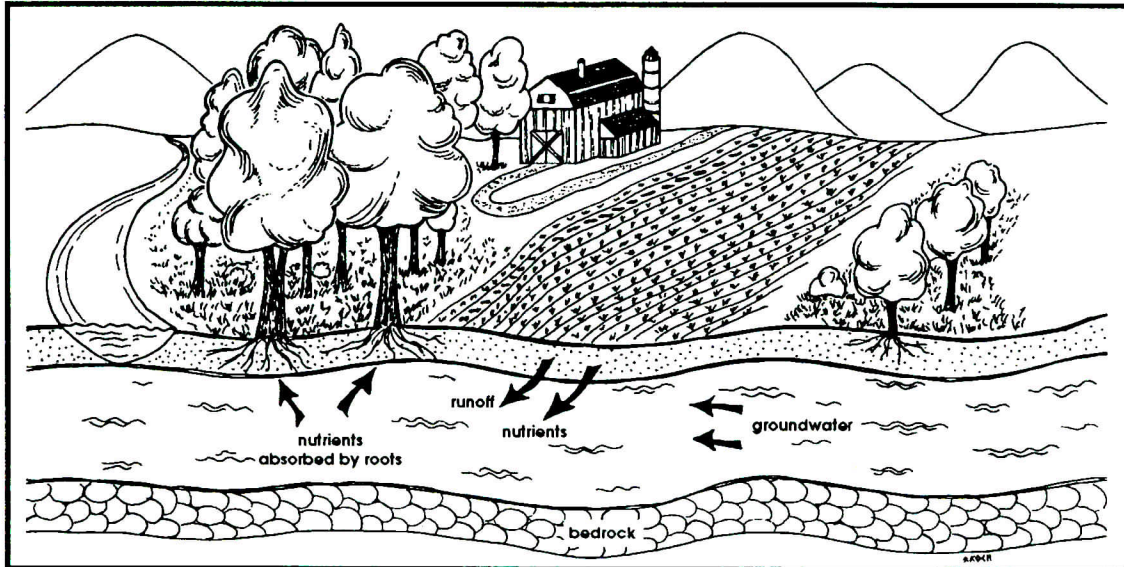
Sediment particles can carry chemicals on their surface, much like a dog with burs caught in its fur. These chemicals can be nutrients, organic materials or metals. Scientists are particularly worried about the toxic materials that are trapped by sediments. A toxin is a substance that can cause cancer or other harmful health effects. These chemicals can accumulate to dangerous levels and harm fish and wildlife. Bottom dwelling animals can become contaminated or killed when exposed to chemicals such as dioxin and heavy metals like arsenic and lead.



Cloudy Water, Choking Sediments

Sediments also harm aquatic life by clouding the water and covering the bottom. Submerged aquatic vegetation (SAV) must have light to survive. Sediments suspended in the water prevent light from reaching the plants. When the flow of the water slows, the sediments begin to settle to the bottom of our rivers. They can bury underwater plants, smother fish eggs, and suffocate clams, oysters, and other bottom dwellers.

The bottoms of rivers are covered by mud patches, rocks, logs, plants, and shells which allow many different types of animals to live in our streams. If silt covers the different structures, the bottom becomes one continuous mud patch, and animals living on anything other than mud will no longer have a home. For a river to be healthy, it must have many different types of animals living in it—much like our



towns must have many different types of people living in them.

Preventing The Problem

Erosion and sedimentation are natural processes, but today they often occur at unnaturally high rates. Bare soil is more exposed to the erosive forces of water than vegetated areas, much like your skin is exposed to cold on a windy, winter day without a coat. This loss of soil harms landowners, farmers, and the Sounds. Excessive erosion can be prevented. Trees and plants growing along the sides of streams are beneficial in several ways. First, the plant stems and fallen leaves slow the flow of water and prevent it from easily washing away soil particles. The plant roots hold soil together. Finally, the plants absorb some chemicals and nutrients which can harm aquatic life while changing others to harmless forms. Both farmers and landowners can reduce erosion by simply allowing natural vegetation to grow in areas bordering rivers and streams. Most construction projects are required to control sediments. They use devices such as hay bales and filter cloth. Some towns are building stormwater detention ponds to prevent sediments from entering our waters. Rainwater is directed into these ponds where the flow slows. Here sediments and harmful chemicals settle out and the cleaner water is slowly released into our rivers. Many other ideas to prevent erosion are available in the booklet entitled "Sound Advice" available from WRAL-TV, Raleigh, NC. Erosion

and sedimentation are Sound problems that we can all help eliminate.

Activity:

Cover the bottom of one-half of a pan with a layer of sand two-three inches deep. Prop the filled end of the pan five inches in the air, creating a downhill slope. Punch five holes in the bottom of a large dixie cup. Hold the cup above one end of the pan. Pour water into the cup to simulate rain. Use at least 1/2 gallon of water. Watch how the water travels down the pan. Does the water erode the sand? Notice how the sand now covers the bottom of the lower section of the pan. What would happen to things living on the bottom in that end? To experiment with different rainstorms, vary the number and size of the holes in the cup, and the amount of water used.

Now cover the bottom of 1/3 of the pan with a layer of sand two-three inches deep. In the next section of the pan place a piece of turf or carpet to simulate a vegetated stream border. Add water as in the previous experiment. Does the "border" trap the sand? Do you think having grass borders near our waterways would help prevent sedimentation? Many communities are establishing parks along their streams. These parks are called **greenways**. They offer excellent recreational opportunities for people, such as bike paths, trails, and playgrounds. Can you think of any benefits they provide for fish and wildlife?

Illustrations by Sandra Koch