

Lesson 24

Turbid Tides

What is turbidity?
Why are streams tested for turbidity?
What are causes of turbidity in a stream?

GOAL To understand turbid waters can affect the water quality.

OBJECTIVES Students will:

- ✓ conduct a turbidity test
- ✓ receive an erosion problem to solve
- ✓ develop solutions to stream bank problem
- ✓ assess a stream bank on the Farmington River Watershed

MATERIALS plastic quart jar, gravel, rocks, sand

CORE CURRICULUM CONTENT STANDARDS

- Science 3(4,5), 7(8), 8(2), 14(1,2)
- Social Studies 6(5), 9(1), 10(5,7,8)
- Arts 1(3)

VOCABULARY turbidity, sediment, penetrate, erosion

PROCEDURES

1. Explain to students that erosion increases the amount of sediment or soil particles in water. The increase in soil particles influences *turbidity*, which is how much light can *penetrate* through the water. Measuring the turbidity is one way to measure stream health and subsequently assessing water quality. Aquatic organisms are susceptible to changes in water quality, especially to the effects of increased sediments. Macroinvertebrates require oxygen flowing waters to survive. Plants also require the sun to produce food through the process of photosynthesis. Cloudy water absorbs more of the sun's rays, thereby increasing the temperature of the water. This can adversely affect organisms that require certain water temperatures to survive.
2. Explain to students that they are recipients of a problem to solve. Break them up into groups to discuss the problem and come up with possible solutions.
3. Discuss that they are responsible for monitoring a stream or riparian area. Explain that they have received news that the heavy rains during the spring and summer has severely affected the side of the stream banks. Have students develop a plan that would help prevent the amount of erosion and sediment going into the river.
4. Have students arrive at the site and take notes on the condition of the area.

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5. The following are examples of observations:
 - a. Plants and shrubs that were previously on the side of the river are gone. They were probably washed down the river during the last remnants of a hurricane.
 - b. A tree had fallen and the roots were exposed, causing much damage to the bank. There were rocks by the edge of the banks.
 - c. The water appeared cloudy and murky. Many of the species require oxygen rich water live in this area of the stream. Water clarity affects living organisms and may be tested by a turbidity test .
6. Have students conduct a test to show how turbidity may affect aquatic life. Have groups fill a clear, plastic quart jar with rocks, pebbles, and soil. Add water until jar is full. Cover container and shake until water becomes muddy. Have students record what happens (*The rocks settle, mud is difficult to see through*). Ask how this would affect the organisms that live on the bottom of the stream? (*They could suffocate*).
7. Have student groups brainstorm ideas on how to prevent additional damage to the riparian bank.
8. Some possibilities:
 - a. Mulches, blankets and mats – covering the soil with these protects the soil surface, reduces runoff velocity, increases infiltration, slows soil moisture loss, and improves seed germination.
 - b. Rocks – rocks placed along the stream bank protects soil from direct contact with erosive stream flows.
 - c. Straw bale barrier – a temporary sediment barrier of anchored straw bales.
 - d. Trees shrubs vines and ground cover – can provide low-maintenance long term erosion protection.
 - e. Vegetative stream bank stabilization – planting trees or shrubs along stream bank to stabilize them.
9. Students present ideas to class. Have them display diagrams on how to implement these preventive measures.
10. Have students research ways riparian zones in their area or areas are protected from erosion.
11. Have them visit a stream bank and determine health of stream by assessing erosion.

EXTENSIONS

1. Have students measure turbidity at a stream site in their area.

RESOURCES

Etgen, John, *Healthy Water, Healthy People, Water Quality Educators Guide*, 2003, The Watercourse, Bozeman, Montana 59717 - 0575

GLOSSARY

erosion - the group of natural processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is worn away from the earth's surface

penetrate - to enter into and permeate

sediment - fine soil or mineral particles, resulting often from the run-off from the land, which either settle to the bottom of a water body or are suspended in the water

turbidity - having sediment or foreign particles stirred up or suspended; muddy