

Subjects/Target Grades
Science and Social Studies
Grades 7-12

Duration/ Location
50-60 minutes
Classroom and outdoor setting

Materials

Per class

- Signs of Soil Erosion teacher resource

Per student

- Excess Sediment: What's the Problem? student activity page
- Signs of Runoff and Erosion at School student activity page

Lesson Two Explore: Managing Excess

Sediment- page 9 from lesson 2

Activity Overview

Students explore the effect of excess sediment in streams and rivers through the creation of a concept map and through an outdoor investigation to look for signs of erosion.

Lesson Procedure

- 1) Show the video on *Communities for Clean Water: Managing Excess Sediment*.
- 2) Follow up with a discussion and then using the *Excess Sediment: What's the Problem?* handout, have students create a concept map of the issues presented in the video and the handout.
- 3) Show students the *Signs of Soil Erosion* teacher resource as an illustration of the problem.
- 4) Using the *Signs of Runoff and Erosion at School* activity, take the class outside to the schoolyard and have students draw a map showing places where there are signs of **erosion** (see *Signs of Soil Erosion* teacher resource) as well as **impervious surfaces** (sidewalks, parking lots, buildings) where water can easily run off the surface instead of soaking into the ground.
- 5) Ask students where they think the water and eroded soil will go [*into storm drains, down a slope, to a body of water, etc.*] and does our schoolyard contribute to excess sediment pollution? [*answers vary*]

Vocabulary Terms

Erosion– the process by which sediments are transported by wind, water, ice, or gravity. Different from weathering, it is the active movement of these sediments from one place to another.

Impervious surfaces– areas where water runs off the surface instead of being absorbed into the ground

Signs of Soil Erosion

- Small rills or gullies beginning to show
- Buildup of silt in certain areas
- Bare spots on lawns or property
- Exposed roots of trees and vegetation
- Small stones or rocks becoming evident
- Soil splashed on windows and exterior walls
- Undercut and fallen trees in stream channels
- Widening and deepening of stream channels



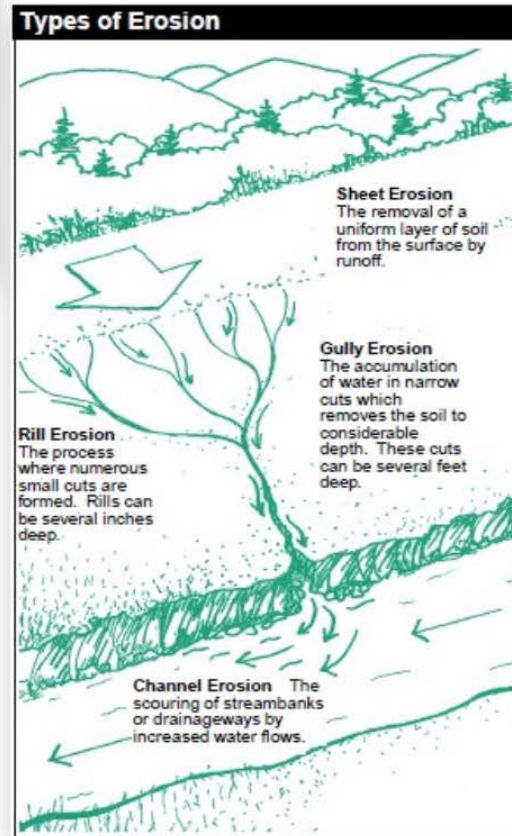
Macatawa River
M. Oudsema, AWRI



Unnamed ditch near 43rd street (Macatawa Watershed)
M. Oudsema, AWRI



Peter's Creek (Macatawa Watershed)
M. Oudsema, AWRI



Types of Erosion
<http://www.fairfaxcounty.gov/nvswcd/youyourland/soil.htm>

Excess Sediment: What's the Problem?

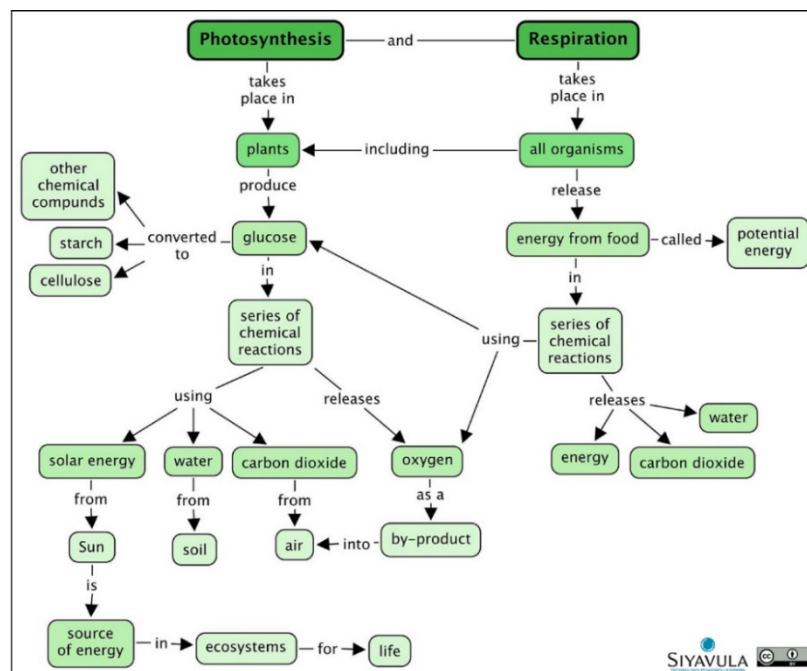
Your challenge: Draw a concept map that links these ideas together. The main topic of your concept map should be "sediment". Feel free to add illustrations to your thoughts.

Sediment entering local waterbodies through stormwater runoff degrades the quality of water for drinking, wildlife, and the land surrounding lakes and streams in the following ways:

- Sediment fills up storm drains and catch basins, potentially clogging them and impairing their ability to carry water away from roads and homes. This increases the potential for flooding.
- Water polluted with excess sediment becomes cloudy, making it more difficult for animals to see their food in the water.
- Murky water limits the ability for natural vegetation to grow in the water if it can't get enough sunlight.
- Excess sediment in stream beds disrupts the natural food chain by destroying the habitat where the smallest stream organisms live and causing massive declines in fish populations.
- Excess sediment increases the cost of treating drinking water and can result in odor and taste problems.
- Excess sediment can clog fish gills, reducing resistance to disease, lowering growth rates, and affecting fish egg and larvae development.
- Nutrients transported by sediment can activate large algae blooms, including cyanobacteria (blue-green algae) that release toxins and can make swimmers sick.
- Sediment deposits in rivers can alter the flow of water and reduce water depth, making navigation and recreational use more difficult.
- Pollutants such as dissolved metals and pathogens can attach to sediment and enter the water.

Source: What is Sediment Pollution, https://cfpub.epa.gov/npstbx/files/ksmo_sediment.pdf

This is an example of a concept map:



Chapter 1: Photosynthesis and Respiration

<http://www.mstworkbooks.co.za/downloads/Science-Grade-8A-English-Learners.pdf>

Signs of Runoff and Erosion at School

1. Make and label a map of your schoolyard showing the school building, parking lots, sidewalks, grass, trees, drains, ditches, etc. You might want to use an online aerial map of your schoolyard to help with this.
2. Go outside and look for areas where water **runs off** the surface instead of being absorbed into the ground. These would be impervious surfaces. Label these areas with an “**R**”.
3. Look for signs of **erosion** and label them with an “**E**”.
4. Use arrows to show where you think the water would flow in a rainstorm.

