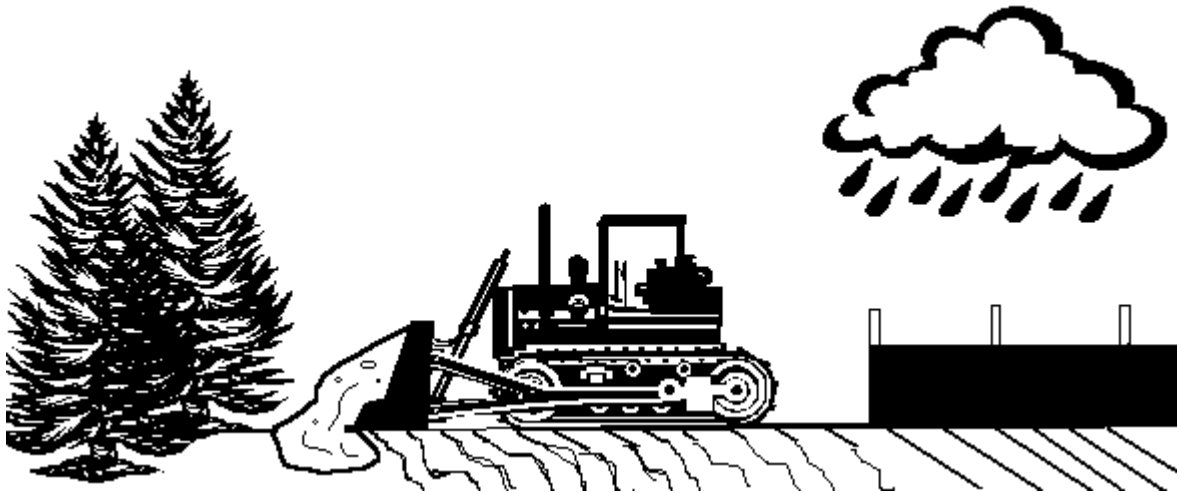


Erosion & Sediment Control Teacher Information Packet



NC DEQ – DEMLR – Land Quality Section

Teacher Packet Contents

Evaluation Form

What is Erosion and Sedimentation

- **Definitions**
- **What Can We Do About it?**
- **What Are Some Examples of Best Management Practices?**
- **What Does the Law Say?**
- **The Full Rules and Regulations**
- **Glossary of Terms**

Erosion and Sedimentation Word Match Activity - Answers

Jell-O Pudding Dirt Cup Recipe

Envirosnacks Recipe

EnviroScape Program Information Sheet

Other Resources

EVALUATION FORM

Teacher and Student Information Guides

Please take a few minutes to fill out this form and send it to the address below. Your constructive criticism will help us improve our educational material and provide you with a better product.

| | | | |
|---------------|------------------------------|---|--------------------------|
| Demographics: | Class/group size: | Grade or age of class/group: | |
| Word Scramble | Did you use it? Yes or No | Circle Rating Poor 1 2 3 4 5 Excellent | Additional Comments: |
| Jell-O Cups | Did you use it? Yes or No | Circle Rating Poor 1 2 3 4 5 Excellent | Additional Comments: |
| Envirosnacks | Did you use it? Yes or No | Circle Rating Poor 1 2 3 4 5 Excellent | Additional Comments: |
| | Overall Evaluation: | Circle Rating | Poor 1 2 3 4 5 Excellent |
| | Overall Comments: | | |

Email to the current Sediment Education Engineer/Specialist:

[DEQ DEMLR Contact Information](#)

Or mail to: Land Quality Section
1612 Mail Service Center
Raleigh, NC 27699-1612

WHAT IS EROSION AND SEDIMENTATION?

Definitions

Erosion is the detachment and movement of soil particles by wind, water, and gravity. Natural erosion (geologic erosion) is a process that occurs slowly over millions of years. Geologic erosion has shaped the landscape around us.

Accelerated erosion is NOT a natural process. Accelerated erosion occurs when more soil than usual is detached and moved by water or some other force and is caused by land disturbing activities such as the construction of roads and buildings, commercial forestry, agriculture, and surface mining. These activities leave the land free of vegetation. Accelerated erosion strips the land of its topsoil, decreasing soil productivity and causing sedimentation in our lakes and rivers.

Sedimentation is the process by which eroded soil is deposited into our lakes and streams. Sediment can accumulate in the bottom of lakes, streams, estuaries, and nursery areas. It can smother fish habitats vital to reproduction and destroy aquatic insects that fish feed upon.

Sediment fills our rivers, lakes, and streams, decreasing their storage volume and increasing the frequency of floods and the damage caused by flooding. Sediment in our waters increases the costs of power production; this cost is passed on to you and me.

Sediment suspended in the water also increases the cost of treating municipal drinking water supplies. Sediment restricts the amount of sunlight reaching aquatic plants, reducing the amount of dissolved oxygen in our waters. Sediment degrades the beauty of our waters by increasing the cloudiness of the water.



What Can We Do About it?

Accelerated **erosion and sedimentation** primarily result from agriculture, forestry, and construction practices. These activities clear the land of vegetation and expose the soil surface so that it is more easily eroded. However, we all benefit from these three activities. How can we protect our land, rivers, lakes, and streams from the damage caused by erosion and sedimentation?

We can control erosion and sedimentation from construction, forestry, and agriculture by using Best Management Practices (BMPs). BMPs are practices that either prevent erosion from happening or keep eroded sediment from entering rivers, lakes, and streams. By using best management practices, we can greatly reduce the amount of sediment entering our rivers, lakes, and streams. BMPs allow us to continue activities such as farming, forestry, and construction while protecting the quality of the water around us.

What Are Some Examples of Best Management Practices?

- Agriculture:
- No till or conservation tillage practices.
 - Leaving crop residue on fallow fields.
 - Strip cropping, contour farming, and use of terraces.
 - Taking land on steep topography out of production.
 - Use of natural buffer zones around rivers, lakes, and streams.
- Forestry:
- Natural Buffer Areas Around Rivers, Lakes and Streams
 - Replant Vegetation on Disturbed Areas
 - Mulching
 - Control Runoff on Forestry Roads and Other Affected Areas
- Construction:
- Use of Temporary Ground Cover
 - Leave Natural Buffer Zones
 - Limit Time of Exposure
 - Use of Phased Grading Plans
 - Control Rates of Runoff
 - Use Devices Such as Sediment Basins, Rock Dams, and Sediment Traps

What Does the Law Say?

Sediment Control in North Carolina is governed by the Sedimentation Pollution Control Act of 1973. The Act requires anyone involved in a land disturbing activity of one acre or more to submit an erosion and sediment control plan to the Land Quality Section of the North Carolina Department of Environmental Quality.

The erosion and sediment control plan must be submitted to the Land Quality Section at least 30 days before the land disturbing activity begins and must be approved before beginning the activity. The Act exempts land disturbing activities for forestry if the logging activity follows forestry BMPs adopted by the Department of Environmental Quality. Mine sites permitted under the Mining Act of 1971 are exempt since an erosion and sediment control plan is required by Mining permits. Agriculture also is exempt under the Act.

The Sedimentation Pollution Control Act has a few limitations as to what goes into a plan. The approved plan must control sediment and keep it from leaving the site. This allows for effective technical innovations in erosion and sediment control and may also help lower the cost of erosion and sediment control.

The Act has 5 mandatory standards.

1. Buffer zones along streams or rivers must be sufficient to control visible siltation within the first 25% of the buffer zone closest to the land disturbing activity. There must also be a 25-foot minimum width buffer along trout waters.
2. Groundcover must be established on exposed slopes within 21 calendar days after completion of any phase of grading.
3. Permanent groundcover must be established within 15 working days or 90 calendar days of completion of the project, whichever is shorter, and measures must be provided to keep sediment on site.
4. Any land disturbing activity of one acre or more must have an approved erosion and sediment control plan.
5. Any land disturbing activity must be done in accordance with the approved erosion and sediment control plan.

The Full Rules and Regulations

[Sedimentation Pollution Control Act of 1973](#) [North Carolina General Statutes Chapter 113A Article 4](#)

The Sedimentation Pollution Control Act (SPCA) is the enabling legislation that gives authority to the Sedimentation Control Commission (SCC) and the Land Quality Section. It 'sets the stage'.

[Sedimentation Control](#) [Chapter 4 of Title 15A of the North Carolina Administrative Code \(T15A.04\)](#)

The NC Administrative Code (*Code*) provides the administrative overview of how the SCC and Land Quality enforce the Act. It provides the 'how to'.

Glossary of Terms

- Accelerated Erosion:** Erosion that occurs more rapidly than natural geological erosion: the result of farming, forestry, and land grading for construction.
- BMPs:** Best Management Practices: Practices or measures that allow us to protect water quality from pollutants such as sediment while still continuing activities such as construction, forestry, and agriculture.
- Buffer Zone:** Strips of natural areas such as forest or grasses between a body of water and a land disturbing activity such as agriculture, construction, or forestry.
- Dissolved Oxygen:** The amount of oxygen dissolved in a specific volume of water. Sufficient amounts of dissolved oxygen are important to the survival of fish and other aquatic organisms. The turbidity caused by sediment suspended in the water restrict sunlight to aquatic plants thereby reducing the dissolved oxygen in the water.
- Erosion:** Detachment and movement of soil or rock by water, wind, ice, or gravity.
- Estuary:** A body of water where a freshwater river or stream empties into the sea. Estuaries are important breeding grounds for many types of fish but are damaged by the accumulation of

sediments due to accelerated erosion.

- Geological Erosion:** Wearing away of the earth's surface by water, ice, or other natural agents under environmental conditions of climate, vegetation, and topography undisturbed by man.
- Nonpoint Source Pollution:** Pollution that is washed into rivers, lakes, and streams from runoff during rainfall events. Sediment is the largest nonpoint source pollutant.
- Point Source Pollution:** Water pollution that is introduced into rivers, lakes, or streams directly from a single source, such as a pipe.
- Pollutant:** Any substance that reduces the quality of biological habitats. Sediment is a pollutant of water.
- Pollution:** Any physical, chemical, or biological change that adversely affects the health, survival, or activities of living organisms or alters the environment in undesirable ways.
- Sediment:** Solid particulate matter, mineral or organic, that has been or is being moved by water, air, gravity, or ice from its origin. Sediment typically consists of clay, silt or sand-sized particles.
- Sedimentation:** The process by which soils that have been washed into rivers, lakes, and streams, or onto the land surface are deposited.
- Topsoil:** The upper layer of soil. This layer holds most of a soil's nutrients and is the most productive layer of soil. Topsoil is the layer of soil that is usually lost due to accelerated erosion.
- Turbidity:** The "cloudiness" or discoloration of a body of water. Turbidity is caused by the suspension of solid particles such as clays in rivers, lakes, and streams.
- Vegetation:** The plants that cover the land surface. Vegetation helps protect soil from erosion by preventing direct effect of rainfall on soil and holding onto soil with its roots.
- Watershed:** The land area that drains into a stream, river, or lake. A large river may have a watershed that encompasses many smaller watersheds.



Erosion & Sedimentation



Directions: Unscramble the jumbled letters on the right, and write the correct word in the blank.



Words

1. **Runoff** _____
2. **Erosion** _____
3. **Muddy Water** _____
4. **Watershed** _____
5. **Sediment** _____
6. **Grass** _____
7. **Pollution** _____
8. **Waterbody** _____
9. **Silt Fence** _____
10. **Land** _____

Unscramble These Words

- NFUFOR
- ROEONSI
- DYUMD TWREA
- DSAWEETRH
- DIMTENSE
- SAGRS
- LUTNLOOIP
- BAWYDERTO
- TISL CEFNE
- ANLD



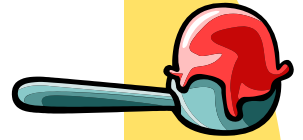
Jell-O Pudding Dirt Cups

Ingredients Needed:

| | |
|-----------------|--|
| 2 cups | Cold Milk |
| 1 pkg. (16 oz.) | Chocolate Sandwich Cookies, crushed (Oreo Cookies will also work) |
| 1 pkg. | Jell-O Chocolate Flavor Instant Pudding |
| 1 tub (8 oz.) | Cool Whip Topping |
| 8-10 (7 oz.) | Plastic Cups |
| 1 | Large Bowl with Lid |
| 1 | Small Bowl for crushing cookies |

Recipe Directions:

1. Pour pudding mix into large bowl, and add milk. Stir until blended and then put lid on bowl and shake vigorously 2-3 minutes until well-mixed and thickened. Allow to sit for 5 minutes.
2. While pudding is setting up, put cookies in the second bowl and crush with a spoon.
3. Stir Cool Whip and half of the cookies into the pudding.
4. Spoon 1 tbsp. of cookies in the dessert cups. Fill cups $\frac{3}{4}$ full with pudding mixture. Top each cup with remaining cookies.
5. Refrigerate for 1 hour
6. Decorate with gummy worms, frogs, candy flowers, or chopped nuts.
7. EAT AND ENJOY!!!!!!!!!!



ENVIROSNACKS

The perfect choice for the environmentally conscious classroom.

Excellent activity for the elementary grades.

Older kids like them too!

Ingredients:

| | |
|--|----------------------|
| Chocolate graham crackers | Soil |
| White spreadable cake frosting | Adhesive agent |
| Chocolate kisses (2 or 3 per student) | Mountains |
| Chocolate chips | Hills |
| Green sprinkles | Grassland |
| Green tree nonpareils (evergreen shape) | Forests |
| Tube of blue cake icing (no gel) | Lakes and Streams |
| Small marshmallows or cool whip | Clouds/Precipitation |

Directions:

1. Assemble the envirosnack by spreading frosting on a full size cracker.
2. Add hills and mountains as desired.
3. Sprinkle with green grassland sugar crystals.
4. Place the evergreen nonpareils to create a forest area.
5. Add blue icing to form mountain waterfalls, rivers, and lakes. (Make sure to use cake icing and not gel.) The instructor may want to control application of the blue icing as it is the most expensive ingredient. (Another choice would be to use blue sugar sprinkles in place of the blue icing.)
6. Add clouds according to personal preference - perhaps surrounding the mountains, creating precipitation that ends up as a lovely mountain stream. (Whipped topping could be used instead of marshmallows, but would require refrigeration.)

NOW EAT YOUR ENVIROSNACK AND ENJOY!!

EnviroScape® Program



EnviroScape® model used for presentations

EnviroScape® is a series of interactive, portable models that dramatically demonstrate water pollution – and its prevention. EnviroScape® programs communicate to people of all ages that we share responsibilities in preventing water pollution.

EnviroScapes® are engaging and effective in creating a real sense of understanding through experience and hands-on demonstration. This makes complex issues much clearer and helps people see how to prevent water pollution in their own communities.

The three-dimensional landscapes illustrate residential, recreational, agricultural, industrial and transportation areas – all representing possible sources of water pollution. The use of loose soil (cocoa) promotes learning by demonstrating how human actions throughout a community affect our water quality.

EnviroScape® actually emphasizes pollution prevention with a follow-up demonstration that shows how to prevent such pollution through the use of best management practices.

In addition to being successfully used with students from Kindergarten through 12th grade, EnviroScape® is also used by universities, soil and water conservation districts, city governments, utility companies, consultants as well as civic and environmental groups around the world.

For additional information on the sediment education program visit our website:

[DEQ DEMLR Erosion & Sediment Control](#)

Or contact the current Sediment Education Engineer/Specialist:

[DEQ DEMLR Contact Information](#)

Other Resources:

North Carolina Department of Environmental Quality:

<https://deq.nc.gov/>

North Carolina Division of Soil and Water Conservation:

<http://www.ncagr.gov/SWC/>

North Carolina Forest Service:

<http://www.ncforestservice.gov/>

United States Environmental Protection Agency:

<http://www.epa.gov/>

US EPA – Polluted Runoff: Nonpoint Source Pollution:

<https://www.epa.gov/nps>

United States Department of Agriculture - Natural Resources Conservation Service:

<http://www.nrcs.usda.gov/>

North Carolina Office - Natural Resources Conservation Service:

<http://www.nc.nrcs.usda.gov/>

For Additional Information on Erosion and Sedimentation Control,

Visit NC Department of Environmental Quality Website:

[NC DEQ Erosion and Sediment Control](#)

Or contact the current Sediment Education Engineer/Specialist:

[DEQ DEMLR Contact Information](#)

Sediment Education Engineer/Specialist

Land Quality Section

1612 Mail Service Center

Raleigh, NC 27699-1612
