

UNDERSTANDING SOIL EROSION

KEY OBJECTIVES

1. Compare the amount of soil that erodes under different scenarios- when it is left barren, when it is mulched and when it has plants growing in it
2. Reflect on the importance of protecting the green cover of our planet
3. Understand the role of mulch and plant/ tree roots in maintaining top soil.
4. Explore some of the human activities that can impact soil erosion.

INTRODUCTION

Soil is the foundation of basic ecosystem function. Soil filters our water, provides essential nutrients to our forests and crops and helps regulate the earth's temperature as well as many of the important greenhouse gases. We build with soil and on soil, it provides habitat for most of the organisms on earth.

Soil erosion is a natural process in which the nutrient rich top soil of a field is carried away due to the effects of forces such as wind, water and farming practices. Losing this layer will make the area useless to farmers and native plants.

In this experiment, we are simulating 3 different scenarios - the effect of water flow on plain soil, mulched soil and soil with plants growing on it. It will demonstrate effectively the role that green cover plays in limiting soil erosion. The sediments collected in our water bodies due to soil erosion and its detrimental impact on aquatic life can also be understood.

GUIDING QUESTIONS

1. Why do we need soil?
2. What happens when soil gets eroded? Who gets affected? (Discuss the impact on land and aquatic life)
3. What is mulching the soil? What are its benefits? (Water retention and temperature moderation)
4. Can you guess what the water collected in the cups will look like? Why do you think so?
5. Why did the cup attached to the bottle with plants look less muddy?

MATERIALS/ PREPARATION

- 6 empty plastic bottles (preferably similar sized)
- 1 piece of wood/cardboard (large enough to fit 3 bottles lying side by side)
- Glue to stick bottle to the wood/cardboard
- String
- Soil (enough to fill bottles)
- Compost
- 4-6 small plants (any type)
- Mulch (dead leaves, sticks, tree bark etc)
- Water

CONNECTION TO SDGS



TOPICS

GEOGRAPHY DESIGN

CROSS LINKS

Environmental Degradation, Flooding, Clogged water bodies

KEYWORDS

EROSION SEDIMENTS TOP SOIL MULCH
GREEN COVER CONSERVATION

LEVEL

Primary/Secondary

RESOURCE TYPE

EXPERIMENT

INTENDED AUDIENCE SIZE

50

MODE OF DELIVERY

Small group, Live online

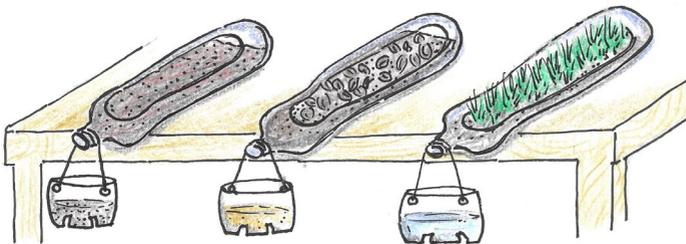
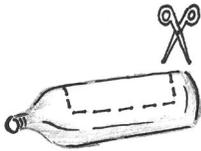
TIME FOR ACTIVITY

60 minutes

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TASK & PROCEDURE

- Observe the soil you have got for the experiment and discuss its possible uses.
- Cut a rectangular hole in 3 of the plastic bottles along the side of the bottle (you can mark with a permanent marker before cutting it).
- Stick these 3 bottles to the wood/cardboard piece making sure that the necks of the bottles protrude a little over the edge of the board (refer picture).
- Fill the first bottle with plain garden soil and the other 2 with a soil and compost mixture. Press down firmly to compact it. In case compost is not available, all 3 can be filled with garden soil.
- Leave the first bottle as it is.
- Cover the top of the second bottle with mulch (tree bark, dead leaves, sticks etc)
- Plant your seedlings in the 3rd bottle. Make sure you plant them tightly together and press down the soil firmly.
- Cut the other 3 bottles in half, horizontally. Retain the bottom half (refer picture)
- Make 2 small holes near the cut side of each bottle.
- Cut 3 pieces of string, put one through each hole and tie it to form a bottle bucket.
- Hang them over the necks of each of the 3 bottles that are stuck to the wood/cardboard.
- Make it rain! Slowly pour equal amounts of water into each of the bottles, at the end furthest from the neck of the bottle.
- Does the water flow through the bottles at the same speed, how do they differ?
- Observe the colour of the water collecting in the cups! The water in the first cup is really dirty, the water from the second and third cups are much cleaner.
- You can add water to the bottles everyday and see what happens to the soil over a week. Make observations and find out why plants are important to our environment.



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FOSTERING DISCUSSION

Would you agree that plants and trees are like the glue that holds soil together?

What are some human activities that contribute to soil erosion (Agricultural practices, Grazing, Logging and Mining, Construction etc)

Have you heard about seed balls/ earth balls?

Get together with your friends to make seed balls and disperse them in areas nearby that could benefit from a green cover.

POSSIBLE EXTENSIONS

What happens when you use different kinds of plants, types of soil, wet/ dry soil?

A simple jar test with soil and water can help identify the type of soil - clay, sand or silt.

Investigate whether the type of soil makes a difference to soil erosion.

Look up different types of soil erosion due to water (Sheet, Rill, and Gully)

Visit an agricultural farm, understand their practices and soil conservation measures. Are they sustainable?

RESOURCE LINKS FOR THE FACILITATOR

<https://courses.lumenlearning.com/geo/chapter/reading-causes-of-soil-erosion/>

<https://www.worldwildlife.org/threats/soil-erosion-and-degradation>

<https://sciencing.com/effects-soil-erosion-8483288.html>

AUTHOR

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