

Biosphere Explorers

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Soil and Water Erosion
Discussion Sheet

Q. What is soil & how is it formed?

A: "The upper layer of earth in which plants grow, typically consisting of a mixture of organic remains, clay, and rock particles." - Oxford Languages

Q. Why is soil so important?

A: Soil takes so long to form and so is a very precious resource. We need it to grow food and other organic materials like cotton or timber, filter water, prevent flooding, and act as a habitat and growth medium for many species on which our ecosystem and food webs depend on. Without soil, humans and most land animals would not survive.

Q. Where would we find bare soil?

A: In areas where humans have altered the soil - for example, farmers, foresters, construction areas, overused paths, and possibly gardens.

Q. How is water erosion affecting these areas of soil?

A: As seen in the experiment, water erosion causes soil to be lost, especially if the soil is bare. This reduces nutrients and overall soil health, and can impact on the organisms in the soil and downstream water quality and wildlife.



Discussion Cont.

Q. What can we, or our farmers/foresters, etc., do to prevent soil erosion?

A: We can keep our gardens intact with as few impenetrable surfaces and bare soil areas as possible. Foresters can fell sections of forest rather than all at once, and leave a buffer area of standing trees around water courses. Farmers can use cover crops and reduce grazing intensity (by decreasing number of cattle or sheep).

Q. How is climate change affecting how water erosion impacts our soils?

A: In Scotland, we're getting more rain but also more droughts. This means we have longer periods of dry weather, and then a lot of rain all at once. Wind, flash floods, and storm events can also affect our soils.

Q. What flaws does this experiment have and how can they be improved on?

A: If compost was used, this may interact with water differently than true soil. In addition, a real world process has been simplified for this experiment and that introduces differences between our results and how the real world acts.

Q. What strengths does our experiment have?

A: Our experiment had only one variable (the soil composition), and - if multiple groups did this experiment - was repeated several times. This makes our results more valid.

Q. What other variables could we introduce into our extension activities?

A: We can change the angle of the bottles (representing slopes) or the speed at which we pour water into the samples (representing flash flooding).

This experiment is from our Biosphere Explorers project, which aims to connect young people with nature and the biosphere.

Visit carboncentre.org/biosphere-explorers for more learning material.

