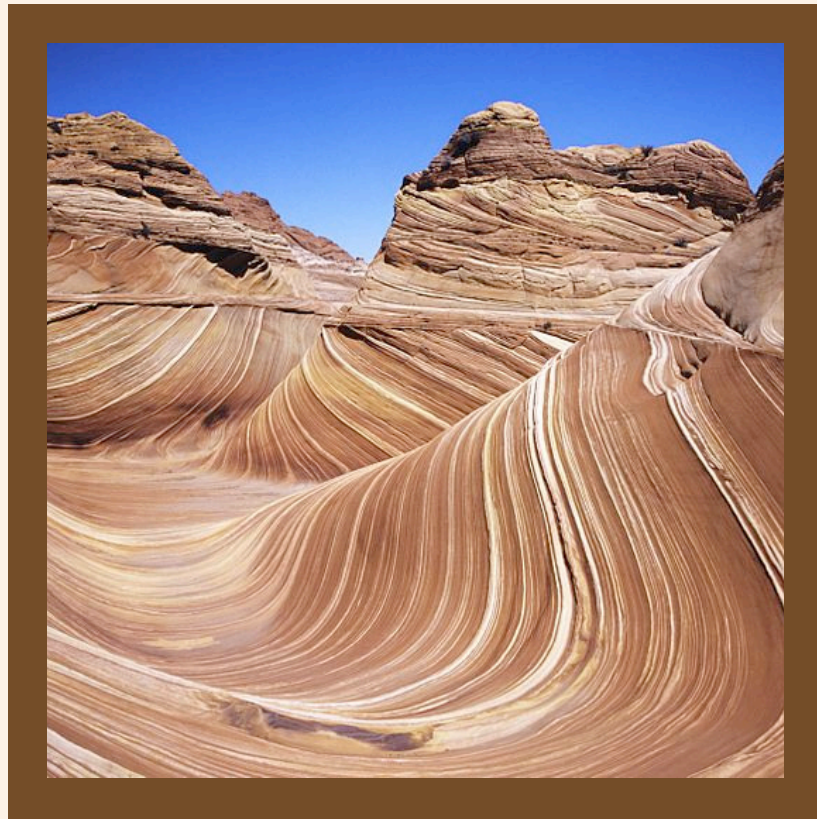


STEM *Sims*™

Erosion Control



Erosion Control

Do you need an idea for a scientific study?

Try out one of our ideas or make one of your own.

Start learning right now about the different elements of erosion. Take the following brief quiz to see how much you already know about erosion control. See the bottom of page 4 to check your answers.

1. How much rock has eroded at Niagara Falls in the last 12,500 years?
 - a. seven inches
 - b. seven feet
 - c. seven yards
 - d. seven miles
2. For at least how long has the Colorado River been eroding the Grand Canyon?
 - a. 5000 years
 - b. 300,000 years
 - c. 6,000,000 years
 - d. 2,000,000,000 years
3. How many people visit the wind-eroded landform “The Wave” in Arizona daily?
 - a. 20
 - b. 200
 - c. 2,000
 - d. 200,000
4. Which of the following is **NOT** a type of erosion control?
 - a. terracing
 - b. exfoliation
 - c. shelterbelts
 - d. retaining walls
5. Which human activity is the worst in terms of increasing erosion?
 - a. climate change
 - b. deforestation
 - c. urbanization
 - d. unsustainable agricultural practices



Sandy Erosion

Rainfall is one of the many ways in which land can be eroded. To learn more about erosion, try this hands-on experiment!

Supplies Needed:

- three plastic (food storage) containers
- three cups of sand
- a foam cup
- a safety pin
- a tissue
- water
- camera (optional for before and after pictures)



Instructions:

1. Pour one cup of sand into each plastic container.
2. In container 1, shape the sand into a mountain.
3. In container 2, shape the sand into a mountain and gently use the tissue to cover the sand.
4. In container 3, evenly cover the bottom of the container with a layer of sand.
5. Take “before” pictures (optional) and predict what will happen when it “rains” on the “sand mountains.”
6. Poke several small pin holes in your foam cup.
7. Use your hand to hold to cover the holes in the bottom of the cup and fill the cup halfway with water.
8. Observe what happens as you move your hand and the cup to a foot above container 1 and let the water drizzle on the sand until the cup is empty.
9. Take an “after” picture.
10. Repeat steps 7-9 for containers 2 and 3.

Questions:

1. Which container showed the most erosion? the least?
2. What type of erosion control did the tissue emulate?
3. What would have happened if you used sugar instead of sand? Why?

Erosion Control

So Erosional 🎵

Sun, wind, rain, rivers, floods, and gravity can all cause erosion by wearing down the surface of rocks and soil. Unfortunately, a lot of things humans do aid erosion along rather than slow it down. The chemicals in the fertilizer and the pesticides used today break down soil. Over-tilling the land makes soil particularly prone to rainfall and wind erosion. Chopping down trees also leads to erosion. The trees act as windbreakers and the leaf detritus on the ground slows down the erosion of the soil from rainfall; so when the trees are gone, the soil is vulnerable to the elements. Building roads requires changes in the natural flow of water, the cutting of trees, and the covering of soil with asphalt, all disrupting the natural biosphere. Climate change due to increased carbon dioxide

levels and consequent temperature rises has affected the water cycle, making precipitation more severe. The melting of glaciers has contributed to a rise in sea levels, which increases coastal erosion as well.

There are measures that can be taken to control and reduce erosion. To protect soil and low vegetation, trees can be planted around the perimeter to form a windbreak, or shelterbelt. Conservation tillage (as seen in the picture to the left) is a method where 30% of the crop is left untilled on the soil to act as a buffer. Terracing, a form of landscaping that looks like bleacher steps made out of grass, decreases erosion. Riprap, another form of erosion control, uses large rocks and stones to protect the coastline from water erosion. One of the best and oldest methods of soil erosion control is crop rotation. Even as far back as 6000 B.C. in the Middle East, farmers planted multiple types of plants in offset cycles on one plot of land. This variety was beneficial because it prevented pathogen buildup, did not deplete nitrogen soil content, and improved soil structure.



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Answers: Page 2 Answers: 1) d. 2) c. 3) a. The Bureau of Land Management will only issue 20 permits per day. 4) b. Exfoliation is a type of erosion, not erosion control. 5) a. Page 3 Answers: 1) Container 1 eroded most, Container 3, least 2) shelterbelt 3) the sugar would have formed a solution because sugar is hydrophilic, while sand is hydrophobic. Everything would have eroded.

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