Water Erosion and Deposition:
How do certain factors affect the erosion of soil by water?

Water erosion is the process by which water wears away Earth’s surface materials and moves them from one location to another. When rain falls it soaks into the ground, evaporates, or becomes runoff. Runoff is the major cause of water erosion. Factors that affect runoff include the amount of rain, the time span over which rain falls, the slope of the land, and the amount of vegetation on the land. The effects of erosion may be immediate, or they may take years to become apparent. There are different types of water erosion. Rill erosion begins when a small stream forms during a heavy rain. The stream carries away vegetation and soil. If a stream frequently flows along the same channel, rill erosion can evolve into gully erosion. In gully erosion, rill channels become wider and deeper gullies.

Water can also erode without forming a channel. For example, when rain falls on a flat area, water accumulates and loosens and displaces surface soil. Sheet erosion occurs when large amounts of water flow along the surface from higher to lower elevations, washing away layers of soil.

Thousands of acres of farmland are destroyed by erosion each year. Embankments surrounding and supporting roads and buildings are also eroding. Precautions that can reduce these losses include terracing a hillside and planting vegetation to prevent the topsoil from washing away in heavy rain. Managed properly, soil is a renewable resource on which crops can be grown and structures built.

In this Virtual Lab you will measure the amount of sediment collected from water runoff to compare the effects of three variables on water erosion.

Objectives:
- Identify some of the factors that affect the erosion of soil by water.
- Compare the influence of different combinations of factors on the erosion of soil by water.

Procedure:

1. Make a hypothesis about how variables such as the slope of the soil, the presence or absence of vegetation, and the intensity of rain affect the erosion of soil by water. State your hypothesis:

2. To test your hypothesis, you will choose settings for each variable and measure the amount of sediment in the runoff from a rainfall. First, choose the slope of the embankment by dragging the diagonal arm of the angle to 10 degree or 30 degree. Record in the Table the slope gradient.

3. Choose whether or not the embankment has vegetation by clicking Yes or No. Record in the Table (on the next page) the presence or absence of vegetation.

4. Choose the intensity of the rainfall by clicking Low or High. Record in the Table the intensity of rain.

5. Click the Rain button. Observe the erosion caused by rain.

6. Drag the beaker to the runoff. Record in the Table the amount of sediment (Low, Medium, or High) in the runoff.

7. Click the Reset button. Repeat the experiment using different variable settings.

8. After all possible combinations of the three variables have been tested, draw your conclusions. Complete the Journal questions on the next page.
## Water Erosion and Deposition: Journal Questions

**Make a hypothesis.** Predict how the amount of water erosion that occurs on a slope will be affected by variations in the slope gradient, presence of absence of vegetation, and rain intensity.

**Hypothesis:**
Test your hypothesis.
- What **data** will you record?
- Which of the **variables** you will adjust and when.

**Analyze the results of your experiment.**

1. Explain any patterns you observed.

2. Did the results of your experiment support your hypothesis? Why or why not?

**Draw a conclusion.**

1. How did the slope gradient, presence or absence of vegetation, and rain intensity relate to the amount of water erosion that occurred on the slope?

2. Which variable do you think has the strongest influence on the amount of water erosion that occurs on a slope? Why?

3. What are some other factors that might influence erosion?

4. What would happen if the angle of the slope was increased to an angle steeper than 30 degrees? What would happen if amount of vegetation were cut by 50 percent?

### Data Table

<table>
<thead>
<tr>
<th>Slope Gradient (degrees)</th>
<th>Vegetation?</th>
<th>Rain Intensity</th>
<th>Sediment Level</th>
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