

# Testing Erosion Variables

Week 25 — Monday | What Makes Erosion Stronger or Weaker?

## Reading Time

Not all erosion is the same. Some areas of Earth experience very rapid erosion, while other areas stay mostly unchanged for thousands of years. Scientists study **erosion variables** to understand what makes erosion stronger or weaker. An erosion variable is a factor that changes how much soil or rock gets moved away. The three most important variables are **water speed**, **vegetation cover**, and **land slope**.

**Water speed** has a huge effect on erosion. Slow, gentle water like a light drizzle or a calm stream can move only tiny particles of soil. Fast-moving water like a flash flood or a rushing river has much more energy and can carry away larger rocks, gravel, and even small trees. The faster the water flows, the more soil it can pick up and transport. This is why areas that experience heavy rainfall see much more erosion than areas with steady, gentle rain.

**Vegetation cover** protects the ground from erosion in several ways. Plant leaves and stems slow down raindrops before they hit the soil, reducing the force that knocks soil particles loose. Plant roots grow deep into the ground and weave together like a net, holding the soil firmly in place. Without vegetation, rain and wind can strip the soil away very quickly. This is why deforested areas and areas that have been plowed for farming are much more vulnerable to erosion than forests or grasslands.

**Land slope** (how steep the ground is) also matters a great deal. On flat land, water spreads out and moves slowly, causing very little erosion. On a steep hillside, water rushes downhill with great force, picking up soil and carrying it rapidly to the bottom. The steeper the slope, the faster the water runs, and the more erosion occurs. Scientists and engineers study all three variables together to design ways to prevent erosion in places where people live and farm.

## Reading Questions

1. What are the three most important erosion variables?

2. How does water speed affect the amount of erosion?

3. Explain two ways that vegetation protects soil from erosion.

4. Describe how land slope affects water flow and erosion. Compare flat land with a steep hillside.

## Vocabulary Grid

Write a definition or draw a picture for each word.



**Water Speed**



**Vegetation Cover**



**Land Slope**



**Flash Flood**



**Deforested**



**Variable**

## Which Variable Changed?

Read each scenario. Write WS for water speed, VC for vegetation cover, or LS for land slope.

| Scenario                                                         | Variable? |
|------------------------------------------------------------------|-----------|
| A hillside has more erosion after all the trees are cut down.    |           |
| A river moves more soil during a storm than during calm weather. |           |
| Farmers notice more soil washing away on steeper fields.         |           |
| A garden with grass has less erosion than a bare dirt path.      |           |
| A mountain stream causes more erosion than a flat lake.          |           |
| Heavy rain creates more erosion than a light drizzle.            |           |

## Comparing Erosion Variables

Fill in the chart showing how each variable affects erosion.

| Variable               | More of This = More Erosion? | Less of This = Less Erosion? |
|------------------------|------------------------------|------------------------------|
| Water Speed            |                              |                              |
| Vegetation Cover       |                              |                              |
| Land Slope (steepness) |                              |                              |

## Draw the Variables

Draw a steep hillside and a flat field. Show which one would have more erosion and why.

*Steep hillside — draw what happens during heavy rain.*

*Flat field — draw what happens during heavy rain.*

## Think About It

A farmer wants to protect their soil from erosion. Based on the three variables, what are three things the farmer could do? Explain your reasoning for each one.

## ✓ True or False — Circle Your Answer

- ☐ 1. Fast-moving water causes more erosion than slow-moving water.
- ☐ 2. Vegetation cover increases erosion by blocking sunlight.
- ☐ 3. Steep hillsides experience more erosion than flat land.
- ☐ 4. Plant roots hold soil together like a net.
- ☐ 5. A variable is something that stays the same during an experiment.
- ☐ 6. Deforested areas are less vulnerable to erosion than forests.
- ☐ 7. Flash floods can carry away large rocks and trees.
- ☐ 8. Plant leaves slow down raindrops before they hit the soil.

## Fill in the Blanks

**Word Bank:** water speed vegetation cover land slope flash flood deforested variable erosion sediment

- 1. A factor that changes the amount of erosion is called a \_\_\_\_\_.
- 2. The faster the \_\_\_\_\_, the more soil gets carried away.
- 3. Plants and grass that protect the ground are called \_\_\_\_\_.
- 4. How steep the ground is called its \_\_\_\_\_.
- 5. A sudden rush of water after heavy rain is a \_\_\_\_\_.
- 6. An area where trees have been cut down is \_\_\_\_\_.
- 7. The movement of soil and rock from one place to another is \_\_\_\_\_.
- 8. Small pieces of weathered rock carried by water are \_\_\_\_\_.

## Observe Erosion Variables Around You

**Look around your neighborhood. Can you find examples of erosion variables in action?**

| Where You Looked                      | Which Variable Did You Notice? |
|---------------------------------------|--------------------------------|
| A roadside ditch or culvert           |                                |
| A grassy lawn versus a bare dirt area |                                |
| A steep hill versus a flat sidewalk   |                                |
| Any other location                    |                                |

## Think About It

**Imagine two identical hillsides. One has thick forest cover and the other has been cleared of all trees. A heavy rainstorm hits both hillsides. Describe what happens to each hillside and explain why the results are different.**

---

---

---