🧪 Testing Erosion Variables Experiment

Week 25 — Wednesday | Comparing How Different Factors Change Erosion

📖 Reading Time

Last week you built an erosion tray and saw how water and wind move soil. Today you will go further by testing **specific erosion variables** one at a time. This is called a **controlled experiment**. In a controlled experiment, you change only one variable while keeping everything else the same. This way you can tell exactly which variable caused the difference in your results.

You will run three different tests. In the first test, you will compare **water speed** by pouring water slowly and then pouring it quickly on the same bare soil hillside. In the second test, you will compare **vegetation cover** by spraying water on bare soil and then on soil covered with grass clippings or small twigs. In the third test, you will compare **land slope** by pouring water on a gentle slope and then on a steep slope. For each test you will observe how much soil moves and where the sediment collects.

Scientists who study erosion use the same approach. Environmental researchers test different variables to understand how to protect farmland, prevent landslides, and design better drainage systems. Civil engineers use this knowledge to build roads, bridges, and dams that do not cause extra erosion downstream. By doing this experiment, you are practicing the same kind of science that professionals use to solve real world problems.

✏️ Reading Questions

1. What is a controlled experiment?

2. Why is it important to change only one variable at a time?

3. What three variables will you test in today's experiment?

4. Explain how the knowledge you gain from this experiment could help engineers and farmers in the real world.

📝 Vocabulary Grid

Write a definition or draw a picture for each word.

🔬 **Controlled Experiment**	⚙️ **Variable**
📋 **Hypothesis**	📊 **Data**
✅ **Conclusion**	🏗️ **Civil Engineer**

🧪 Your Erosion Variable Tests

Materials: A shallow tray or baking pan, dirt or sand, water, a spray bottle and a cup, grass clippings or small twigs, paper towels for cleanup.
Setup: Build a small hill in your tray. You will reshape it between tests. Keep a notebook ready to record your observations.

Before you start: Write your predictions. What do you think will happen in each test?

📋 Test 1: Water Speed

Test	What You Did	How Much Soil Moved?	Sediment Location
Slow water on bare soil	Spray gently		
Fast water on bare soil	Pour quickly from a cup		

📋 Test 2: Vegetation Cover

Test	What You Did	How Much Soil Moved?	Sediment Location
Water on bare soil	Pour water evenly		
Water on soil with grass/twigs	Pour water evenly on planted area		

📋 Test 3: Land Slope

Test	What You Did	How Much Soil Moved?	Sediment Location
Gentle slope	Build a low hill, pour water		
Steep slope	Build a tall hill, pour water		

📊 Experiment Results Analysis

1. In Test 1, did fast water or slow water cause more erosion? Describe what you observed.

2. In Test 2, did the vegetation cover protect the soil? Describe what you observed.

3. In Test 3, did the steep slope or gentle slope cause more erosion? Describe what you observed.

4. Were your predictions correct? For each test, explain whether your results matched what you expected and why.

✅ True or False — Circle Your Answer

- **1.** In a controlled experiment you change only one variable at a time.
- **2.** Fast water causes less erosion than slow water.
- **3.** Vegetation cover helps protect soil from erosion.
- **4.** Steep slopes cause less erosion than gentle slopes.
- **5.** A hypothesis is a prediction made before the experiment.
- **6.** Sediment is soil that has been moved by erosion.
- **7.** Civil engineers use erosion knowledge to design roads and dams.
- **8.** Data is information collected during an experiment.

✏️ Fill in the Blanks

Word Bank: controlled experiment | variable | hypothesis | data | conclusion | vegetation cover | land slope | water speed

1. An experiment where you change only one factor at a time is a _____.
2. A factor that you test in an experiment is a _____.
3. A prediction made before an experiment is a _____.
4. Information you collect during an experiment is _____.
5. Your final explanation after an experiment is a _____.
6. Plants that protect soil are called _____.
7. How steep the ground is called _____.
8. How fast water flows is called _____.

💭 Think About It

A town wants to build a new road on a steep hillside. The construction will remove all the vegetation. What problems might this cause with erosion? What could the town do to prevent those problems?