Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lesson 1: How Does a Hill’s Steepness Affect Erosion?**

Have you ever tried to stand on the side of a hill? Was standing on the hill easier than on flat land? Soil has a hard time staying in place on a hill. Just like you, the soil often moves down the hill. Keeping soil in place on a hill is important to avoid landslides. Can you find out what affects how soil moves on a hill?

Here are some definitions to help you in your investigation.

Steepness - the amount of rise or falling of something

Slope - ground that rises or falls

Soil - surface of the earth that supports plant life

Weathered material - smaller rocks and soil

Erosion - the movement of weathered materials from one location to another

Measurement - the size, length, or amount of something

Length - a measurement of something from one end to the other end

Centimeters (cm) - a unit for measuring length

**Preparing for the Science**

1. To measure the length of something, you must first look at the measuring tool.



 (*Ruler is enlarged and is not to scale*)

2. What unit of length does this ruler measure?

3. After looking at the measuring tool, find the written numbers on the tool. What are the written numbers on the tool?

4. Now, line up the end of the thing you want to measure with the zero (0) mark on the end of the measuring tool.

 



 (*Ruler is enlarged and is not to scale*)

5. Next, find the two written numbers between which the other end of the object is located.

6. This object is between \_\_\_\_\_ and \_\_\_\_\_ centimeters long. So, the pencil is

 longer than \_\_\_\_\_ centimeters, but shorter than \_\_\_\_\_ centimeters.

7. Now comes the estimate part of your measurement. This allows you to estimate the length of the pencil.

 The pencil’s right end is about what part of the way between the two written numbers?

8. This pencil is \_\_\_\_\_\_\_ centimeters long.

**Doing the Science**

1. Start the Erosion Control Simulation by clicking on the “Simulation” tab.

2. Click the “Sand” container to place the sand on the stream table.

3. Click the red “On” button on the stream table controlling station.

4. Note and record in Table 1 the farthest distance moved by the sand.

5. Click the red “Reset” button on the stream table controlling station.

6. Click the “Sand” container to place the sand on the stream table.

7. Click the “Gentle” button on the Table Angle selector.

8. Repeat steps 3 – 6.

9. Click the “Steep” button on the Table Angle selector.

10. Repeat steps 3 – 6.

**Table 1. Stream Table Angle and Erosion Distance**

|  |  |
| --- | --- |
| **Table Angle** | **Farthest Distance Sand Moved (meters)** |
| Flat |  |
| Gentle |  |
| Steep |  |

**Do You Understand?**

1. What was eroded in this experiment?

2. How did the slope of the stream table affect the distance moved by the eroded material?

3. What two things caused the soil at the top of the stream table to erode to the bottom of the table?

4. What are some suggestions you can make to people that have homes, schools, and businesses built on hills?

5. State two methods for reducing the erosion of soil from a hill.

6. Construct an explanation for how the slope of the stream table affected the distance traveled by the eroded soil, using evidence from your data table above.

7. A student claims that *no erosion* takes place with the stream table lying flat. Do you agree or disagree with student’s claim? Provide evidence to explain your thinking.

8. Create a model that compares how land would be eroded around a home on flat land versus a home positioned on a hillside. [A good model shows the components of a system and arrows show the interrelationships among the components. Use these features in your model.] Identify one limitation of your model.

9. The scale of the stream table is *not* the same as the natural environment. How would scaling up (4x) the model affect the amount of erosion?