



REYS: Restoration Ecology for Young Stewards

How Do Trees Affect Erosion – answer key

Purpose/Investigative Question Below, write the question you are investigating, and a definition of erosion

How do trees affect erosion?

Erosion: when earth materials, like sand or soil, are washed or worn away by water or wind

Prediction (Make sure that your prediction specifically answers your testable question)

These can be one of three general options: I predict that the model with trees will have less/more/the same erosion than the model without trees. (A because statement is optional at the fifth grade level)

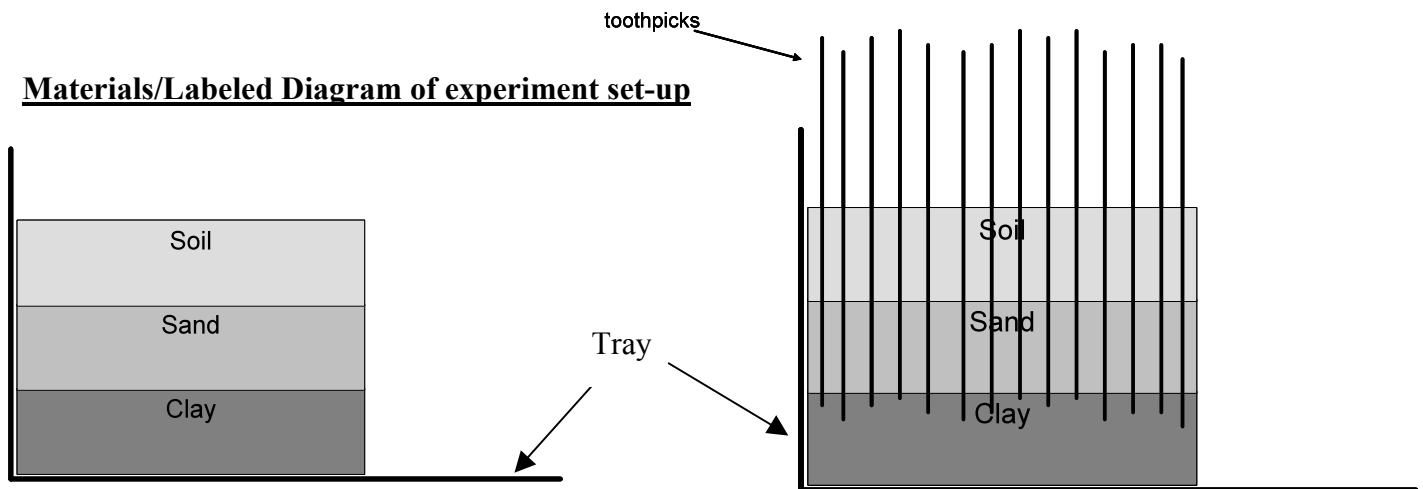
Variables

Manipulated (changed) variable: Toothpicks (trees)

Responding (measured or dependent) variable: amount of erosion, or soil that washes away

Controlled variables (kept the same): Amount of earth materials (clay, soil, sand), amount of water, placement of water and speed of water

Materials/Labeled Diagram of experiment set-up



- Strainer
- 8 sticks of modeling clay
- two 9"x13" foil baking trays
- 12 ounces of sand
- 16 ounces potting soil
- one 1-ounce plastic cup
- one plastic cup with holes on the bottom
- 40 ounces of water
- 100 toothpicks
- floppy disc (or whatever flat item is used)

This product was funded through a grant from Washington State Department of Ecology. While these materials were reviewed for grant consistency, this does not necessarily constitute endorsement by the department.

Procedure

- 1) Gather materials.
- 2) Place a block of clay, forming a square about 1”x 1”x 4”, in the corner of a foil tray.
- 3) Add 6 ounces (scoops) of sand on top of the clay, and flatten into an even layer.
- 4) Add 8 ounces (scoops) of soil on top of the sand, and flatten into an even layer.
- 5) Repeat step 1-3 to create a second model
- 6) On one model, add 100 toothpicks about 1 cm apart, upright and pushed through the clay.
- 7) Add 20 ounces (scoops) of water to both models, quickly adding one ounce a time to the cup with holes, held 4 inches over the soil on the model.
- 8) Using the cup with holes, measure the amount of erosion (in ounces) but straining the runoff through the cup and measuring the remaining sand and soil.
- 9) Record results in a data table.
- 10) Repeat procedure. (This is done in this lesson by having multiple groups perform the experiment at the same time)

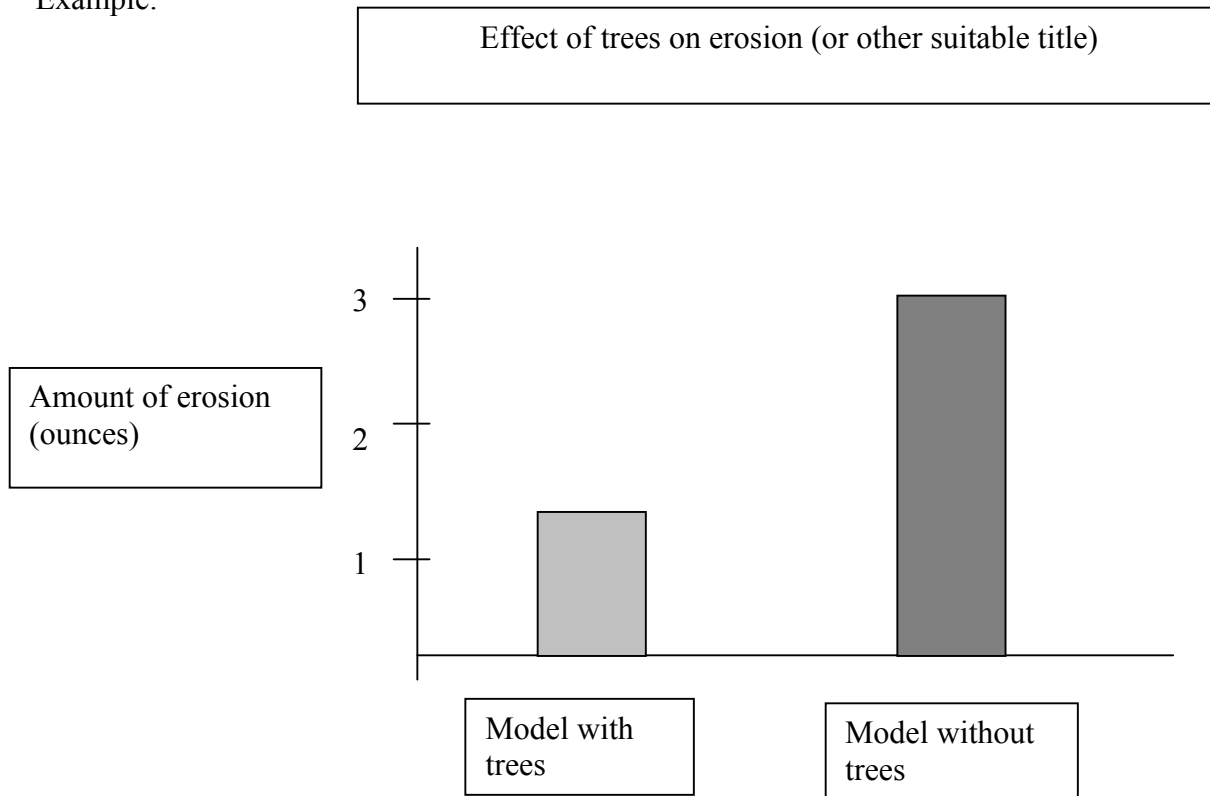
NOTE: On the WASL, students should put “Repeat procedure” as their final step. They need to indicate repetition to get full credit.

Data (Display your data in a table. Clearly label columns and rows, and provide units of measurement)

Effect of trees on erosion (or other suitable title)		
Group number (trial)	Model with trees (ounces)	Model without trees (ounces)
1	2 ounces	4 ounces
2	1.5 ounces	3.5 ounces
3	2.5 ounces	4.5 ounces
EXAMPLE DATA TABLE – YOUR NUMBERS WILL DIFFER!		
Average	2 ounces	4 ounces

Analysis/Bar Graph (optional)

Example:



Conclusion In your conclusion, be sure to: 1) Answer the investigative question; 2) Include supporting data (numbers) from the data table; 3) Use explanatory language to show how these data support your conclusion.

Where there were trees (toothpicks), there was less erosion. On the model with trees, an average of X.X scoops of soil washed away, and on the model without trees, an average of X.X scoops of soil washed away. (Or, there was X.X more erosion on the model with trees than on the model without trees is OK) Therefore, there was less erosion on the model with trees.

(Students can propose different reasons as to why they *think* they saw these effects, but this experiment tested only *what* happens, and not *why*, therefore the proposed mechanisms behind the results, i.e. trees block soil movement can be optional)