The Long Profile

Topic

River features on the long profile

Introduction

A river's length from its source to the mouth is termed its long profile. Rivers move from higher areas down to lower ones. A model for a river could show an upper course with a steep gradient, then slope more gently as a middle course, and finally flattening out in the lower course. Certain features and river characteristics are found in each of these stages. In this experiment you will investigate these as you replicate each of the stages of a river's course.

Time required

60 minutes

Materials

large, long tray
three bricks
plastic box (e.g., window box) wider than the tray
1-liter plastic jug
plastic cup/beaker
modeling clay
tap water
damp sand
pencil
pebble or block of wood (about 6 cm × 6 cm)
sharp-pointed scissors

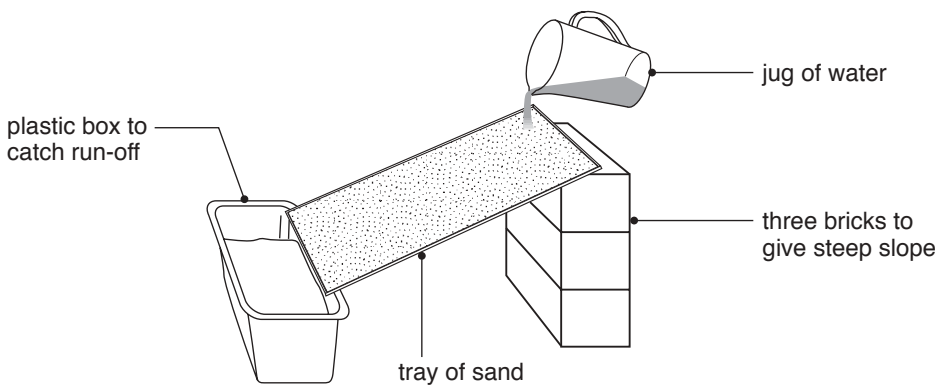
Safety note

Take care when making a hole in the plastic cup with the scissors.

Procedure

1. Cover the tray with a layer of damp sand.
2. Arrange the bricks, tray, and plastic box as shown in diagram 1 below.

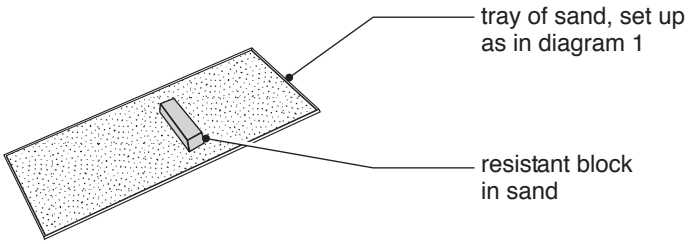
1



Steep gradient with fast flow (upper course)

3. Fill the jug with water and pour the water down the steep slope.
4. Use the data table on the next page to record your observations on the pattern of river flow and any other features.
5. Push the pebble or block of wood into the tray of sand about halfway down where the river will flow (see diagram 2 below).

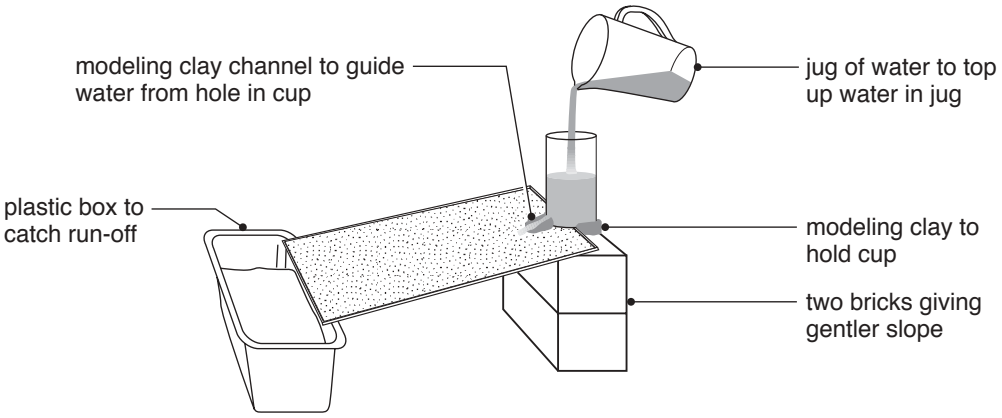
2



Steep gradient with resistant material (upper course)

6. Repeat stages 2 to 4.
7. Then take off one of the bricks to reduce the height and give a gentler slope.

3



Gentle slope with even flow (middle course)

8. Arrange the sand in the tray as in diagram 1 on the previous page (i.e., without the resistant block).
9. Use the sharp-pointed scissors to make a small hole near the bottom of the plastic cup.
10. Place the cup at the top of the tray. Use modeling clay to steady it.
11. Make a narrow channel with the modeling clay and press it around the hole and onto the tray so that it will guide the water out of the cup and onto the tray (see diagram 3 above).
12. Pour the water into the cup, filling as necessary to give an even flow.
13. Record your observations in the data table.
14. Reduce the height of the bricks again to give a very gentle slope towards the window box.
15. Repeat stages 8 to 12, but occasionally pour water from the jug into the channel to give periods of increased flow.
16. Record your observations in the data table.

DATA TABLE	
Experiment	Sketch or describe river features
1. Steep gradient with fast flow (upper course)	
2. Steep gradient with resistant material (upper course)	
3. Gentle slope with even flow (middle course)	
4. Shallow gradient with different flows (lower course)	

Analysis

1. Describe the route taken by the river on the steep slope (experiment 1). Why did it flow like this?
2. What happened when the river flowed over the resistant piece of material? What feature would this be in the river's upper course?
3. As the slope became more gentle and the flow more regular (experiment 3), what river features developed? Suggest reasons for these.
4. With the shallow slope, what happened to the river as its flow increased and decreased?
5. Find out how meanders can create lakes and terraces can form on valley floors.

Want to know more?