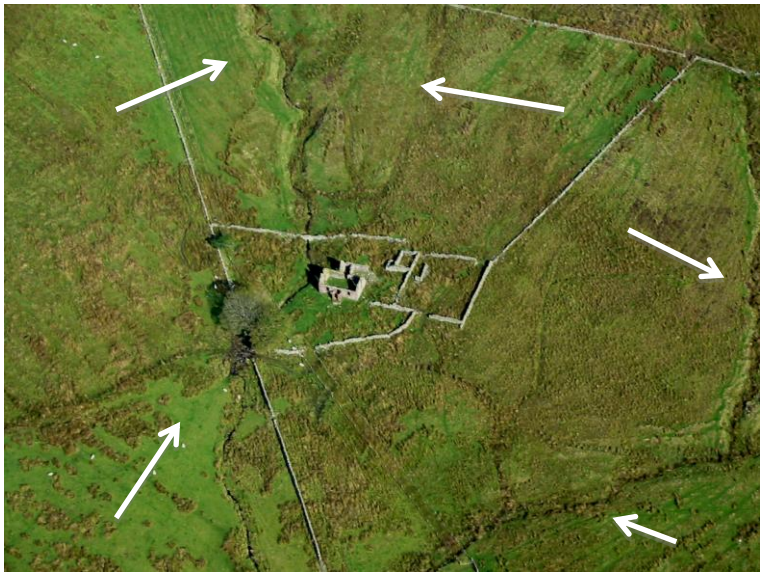
Soil Creep (Gravity) – Teacher Notes



The photograph shows ridged lines running across the slopes leading down to the valley. These are caused by soil creep which is exacerbated by sheep farming removing the bushes and trees whose long roots would have held the soil in place. Sheep make their paths along these ridges of slumping soil making them more outstanding. The loss of topsoil and decrease in fertility led the farm to be abandoned.

The angle of slope necessary to promote soil creep can be estimated by placing soil or sand in a laboratory tray, using bricks or books to raise one. The increase of depth of soil at the bottom can also be measured. The angle of repose is the angle between the base of the tray and the flat bench or table. On the edges of the Stirling Ranges where the slopes are sharp and there is rain, the soil will creep down the slope in just tens or hundreds of years

Testing soil creep

Materials per student or group

- 1 laboratory tray
- Dry soil or sand (from sand pit or long jump pit)
- Bricks or books
- A protractor
- A ruler
- Water and a measuring cylinder

Part 1

1. Fill your tray to an even depth of 1 cm. Use a ruler to produce a level surface.
2. Use bricks or books to raise one end of the tray until it slopes at the angle your teacher will suggest for your group
3. Leave the tray in this position for 5 minutes
4. Return your tray to level
5. Measure the height of soil or sand at the bottom of the tray
6. Repeat twice more and average your three readings
7. Enter your data into the sheet provided

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Part 2

1. Add 500mL of water to the sand or soil in your level tray and mix well
2. Return your tray to the slope you used previously
3. Leave for 5 minutes
4. Measure the height of the sand at the bottom of the tray three times and average the readings
5. Enter your data on the sheet provided.
6. Add other group's data to fill the table

Part 3

Graph the results and answer the questions.

Slope	Increase in depth of dry material (mm)				Increase in depth of wet material (mm)			
	1	2	3	Ave.	1	2	3	Ave.
15^0								
20^0								
25^0								
30^0								
35^0								
40^0								

Students often confuse accuracy and precision. If you only choose to take slope readings at 5^0 intervals your readings will be accurate. If you take readings at 1^0 around where the slope became unstable you will be more able to measure the slope precisely. Accuracy is a matter of reading technique whereas precision is a matter of choice of tools

Why did we take three readings and then average them? To provide a more accurate result and decrease the effect of any outlying results.

When the slope increased what happened to the soil? More soil moved down slope.

What could be done to make the readings more precise? Take readings at a closer interval

When you added water, what happened? The slope became unstable at a lower angle.

To the north of Australia lie many mountainous volcanic islands. Weathering in the tropics is rapid and deep rich soils are produced which are excellent for farming. Mudslides are a common hazard at certain times of the year. What would be the main triggers for mudslides? Steep slopes, deep soils and rain. Earthquakes can also trigger mudslides. They often occur in the Monsoon season.