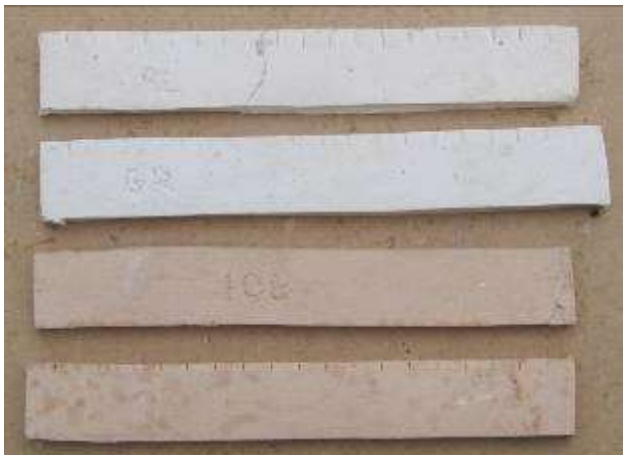
Landslides and the stability of the land

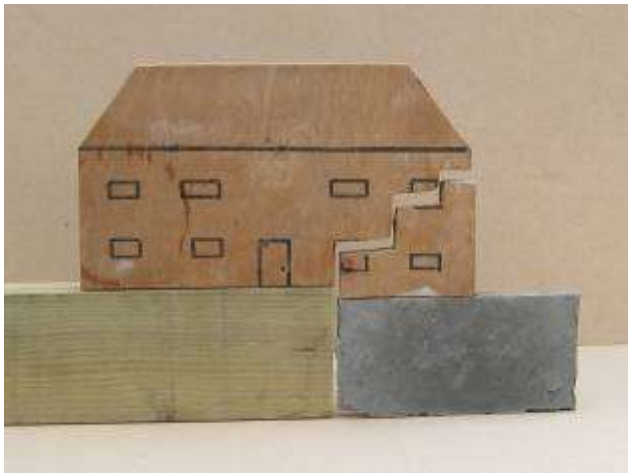
Shrinkage of clay ***E P F 20 min***

Students roll out a sheet of clay 5mm thick by using a rolling pin resting the two wooden strips 5mm thick with the clay between. From this sheet of clay they cut strips 2cm wide and exactly 10cm long. They should put their initials on the clay and then let it dry for several days. Its length is measured again and the percentage contraction calculated.



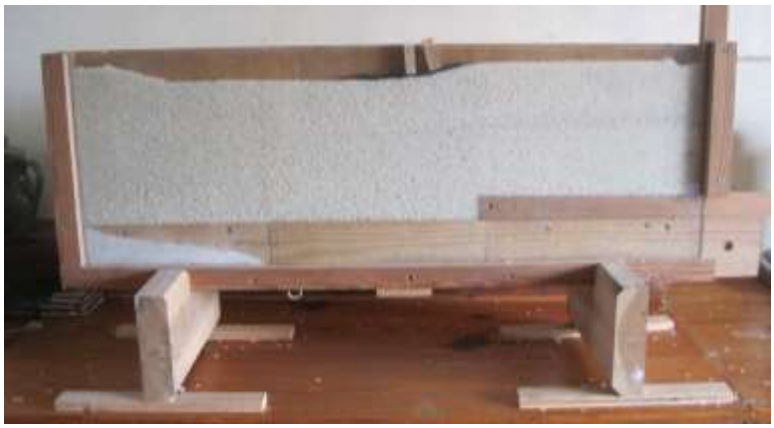
Cracking of houses due to clay shrinkage ***D***

The shape of a house is cut from a piece of wood 25cm by 15cm by 2.5cm and painted. A zigzag cut is made from the base to one side with a fret saw. The model is placed with the two parts together but with the larger part on a piece of wood 5cm thick and the other on damp clay the same thickness. As the clay dries out the crack in the house opens. If placed on a window sill the crack is easily visible.



Subsidence due to mining D F

A box with clear sides has a removable strip of wood, representing a coal seam, at the base. The box is filled with rice representing the overlying rock. The wood is slowly pulled out and the effects on the surface of the rice and of the minature buildings on it is noted.

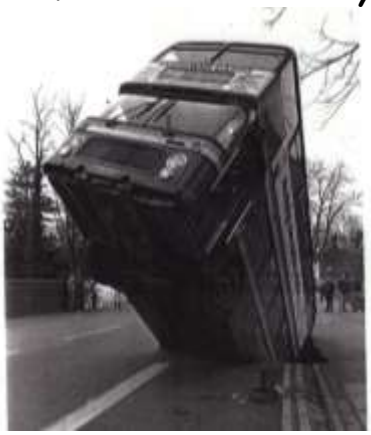


Subsidence of the Scilly Isles D F

Show students a map which illustrates how the Scilly Isles have changed from being one island 4000 years ago. (Taken from Exploration of a drowned landscape: Archaeology and history of the Isles of Scilly by Charles Thomas)

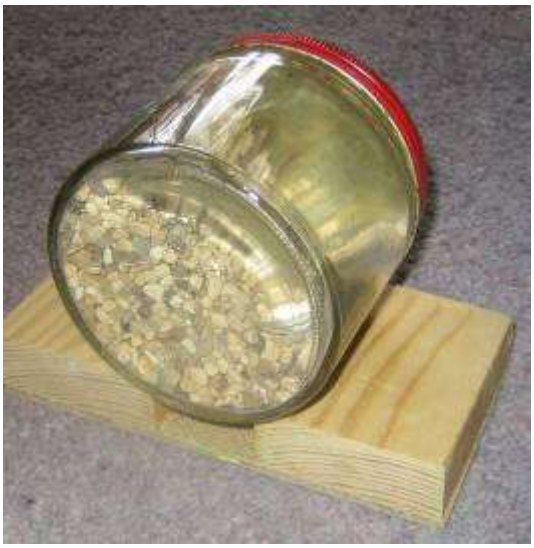
Solution and subsidence A F

Students are asked what geological process could have caused a bus to end up at this angle. (Photo from Eastern County Newspapers)



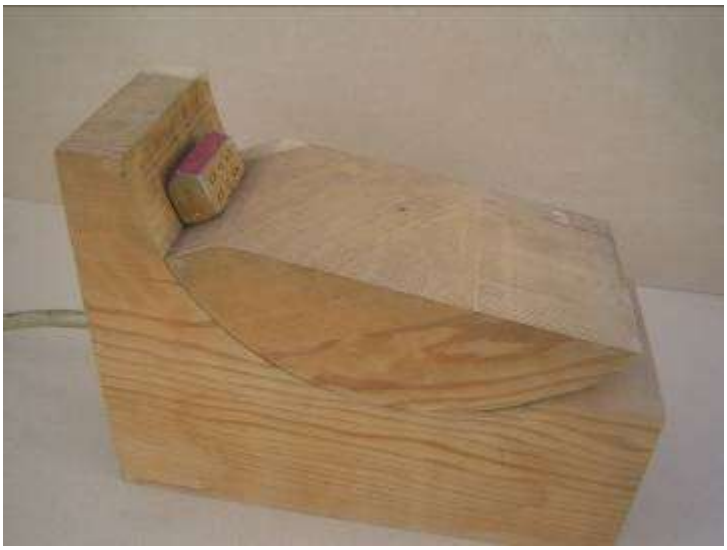
Angle of rest ***E P F 3 min per container***

Students measure the angle of rest of loose sediment in a jar and in photographs to find that size does not affect angle of rest but water content does. This can be done as a paper activity using just the photographs.



Landslide model ***D***

A wooden block, 36cm by 25cm by 10cm, is cut in a curve to represent a slump. A hole is drilled the lower part and a tube is attached to the hole. The upper block slips if extra weight is added to the top or if pore pressure is increased by blowing into the hole or if it is jogged to simulate an earthquake.



Landslides and pore pressure *E P F 20 min for students*

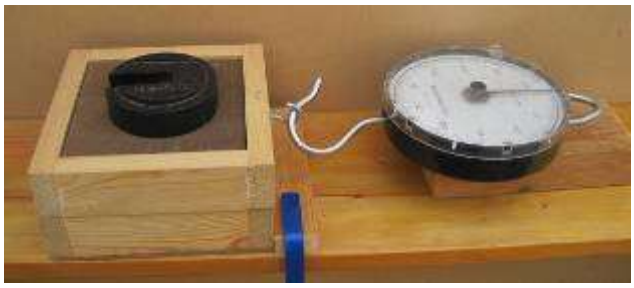
Two tins one with pin pricks in the bottom and one without are filled with coarse sand and put at the top of a sloping piece of 6mm glass 50cm by 30cm. Both tins are filled with water and the glass wetted. The glass is slowly raised. The tin with the holes slides at a lower angle than the tin without.

Landslides *E P F 40 min*

Students work out the effects of weight and surface roughness on the angle of sliding. They place wooden blocks with sandpaper on, on a longer piece of wood also with sandpaper on it. The longer piece of wood is raised until the upper block slides and the angle noted. Weights can be added to the top of the upper block and the grade of the sandpaper changed.

Landslides and stress *E P F 60 min*

Students work out the relationship between the force necessary to initiate movement and the weight of the overlying strata and the grain size.



Sandcastles and cohesion between grains *A P 5 min per castle*

Students try to make a series of sandcastles from sands with different water contents. This can then be related to the slope stability of loose sediments.

Leaning tower of Pisa ***E P 20 min***

This activity is to discover what determines whether a building resting on clay stays upright or topples. Students are given 20 pieces of dowelling of varying lengths and diameters. These represent buildings. They place them on a piece of sponge representing the clay, and see if they remain upright. They should plot their results on graph paper with diameter on one axis and length on the other. They then discuss how to stop the tower leaning further.