

Construction materials and civil engineering

Roadstone

A P **F** 60 min

Students find the best materials for road stone by examining a number of rock samples and working out their grain size, mineral composition, hardness of minerals etc. Alternatively students can be given the data and it is then a paper exercise.

Building stone

A P 15 min

The purpose of this activity is to show students that the common rocks which are easy to cut let the damp in whereas those which are impermeable are difficult to cut or rare. Provide students with two sets of rocks, e.g. limestone, sandstone, granite, marble, slate and dolerite. The first set is tested for ease of cutting using a hack saw. The second set is placed in a shallow tray with water in it so that the bottoms of the samples are wet but the top is above the water. This must be done an hour before the samples are tested. The students use a resistivity meter on the top of the samples to test for dampness.

Sand and gravel reserves

Pa I **F** 60 min

Students use borehole data to outline an area beneath which there are workable beds of sand and gravel. They then calculate the volume.

Motorway route

Pa I 15 min

Students are given a cross section of a proposed motor way route and must find where the engineers will have to solve geological problems.

Tunnel

Pa I 15 min

Students are given the cross section of a hill through which a tunnel is to be driven. Students must locate the problem areas.

Channel tunnel

Pa I **F** 10 min

Students are given a cross section of the Channel and using certain criteria must choose the best strata in which make the tunnel.

Strength of Aggregate

E P **F** 15 min per sample

Students drop a steel cylinder 15 times down a tube onto a known weight of sieved aggregate. It is then sieved again to see how much it has been crushed.

Strength of rock

E P F 60 min

Students drop a marble from 1 metre onto a rock slab and note its height of bounce. The height of bounce is related to the strength of the rock. The rocks are plotted in descending order of strength to see which rock group has the strongest rocks and to explain why. Students can also compare rocks to see what effect porosity, mineral hardness, mineral cleavage, crystallinity etc have on the rock strength.

Rising water table and buildings

D

A spray can top 5cm diameter, representing the basement of a building or a buried tank, is partially buried in fine gravel. Water is added slowly to the gravel. The cap pops out of the gravel showing that buildings and more especially underground tanks could be destabilised by rising water levels.

