THE POROSITY OF ROCKS

Purpose
To determine the porosity of irregularly shaped rock samples

Activity

1. Weigh the sample with the spring balance in (Wa1)

2. Quickly weigh the sample in water (Ww)

3. Allow the sample to soak in water for at least 15 minutes

4. Dab the surface water from the sample and weigh it in air (Wa2)

The porosity will be the volume of pore space divided by the volume of the sample. The porosity is normally given as a percentage.

$$\frac{(Wa2 - Wa1)\times 100}{Wa1 - Ww}$$

The difference between the mass in air before and after soaking is the weight of the water in the pores. Since 1 gram of water has a volume of 1cc the volume of the pore space in cc is the same as the added weight in grams. The volume of the sample will be the weight of the water displaced by the sample and this will be the difference between the weight in water and the weight in air.

Teacher's Section

Requirements
Spring balance
Pieces of porous rock with a nylon loop attached with araldite
Beaker large enough to take sample

Notes
Strictly this experiment only measures absorbancy because not all the holes may be interconnected or the connecting gaps may be too small to allow the water through.
Oolitic limestone is the best rock to use, fine grained rocks would be better soaked over night.
This can be made more interesting by comparing the porosity of, for instance, different types of limestone: bioclastic, oolitic, micrite, chalk or sandstones of different ages: Longmyndian, Cambrian. Devonian, Millstone grit, Permian; or linking it in with reservoir calculations or rock strength.

Time
15 minutes

Results
Most sandstones and oolitic limestones have porosities of between 5 and 15%

Variations
It is simpler for students to understand if rectangular pieces of rock are used. They measure the rock's volume and then work out the change in weight.