Measuring Porosity of Sediments

Basics

Some of the water that falls to the ground infiltrates into rocks and sediments to form groundwater.

90% of the water we use comes from the ground, yet groundwater is less than 1% of all waters on earth's hydrosphere.

A rock that contains groundwater is called an aquifer

A good aquifer like sandstone, gravel, or limestone, has to be porous and permeable

Porosity is the ability of a media to store fluid, in this case, water.

Permeability is the ability to allow fluid, in this case water, to flow between openings or pores

Porosity depends heavily on the space available in a rock.

Porosity is calculated as the ratio of the volume of pores and the total volume of rock time 100. It is

very dependent on the particles' shape, size, and arrangement in a rock.

The larger the volume of pores in a rock, the greater its porosity, hence, the more water it can hold.

Porosity = (Volume pores/Volume rock) x 100

Activity

Material Needed

4 identical plastic tubes

1 cup of plastic beads, 3mn diameter

1 cup of plastic beads 6mn diameter

1 cup of sand

1 graduated cylinder

Step I

Fill up the graduated cylinder to 100ml

Use water from that cylinder to fill up a plastic tube with water

Make a table and record that volume of water taken out of the graduated cylinder

It is the <u>total volume of the plastic tube</u> (V_T)

Step2

Take two tubes, one of 3mn and one of 6mn, and fill them up with beads all the way to the top

Refill the 100ml cylinder with water again and use it to fill with water the 3mn and the 6mn plastic tubes with beads

Record the water needed in each case by checking the volume of water taken out of the 100ml cylinder

Again record these datas in the table

These are the <u>volume of the 3mn beads</u> (V_3) and the <u>volume of the 6mn beads</u> (V_6)

The porosity of the 3mn beads is

$P = (V_3/V_T)\ x100$

The Porosity of the 6mn beads is

$P = (V_6/V_T)\ x100$

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