

SPREADING POLLUTION UNDERGROUND

Purpose

To show that water will move upwards through permeable rocks by capillary attraction and to show that water can dissolve pollutants and transport them underground.

In the first activity you will find that water can move up through rocks as well as down or sideways. It moves up by a process called capillary attraction. That is the same process by which it moves up through plants. When water comes in contact with any sources of pollution such as rubbish pits it will often dissolve some of the pollution and spread it around. In activity II you will watch this happening. In the last activity you will see how water can carry pollution upwards through rock or soil.

Activity I

1. Pour a small amount of water into your dish so that the water is about 5mm deep.
2. Place your rock in the dish and watch what happens.
3. Describe what happens to the rock.

Activity II

1. Mark the strip of blotting paper 2cm and 5cm from the end with a pencil.
2. Bend the strip into an L shape at the 2cm mark and place the short part in the dish.
3. Use the tweezers to put a crystal of potassium manganate (VII) on the 5cm mark in the centre of the strip.
4. Estimate the area of the crystal.
5. Watch and wait for 15 minutes.
6. Describe what has happened and describe the shape of the "polluted" area. The polluted area is called a pollution plume. Draw a sketch of it in your book and indicate the original position of the crystal and the direction of water movement.
7. Estimate very roughly the area now "polluted" by the manganate
8. Calculate how much larger area is now polluted because of the movement of the water.

Activity III

1. Use the tweezers to place a small crystal of potassium manganate (VII) on your dish.
2. Place the sugar cube which is permeable like sandstone on top of the crystal.
3. Add a small amount of water onto the dish beside the sugar cube. Do not pour it onto the sugar cube.
4. Watch what happens and then describe it.

Teacher's Section

Requirements

Activity I

Shallow dish

5cm by 5cm by 5cm sample of permeable sandstone

Activity II

A small crystal of potassium manganate VII (1mm by 1mm), and tweezers to pick it up

A piece of blotting paper 5cm by 20cm, dish from activity I.

Activity III

A small crystal of potassium manganate and tweezers to pick it up

Shallow dish

Sugar cube

Time

10 minutes ignoring the time for the plume to spread