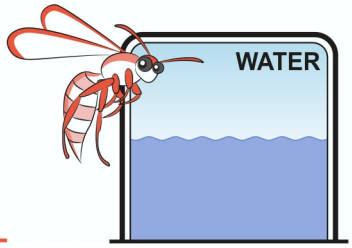


Permeability - Teacher Notes

When fragments of weathered and eroded rock form soils and sedimentary rock small spaces or pores are left. If these spaces are joined water can move through them. They are permeable.

Sand will allow water through. Sand is ***permeable.***

Clay will not allow water through. Clay is ***impermeable.***

Permeability controls the movement of water through soil and rock. Soils with high permeability not only allow water to penetrate through to plant roots but all the way down to join the aquifer (aqua = water, fer = maker) below. Bores can tap into this water reservoir. Most water in metropolitan Perth now comes from bores. When bores are drilled into aquifers care must be taken not to drill through the impermeable layer below, as water would be lost.

Materials required per student or group:

- Filter papers
- Filter funnel
- Beaker
- Measuring cylinder
- Water
- Specimens of different soils
- A large spoon

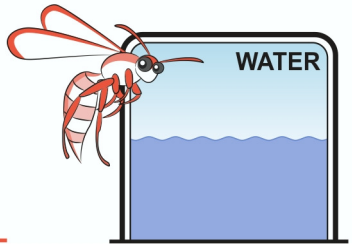
Set up the equipment for filtration (See "Physical Separation Techniques" section for help)
Place two spoons of one soil in the filter paper.
Measure 20mL of water and carefully pour onto the soil. Do not disturb the soil.
Wait for 5 minutes then measure the volume of water that has permeated through the soil.
Enter your results in the table provided.
Wash the equipment and repeat for another two samples.
Compare your results with those of others.

Sample	Description	Vol. water collected	Comment
1			
2			
3			

Why were you asked to compare your results with others? To achieve a more accurate result. One reading might be atypical. To achieve a statistically relevant result. Fair test.

Which soil would be best for farming? Explain your answer**.** The most permeable soil is best because it allows water with dissolved nutrients to penetrate down to the plant roots. It also allows water to drain from the root zone to prevent waterlogging.

Which soil would form the best aquifer? The most permeable soil would hold the most water.



Permeability - Teacher Notes

Which soil would be the best one to use to build and line a farm dam? The least permeable as it will reduce water loss through seepage. Farmers use clay.

Formation of salt lakes on clay pans

1. Clay (including salt) sediment is deposited on a low lying area by water flow
2. Rain falls on soil, dissolves any salt and the salt solution flows onto the low lying clay pan
3. Because clay is impermeable the liquid does not soak through but lies on the surface
4. Heat from the Sun evaporates water leaving salt.
5. This process repeats over thousands of years

In Western Australia this process is aided by salt being blown in from the sea on the prevailing western winds. Low rainfall means salt is rarely flushed back to the sea. High evaporation rates also pulls dissolved salt to the surface. Many salt lakes are formed over ancient river courses. These rivers flowed in the past when our climate was much wetter.

EXTENSION Salt Pans and salt lakes

The rate of evaporation depends on temperature and wind. High temperature and wind means a high rate of evaporation. In cool rainy areas this activity may take a few weeks.

Materials needed per student or group:

- A piece of clay to mould into a small saucer shape. Plasticine, a saucer or a small plastic plate will do as well
- A small beaker or cup to contain salt solution
- Salt and water to make a supersaturated salt solution
- Sunshine

Make your own saltpan or salt lake

1. To make a super-saturated solution of salt in water, stir as much salt into warm water as you can until no more salt will dissolve
2. Create a saucer shape with your clay
3. Place the clay saucer outside in a hot windy area
4. Fill to the brim with salt solution and keep topping it up as it evaporates over one week
5. Leave and observe the saltpan form