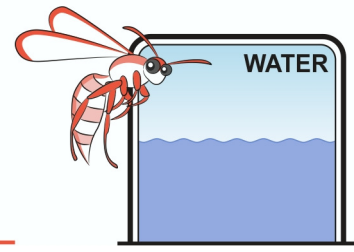


Water On Land - Teacher Background



Earth Processes Evaporation and Percolation

Only one fifth of the surface of Earth is land. The other four are sea. Water is evaporated from the sea, condensed as rain to fall on the land and must percolate through the land to re-join the sea.

Moving water and the sediment it contains sculpts the surface of our planet. Erosion removes mountains and dumps sediments into the sea. Without wind or water our planet's surface would look like the Moon.

If rain falls on an impermeable surface such as granite, clay or concrete, the water may evaporate directly back into the atmosphere, run into rivers or may be directed to a dam or reservoir. This is called surface runoff. In Western Australia a lot of rain is lost through evaporation at the surface before it has a chance to penetrate into soil.

If, however, water falls on permeable ground it will percolate through soil and rock carrying dissolved substances down to the aquifer (water maker) underlying the water table. Most rural and remote areas rely on underground water from bores. Metropolitan areas increasingly rely on bore water (water from the aquifers) to provide domestic and industrial water. To replenish our underground reservoirs water must be able to seep through soils and rocks that are both porous and permeable. Underground water reservoirs are both permeable and porous but are sealed by non-permeable beds.

Porous Having pores or spaces
Permeable Having pores or spaces which are interconnected

Many students have problems differentiating between porosity and permeability. Bubble wrap is porous (has holes) but is not permeable as the holes are not joined and do not allow water to pass through. A sponge is both porous and permeable as it has holes that are interconnected and will allow water to pass through.

Many native plants produce a waxy layer which coats sand grains and reduces permeability of soils. Water drops from a transfer pipette will remain as beads on the top of these soils. Surface water can be rapidly removed by evaporation. Soil wetting agents can aid penetration. Many native plants like acacia, have leaves and branches arranged to channel rainfall directly down their stems to their roots.

Water movement is delayed by cohesion between water molecules holding them together and adhesive forces between water and soil or rock. At depth, pressure of burial causes grains of rocks to be compressed reducing open pore space and squeezing water back up into the aquifer. Water can remain in an underground reservoir for days or for tens of thousands of years. The Yarragadee aquifer underlying Perth has water estimated to have resided there for 300,000 years.

Where the water table comes to the surface, spring water is released to become rivers and lakes. Eventually water will flow down to the sea.