SCOUT ENVIRONMENT AWARENESS PROGRAM

Groundwater Spiders

A fun, easy and edible way to understand the geology of groundwater.

Suitable for Cubs, Scouts, Venturers, Rovers

Award Scheme Links:

Cubs:

Waterwise Badge – Protecting our Wetlands

Outcomes:

- Develop an understanding of aquifers, confining layers, groundwater, water table, recharge and contamination.
- Visualise how pollution can get into groundwater.
- Discover how pumping can cause a decline in the water table.

Materials:

- Clear plastic cups
- Small chunks or crushed ice
- Lemonade
- Vanilla icecream
- Red food colouring
- 100s and 1000s or coloured sprinkles
- Straws

Activity:
(Adapted from Ribbons of Blue)

1. Each scout will construct an aquifer. An aquifer is an underground layer of water-bearing permeable material. Permeable means that water can pass through, impermeable being the opposite. Aquifers are underground reservoirs, recharged by precipitation (rain and snow). The water is held in the spaces between the rocks and gravel. There are two types of aquifers, confined and unconfined.

2. Issue a plastic cup to each participant, stressing that they can not break the cup and can not touch the contents until told to do so.

3. Explain that a section of the earth is going to be placed into the cup, as if a hollow drill had drilled straight down, and a sample taken.

4. Fill the cup one-third with crushed ice. This represents gravel and soil below the surface of the earth.

5. Add enough lemonade, representing water, to just cover the ice. Notice how it fills the spaces around and between the particles of the gravel and soil (crushed ice). This is *groundwater* and represents past rains. Groundwater in this sense, is called an *aquifer*, an underground store of water.

6. A layer of ice-cream is added to serve as a *confining layer*. This layer, often clays and impermeable materials in the ground, does not let water pass through easily. There is now a *confined aquifer* in the cup.

7. Crushed ice is added on top of the confining layer. This represents more gravel and soil, above the confining layer.

8. Add some more lemonade to represent more rain, and more groundwater. This is an *unconfined* aquifer, having no confining layer above. The upper boundary of the unconfined aquifer is the *water table*.

9. Coloured sprinkles represent surface soils and should be sprinkled over the top as the porous top layer. This lets water pass through, to recharge the unconfined aquifer below.

10. Red food colouring is added to another bottle (or the remaining) lemonade. This coloured lemonade represents contamination and is poured on the earth's surface. As participants watch the coloured lemonade infiltrate the layers, discuss contaminant movement and the overall vulnerability of aquifers to spills upon the earth's surface.

11. Straws can be used to drill a *bore* into the aquifer. Pumping (sucking) the well demonstrates a decline in the water level. Scouts should also notice that the contaminants can get sucked into the bore area and end up in the groundwater by leaking through the confining layer.

12. The aquifer can be recharged with more uncoloured lemonade (rain) and re-polluted with more coloured lemonade.

This activity can be extended to include discussion about:

- The types of substrates found in the earth and their properties, either at holding water, letting water through or extended to include growing plants and geological formations.
- How the water gets into the ground – rain, snow melting, lake or river above etc and can be linked into the water cycle
- How and what type of pollution gets into the groundwater and how it can be avoided
- What groundwater is used for.