



my homeschool

Water in the Landscape

By Jo Lloyd

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Written by Jo Lloyd

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Introduction to Parents

Welcome to our geography unit about water as a resource. Geography offers students an opportunity to learn about the world around them and how other people live, guiding them to identify similarities and differences between people. Through readings, maps and case studies your child will explore the uses and management of water, conflicts over its scarcity, water based hazards and the different forms water takes in our physical landscape. This unit reflects the two components of the Australian Curriculum to studying geography:

1. knowledge and understanding of geography based topics; and
2. experience in geography skills and tools that are developed and practiced from Foundation Year to Year 10.

The Structure

This unit includes sixteen weekly topics to be used over two high school terms. Each topic is explored over two lessons, including information on the topic area as well as:

- ❖ an excerpt from a living book,
- ❖ guidance on developing a geographical skill, or
- ❖ a case study to allow more in-depth consideration of issues in a specific location.

Links to complement the content are included to help your student explore the topic area in more detail. You can decide which links you would like your student to access. All links are provided on the Year Seven Online Resources and Quick Links page.

Notebooking ideas are provided at the end of each topic. Encourage your student to use these for their weekly notebooking activities. They can include a written narration or a diagram explaining what they have learned. A botany book works well for this. Discuss and agree with your child what your expectations are in terms of length of answers provided.

Fieldwork

Suggested fieldwork activities and projects are also included in this unit. Undertaking geographical fieldwork complements and extends the information in this resource and helps to develop new skills. Actually seeing things also helps to understand the issues and encourages your child to “read” the landscape in a new way. For some families, doing fieldwork will be a new experience, so just choose one exercise which best suits your location, interests, skills and abilities. For other families, undertaking fieldwork will extend the nature study work they have enjoyed and help hone observation skills and they may choose to try a few of the activities suggested. An art journal is a useful book to use to record your fieldwork explorations.

Topic 1 – The Water Cycle

Lesson 1 – Introduction to the Hydrological Cycle

This unit will encourage you to consider the value and role water plays for people all around the world. Water is valued, used and managed by many different people for many different purposes. One person living an average lifespan is estimated to consume approximately 60,000 litres of water. Water is an important environmental resource and essential for life on earth.

The location of water helps to explain our settlement locations as it is essential for drinking, sanitation and food production. Rivers can play a role in transporting goods, which was significant in the case of the Murray River in Australia, and for rivers such as The Nile in Africa, the Danube in Europe and the Mississippi in the United States of America. Water is used for generating electricity, recreation and valued for its aesthetic qualities. Water is also a marketable item, a commodity where cost and quality matter.

Water is a key component in our environment and is essential for life. A natural starting point when studying water in our world is the hydrological cycle. The hydrological cycle gives a helpful overview of the natural movement and storage of water and highlights that water is a renewable resource.

Fresh water generally comes as rain or as melting snow in the spring. Evaporation takes some of this into the atmosphere and some percolates into groundwater, with the rest travelling along the river until it meets the sea or is used for agriculture, drinking or for sanitation. Once the water reaches the ocean, it can evaporate into the atmosphere, and fall again as precipitation, thus starting the hydrological cycle once more. Water molecules are forever moving in this cyclical motion. They move from land, to sea, to air, to land, continuing the cycle.

Surface water, in the forms of rivers, lakes, dams, irrigation channels and surface runoff evaporates from the ground, along with transpiration from vegetation. This leads to cloud formation as water vapour condenses either because its temperature decreases as altitude increases (the air is cooler higher in the atmosphere), and as it loses latent heat. The condensed water vapour then gathers, with millions of other water droplets forming in the atmosphere. These can form rain clouds, which then leads to precipitation, with those water droplets falling back to earth.

Precipitation brings water to the ground in the form of rain, hail, sleet or snow. Once the precipitation hits the ground it joins the surface water. Some of that surface water soaks into the soil, which is the first layer of earth. This is referred to as infiltration. Infiltration differs from percolation, which is where the surface water soaks into the soil and mixes with groundwater.

Deep percolation is where the surface water soaks down into deep rock and mixes with groundwater. Groundwater is water that is held beneath the earth's surface. It has seeped into the ground, moving through dirt and rocks. Approximately 2 percent of the earth's water is groundwater. Groundwater can be located very deep and travels through and accumulates within cracks, porous aquifers, underground caves and underground stream systems. Scientists, called hydrologists, make predictions on how groundwater moves because it is difficult to see and difficult to measure. In Australia, the Great Artesian Basin contains a huge amount of groundwater.

Lesson 2 – Understanding the Water Cycle - A History

Ancient civilisations did not understand the water cycle in the same way that we do today. This lesson you will read an excerpt from a living book which outlines part of the history of understanding this key natural process.

One Author's Insights

The hydrological cycle, to use its technical name, is the largest movement of any substance on earth. It might seem that something as obviously simple and so important for human life and society might have been a kind of folk knowledge, built up over several thousand years through casual observations and then codified and improved as instruments and scientific thinking got better. It might surprise you, therefore, that for most of recorded history we did not understand the water cycle at all.

Civilisations in Sumeria and Egypt that existed more than 5,000 years ago relied on the rise and fall of water to keep their societies running. They built irrigation mechanisms to manage and exploit their resources and created social and political hierarchies based around the access and control of that water. But there is little evidence that the engineers of the time were aware of the global cycle of water and how it appeared in their rivers. There are hints from Chinese settlements some 3,000 years ago that they had inklings of how different bodies of water might be related - they noticed that their wells rose and fell in relation to the tides, for example, and some of them referred to rivers as "threads" of the sea.

But exactly who came up with the idea that the earth's oceans and rivers were connected via clouds is unclear. The concept of some kind of cyclical behaviour to the world's water seems to have emerged around 3,000 years ago in the work of the early Greek philosophers. Thales of Miletus, who lived around 600BC and was one of the earliest thinkers who we might now consider to be "scientific" in his attempt to get to the bottom of everyday life, believed that water was the origin of all things and that everything would eventually return to water. One of his followers, Anaximander, described the process of evaporation as the way water moved from sea to sky. Others, including Plato and Aristotle, subsequently added ideas that clouds could move water through the air and then produce rain to feed rivers and streams, and they provided descriptions of how water might also then seep into the ground. Most of the elements of the water cycle seemed to have been in place but, unfortunately, the Greeks ended up connecting the dots the wrong way around.

From *The Water Book: The Extraordinary Story of our Most Ordinary Substance* by Alok Jha