

Year 7 - Unit 1: Resources In The World

Aligned with the Australian National Curriculum



**Section 1:
Using And
Classifying
Environmental
Resources**

**Section 2:
Water**

**Section 3:
Environmental
Hazards**

**Section 4:
Non-Renewable
Resources**



By Fiona Back

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Teachers' Notes

Year 7 - Unit 1: Resources In The World and *Year 7 - Unit 2: Place And Liveability* have been written by the same author for Year 7 students studying Geography in Australia. This book contains four sections which are clearly linked to Unit 1 of the Year 7 Australian National Curriculum.

The first section of this book investigates environmental resources: renewable resources, non-renewable resources and continuous resources. It explains how they are used and how we classify them.

The second section of the book is an in-depth study of water as an essential and renewable resource. It encourages the students to think about how we access water and how we can save this precious resource. It creates an awareness of the unequal distribution of water around the world and describes how different countries manage the water that they have. Indigenous water management and knowledge is also considered and the concept of virtual water is introduced.

The third section of the book is entitled *Environmental Hazards*. It concentrates on floods that have occurred in Australia and Thailand and compares how each country has managed flooding disasters in their own area. It examines different types of floods and why they occur.

The final section of the book explores the non-renewable resources: coal, oil and gas. It looks at how each non-renewable resource is created, used and managed in Australia and overseas. It introduces the terms 'natural capital' and 'financial capital'.

The activity sheets in this book have been designed to help students appreciate environmental resources and begin to understand the importance that they play in all of our lives. Students are given the opportunity to develop their Geography skills, knowledge and understanding, through: observing, questioning, planning, collecting, evaluating, processing, analysing, interpreting and concluding.

Year 7 - Unit 1 and *Year 7 - Unit 2* are both part of the *Australian Geography Series* which comprises nine books in total.

National Curriculum Links

Geographical Knowledge and Understanding

The classification of environmental resources and the forms that water takes as a resource (ACHGK037)

- classifying resources into renewable, nonrenewable and continuous resources, and investigating examples of each type
- describing how water is an available resource when it is groundwater, soil moisture (green water), and surface water in dams, rivers and lakes (blue water), and a potential resource when it exists as salt water, ice or water vapour

The ways that flows of water connect places as it moves through the environment and the way this affects places (ACHGK038)

- explaining how the movement of water through the environment connects places
- investigating the environmental, economic and social effects of water as it connects places

The quantity and variability of Australia's water resources compared with those in other continents (ACHGK039)

- investigating the main causes of rainfall and applying their knowledge to explain the seasonal rainfall patterns in their own place and in a place with either significantly higher or lower rainfall
- interpreting the spatial distribution of rainfall in Australia and comparing it with the distribution of that of other countries
- comparing the quantity and variability of rainfall, runoff and evaporation in Australia with that in other continents

The nature of water scarcity and ways of overcoming it, including studies drawn from Australia and West Asia and/or North Africa (ACHGK040)

- investigating the causes of water scarcity, for example, an absolute shortage of water (physical), inadequate development of water resources (economic), or the ways water is used sustainably
- discussing the advantages and disadvantages of strategies to overcome water scarcity, for example, recycling ('grey water'), stormwater harvesting and reuse, desalination, interregional transfer of water, transfer and trade in virtual water, and reducing water consumption
- examining why water is a difficult resource to manage, for example, because of its shared and competing uses and variability of supply over time and space

The economic, cultural, spiritual and aesthetic value of water for people, including Aboriginal and Torres Strait Islander Peoples and peoples of the Asia region (ACHGK041)

- examining and comparing places in Australia and countries of the Asia region that have economies and communities based on irrigation, for example, rice production in Leeton in NSW and the Mekong Delta in Vietnam or Java in Indonesia
- exploring the multilayered meanings (material, cultural and spiritual wellbeing) associated with rivers, waterholes, seas, lakes, soaks and springs for Aboriginal and Torres Strait Islander Peoples
- examining bays, rivers, waterfalls or lakes in Australia and in countries of the Asia region that have been listed as either World Heritage sites or national parks for their aesthetic and cultural value
- investigating the spiritual significance of water in an Asian culture

The causes, impacts and responses to an atmospheric or hydrological hazard (ACHGK042)

- explaining the physical causes and the temporal and spatial patterns of an atmospheric or hydrological hazard through a study of either droughts, storms, tropical cyclones or floods
- explaining the economic, environmental and social impacts of a selected atmospheric or hydrological hazards on people and places, and describing community responses to the hazard

Renewable And Non-Renewable Resources 1

Read the information then complete the tasks.



Resources

Natural resources are environmental resources which are found naturally in the environment. So far, only natural resources which are found on Earth are used by people around the world. However, scientists are exploring natural resources that they have found on items such as asteroids in outer space! Natural resources are divided up into three categories: renewable, non-renewable and continuous.

Renewable Resources

Renewable resources are those which are unlimited and include: water, air, sunlight, plants, trees, soil, wind energy and tidal energy. It is important to remember that renewable resources, such as water, need to be conserved and that we all need to be educated about the conservation of renewable resources.

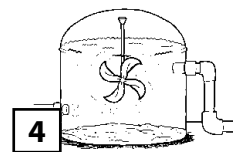
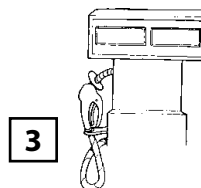
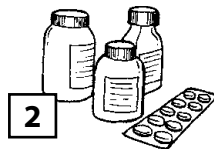
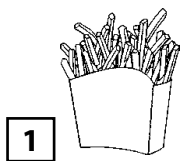
Non-Renewable Resources

Non-renewable resources cannot be regrown or reproduced over and over again. Non-renewable resources include: oil, metals (such as coal and uranium), salts and sand. For example, oil has developed beneath the earth over billions of years and once it is all used, no more can be made.

A. Label the resources renewable or non-renewable.

Resources	R or NR	Resources	R or NR
1. river		6. coal	
2. petroleum (oil)		7. water	
3. farmland		8. uranium	
4. plants		9. metals	
5. soil		10. air	

B. Which of the above resources are used to make:



Challenge

C. Find out how a continuous resource is different to a renewable and non-renewable resource. Write your answer below.

Rainfall And The Water Cycle

- ☐ Read the information and complete the tasks.



It is hard to imagine, but there is a limited amount of water in the world. The water that you may drink today has actually been recycled millions of times before it reaches your cup. This process of water recycling is known as the water cycle. The next time you have a drink of water think about where it has come from - it may have been a part of the iceberg that the Titanic hit or water which was once snow on the top of Mount Everest!

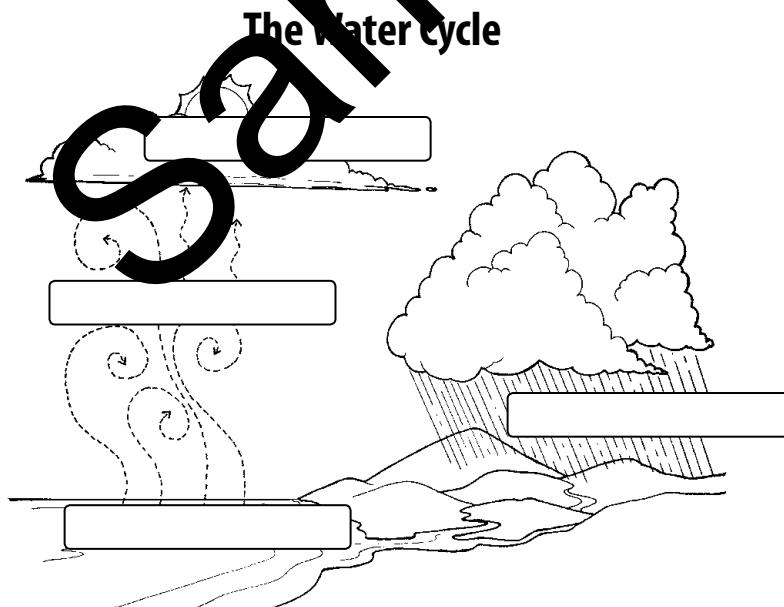
Water is constantly being recycled throughout the world. Water is considered a precious resource due to the large differences in its availability

in different countries. Some countries have an abundance of water such as New Zealand; other countries, such as Australia, have little water due to long periods of drought and large desert areas. Even within one country the availability of water can change greatly. For example, parts of Australia such as New South Wales and Victoria often suffer from extreme flooding due to heavy rainfall, while other outback regions frequently experience droughts.

Water is capable of taking many forms to serve many purposes. Firstly, water in its liquid form evaporates.

Evaporation occurs when the sun heats up the water in lakes, rivers and oceans, and turns it into vapour or steam. The vapour then rises into the air. This is the start of the water cycle. The water vapour gets cold in the air and changes back into a liquid, forming the clouds. This is called condensation. The third step in the water cycle process is precipitation - another name for rain. Rainfall occurs when the air can no longer hold the condensed air, and it falls back to Earth. The last step in the water cycle is collection - the return of the rain (water) back into the Earth's oceans, rivers, lakes and groundwater.

- A. Label the diagram to show the four stages of the water cycle. You could provide further explanation of each stage in the spaces around the diagram.



- B. Tell a partner how the water cycle works without looking at this sheet.

Challenge

- C. The Australian Bureau of Meteorology (BOM) publishes daily reports on dam water levels, rainfall predictions and actual annual rainfall in each region of Australia. Look up the actual rainfall recorded in your area for June for the last three years. Has the amount of rainfall increased or decreased during this time? Record your findings on the back of this sheet.

Surface And Groundwater 1

☐ Read the information and complete the tasks.



If you have ever tried digging a hole in your backyard and you live near a river, lake or ocean, you may have come across water as you have dug down. This water is known as groundwater.

Groundwater is the water which has soaked into the ground from rain, hail, snow

and sleet. Groundwater is used for drinking, irrigation, and for use in households and businesses. Due to gravity, the water moves down into the ground between the particles of soil, gravel, sand and rock until it reaches the other stored groundwater - this area is called the saturation zone.

GROUNDWATER

The top of this zone is called the water table. An aquifer is the name given to the water-bearing permeable rock from which the groundwater is extracted through a water well. The water table can be either close to the ground's surface or hundreds of metres below it.

A. On the back of this sheet or in your workbook draw a diagram which explains how groundwater is formed and extracted. Label your diagram using the words: new groundwater; particles of soil, gravel, sand and rock; stored groundwater and saturation zone.



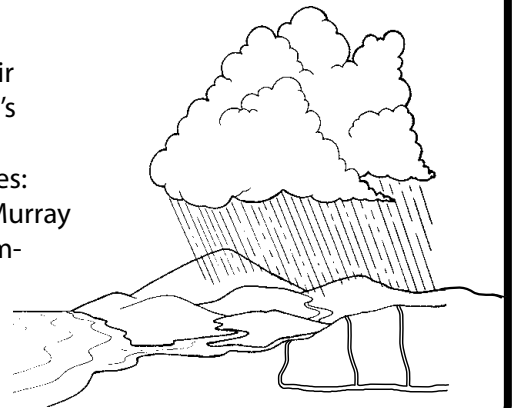
The water in rivers, lakes and ponds is called surface water. Surface water can soak down into the ground and become groundwater. Surface water is replenished by the water cycle.

The management of water resources is very important. In Australia the *Rights in Water and Irrigation Act (1914)* regulates how companies such as The Water Corporation manage the use of available water. Water allocation plans, state how much water is available from a particular

groundwater aquifer at any given time and how much water needs to remain in order for the groundwater to replenish. Licences are issued to companies and councils in order to make them accountable for their use. For example, Perth's Swinburn Peel region has five groundwater resources: Cockburn groundwater, Murray groundwater, Rockingham-Stakehill groundwater, Serpentine groundwater and South West Coastal

SURFACE WATER

groundwater. Licences are issued to all those in need of the water; they are then accountable for how the water is used and how much is used.



B. Explain what is happening in the diagram above left. Label surface water and groundwater.

C. Define surface water and groundwater in your own words.

Surface water: _____

Groundwater: _____

Limited Stocks Of Water 1

☐ Complete the task and read the information.

- A. Before reading the information below, complete the 'Before Reading' section of the Anticipation Guide. When you have read the information below, record how accurate you were by completing the 'After Reading' section of the Anticipation Guide.

ANTICIPATION GUIDE - GLOBAL WATER STOCKS

Selected Statements	Before Reading	After Reading
1. The world's population currently stands at four billion.	I think this statement is ... ☐ True ☐ False	I think this statement is ... ☐ True ☐ False
2. The melting of polar ice caps will increase the world's fresh water supply.	I think this statement is ... ☐ True ☐ False	I think this statement is ... ☐ True ☐ False
3. Fresh water stocks are readily available worldwide.	I think this statement is ... ☐ True ☐ False	I think this statement is ... ☐ True ☐ False
4. Nine countries in the world hold half the world's water.	I think this statement is ... ☐ True ☐ False	I think this statement is ... ☐ True ☐ False
5. A significant increase in the world's population will not affect fresh water availability.	I think this statement is ... ☐ True ☐ False	I think this statement is ... ☐ True ☐ False



GLOBAL STOCKS OF FRESH WATER

It is estimated that the world's population currently stands at six billion. It is thought by some scientists that in the next 40 years the world's population will double. This means that there will still be the same amount of water in the world but the human demand for it will be twice as much. Already, only 3% of the world's water can be used directly for human consumption.

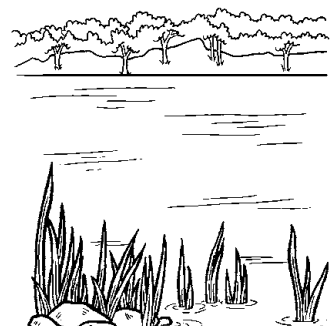
Fresh water is not evenly distributed throughout the world. Half of the world's water supply is located in just nine countries: the USA, Canada, Brazil, Colombia, the Democratic Republic of Congo, Russia, India, China and Indonesia. Even in these

countries, some people go without clean drinking water due to a lack of sanitation. The amount of fresh water in the world is estimated at about 10 million cubic kilometres, it is mostly contained in polar ice caps and underground aquifers. The rest comes from the following four areas:

- rainfall: 119,000 cubic kilometres;
- lakes: 91,000 cubic kilometres;
- human-made reservoirs: 5,000 cubic kilometres;
- rivers: 2,120 cubic kilometres.

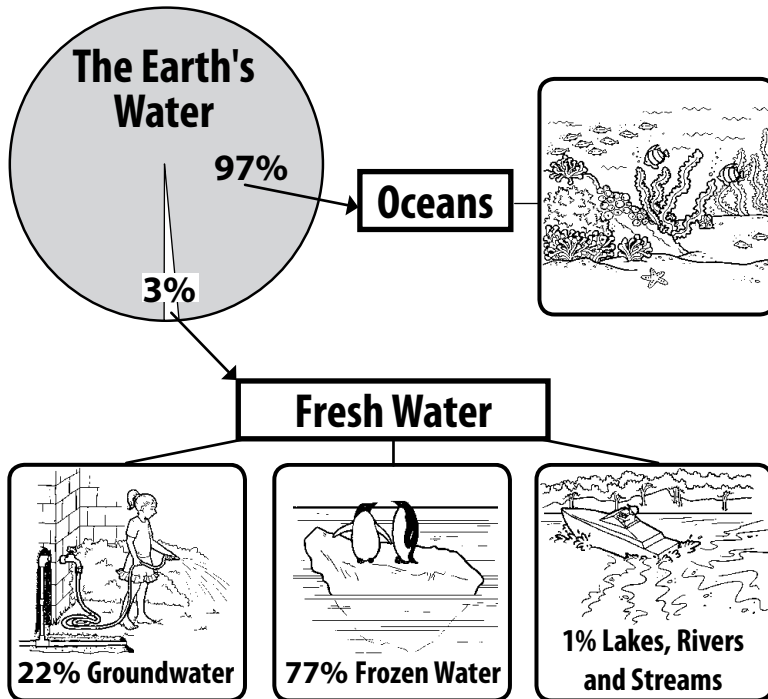
There is some concern that if global warming continues to melt glaciers in polar regions the amount of available fresh

water may actually decrease. The first threat comes from the fresh water in the glaciers melting and merging into the oceans' salt water. The second threat comes from an overall increase in the oceans' volume from the melted glaciers - two thirds of the world's fresh water is locked up in glaciers which could cause a rise in the sea level resulting in the contamination of fresh water sources along coastal regions.



Limited Stocks Of Water 2

☐ The information on this page and on page 21 will help you to complete the tasks below.



A. Use the information in the diagram to explain the current status of fresh water available in the world.

B. List the nine countries in the world that hold the most water.

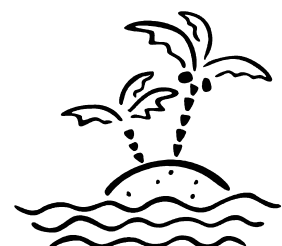
1.	4.	7.
2.	5.	8.
3.	6.	9.

C. What Am I? Solve the riddles.

- I hold 77% of the Earth's fresh water but nobody can drink from me.
- I am under the ground but not everyone knows that I am there for them to drink.
- I currently have six billion inhabitants but that will double in the next 40 years.
- I flow on the Earth's surface for all to see but I hold only 1% of the world's fresh water.
- I hold 97% of the world's water but no matter how thirsty you are you can't drink me.

Challenge

- D. A group of islands known as the Maldives have already been affected by rising sea levels. Find out how this group of islands has been affected. On the back of this sheet or in your workbook write down what they have done to adjust to this situation.



Irrigation

☐ Read the case study then complete the task.



CASE STUDY: KUNUNURRA



Water needs to be shared by industries, agriculture and households. Kununurra is a town in the far north of Western Australia. The town was deliberately placed among the hills and ranges of the far north-east Kimberley region. This area had an abundance of fresh water conserved by the Ord River Diversion Dam and the main Ord River Dam.

Over time the area has harvested crops, (sugar cane, melons, sorghum seeds, chickpeas, pumpkins, mangoes, bananas and citrus), irrigated pasture and tropical forests. 134 kilometres of open channels carry water from Lake Kununurra to farms, while about 155 kilometres of open channels collect drainage water which discharges into the Ord River.

Tourism and mining have become important to the local economy as well as agriculture. The Ord River Irrigation Area makes it possible for many other communities to exist in the region.

- A. Kununurra and its surrounding communities have economies based on irrigation. Use the planning sheet below to research the area and find out how the irrigation system supports local agriculture, mining, industry and townships.

MY RESEARCH NOTES ABOUT: KUNUNURRA AND THE ORD RIVER IRRIGATION AREA			
NAME: _____		DATE: _____	
	Research Question 1	Research Question 2	Research Question 3
Research Source 1			
Research Source 2			
Research Source 3			

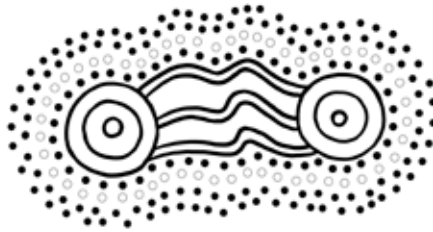
Indigenous Water Management 1

☐ Read the information then complete the task.

Indigenous people's relationship with water, land and resources are interrelated. Inland water, rivers, wetlands, the sea, islands, reefs, sea grass beds and sandbars are all part of an inseparable understanding of the Earth.

Indigenous people have always understood how water is stored below the land and is part of river or creek systems. In the desert a 'soakage' or 'soak' is the non-indigenous name given to water sources. The indigenous people depend on these 'soakages' in times of drought. Indigenous people scoop out the mud or sand of groundwater by using a tool known as a coolamon. They often dig down for several metres until clean water appears at the base of the hole. These 'soaks' are also known as a native well.

Indigenous people cover wells with dead branches and uprooted trees to keep away dead animals. They can maintain wells up to fifteen feet deep by using the coolamon to throw peat against the wall -



this sets like cement and helps to hold the loose sand on the sides of the well.

For the Aboriginal people water is protected by Lore, a system of sustainable management which was misunderstood by the European settlers. To a certain extent there is still a poor representation of Aboriginal knowledge of water in government laws and regulations. For example, in Aboriginal traditions, water is never to be separated from the sky or the features of the landscape. Modern regulations have treated each of these as completely separate entities. However, with further recognition of Aboriginal ownership of the land more consultation now takes place with the traditional land owners of Australia.

There has been recent

consultation with the Aboriginal people regarding the Gngangara Mound in Western Australia. This groundwater supply extends from the Moore River and Gingin Brook in the north; Ellen Brook in the east; the Swan River in the south; and the Indian Ocean to the west. The mound is of vital importance to supporting population and economic growth in the region. Water from the mound supplies public ovals, recreation grounds, household gardens, horticultural centres, businesses and industries. Water from the mound needs to be carefully regulated. The Aboriginal people request that water flow and vitality are protected from development. Long-term strategies to manage the mound include consultation with the Aboriginal people as a part of the spirit of inclusion and co-operation. The Aboriginal Heritage Act of 1972 and the Native Title Act of 1993 ensure that sites of heritage or spiritual significance for the Aboriginal people are protected.

Challenge

Why is it important that Aborigines and Torres Strait Islanders of Australia are consulted about the use of water in Australia today?

Water Management Strategies 1

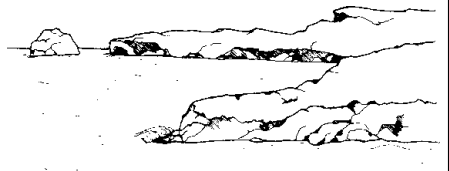
- Read the following case studies about how Australia and overseas countries are managing their water, then complete the Find-A-Fact tables.



CASE STUDY 1: KURNELL DESALINATION PLANT, SYDNEY, AUSTRALIA

The Kurnell Desalination Plant was built in 2010 and is located in Kurnell, New South Wales. It generates 250 mega-litres of water per day and was built at a cost of \$1.896

billion dollars. Desalination is the process of using reverse osmosis to convert ocean water to fresh water. The plant is generated by 100% renewable energy.



Find-A-Fact

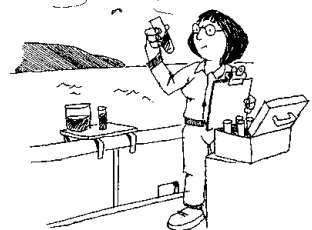
1. Find out how much of Sydney's water supply the Kurnell Desalination Plant currently supplies.	
2. Which three areas in New South Wales does Kurnell supply water to?	



CASE STUDY 2: THE WARRAGAMBA DAM, SYDNEY, AUSTRALIA

The Warragamba Dam supplies 80% of Sydney's water supply. The dam took 12 years to build and was completed in 1960.

Warragamba is the largest concrete dam in Australia and is used specifically to supply water to urban areas.



Find-A-Fact

1. Find out what the name Warragamba means in the traditional Aboriginal language.	
2. How is the dam used to combine recreation and water supply?	

CASE STUDY 3: Increasing The Cost Of Water

Increasing the cost of water for consumers can be an effective tool for getting people to reduce their use of water. Discuss with your class whether this is an effective strategy.

