

Teacher Support Package

Early Years Education

This package is designed to support teachers and educators by providing links to relevant, quality and engaging educational resources related to the work that WaterNSW does managing the drinking water catchments and dams for Greater Sydney. The selected content, experience ideas and online learning tools are aligned with the Early Years Learning Framework outcomes as outlined below.

How to use this package:

- Use the introduction to each section and the links to websites to extend educators' understanding of key concepts before teaching.
- Include the songs, books, videos, and hands-on activities in your experience plans to extend children's learning.
- There are four example experience plans provided at the end of this package which can be adapted by educators to explore key concepts.
- This package may be used as a standalone resource or to enhance an excursion to Warragamba Dam.

Pre-visit

Prior to visiting Warragamba Dam on an excursion, teachers may choose to introduce new ideas and concepts. This will enable children to connect place-based learning to existing understandings.

Post-visit

Following an excursion to Warragamba Dam, teachers may choose to validate, consolidate, or further extend children's understanding.

Connections to the EYLF:

- Outcome 1 – Use the resources to extend children's learning based on their interests, needs and developing skills.
- Outcome 2 – Experiences and resources foster children's connections to our world, including exploration of Warragamba Dam, catchments, and the natural environment.
- Outcome 3 – Experiences and resources provide opportunities for children to develop physical and social skills through exploration and play.
- Outcome 4 – Resources could extend children's learning through inquiry-based experiences and projects.
- Outcome 5 – Children's language skills can be supported through discussions, engagement with literacy and numeracy, and through expression through many forms.

The following icons have been used to categorise the links:

	Websites (for teacher's background information)		Videos		Movement & Singing
	Puzzles, Games and Creativity		Books		

Visit waternsw.com.au/education for more information or to book an excursion.

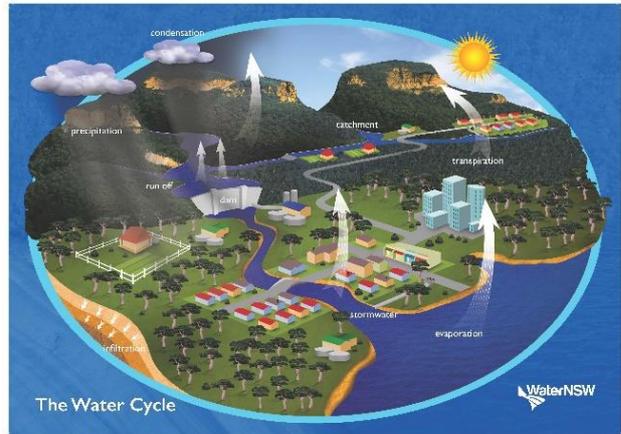
The Water Cycle

The earth only has a limited amount of water. This water keeps going around and around – from the land to the sky and back again. This journey is called the 'water cycle'.

We all need clean freshwater to survive.

Although about three-quarters of the Earth's surface is covered with water, less than one percent of this is available for us to use.

When we interrupt the natural water cycle by building dams so that we have clean safe water, this is called the 'managed water cycle'.



Resources	
	<p>WaterNSW – Water Cycle Information</p> <p>WaterNSW – A4 Water Cycle Factsheet</p>
	<p>Dreamtime Stories – Tiddalik The Frog (2:42mins)</p>
	<p>Meg Humphrys – When water lost her way (8:00mins)</p> <ul style="list-style-type: none"> • An Australian story about water • From the 2019 Notable list from the Children's Book Council of Australia • Lost in her ever-changing forms, Water questions who she is after an encounter with a creature in an underground cave. Water seeks all parts of her cycle for answers. <p>WaterNSW – Water-themed book list</p> <ul style="list-style-type: none"> • This water-themed book list will help you to find books suitable for exploring all aspects of water, including Australian perspectives. <p>Red Cat Reading – Earth's Water (5:57mins)</p> <ul style="list-style-type: none"> • The book explores the different states of water - liquid, gas and solid. It explains how the changes occur. • At the end there are some simple experiments you can do at home or in the classroom. <p>Yorta Yorta Man and Aboriginal artist Mr Francis Firebrace – How the Great Fish Goodoo Created the Murray River (4:30mins)</p> <p>Picture book – A Drop Around the World by Barbara McKinney</p> <ul style="list-style-type: none"> • Review and Introduction • Read Aloud with Ms Caudle



Have fun teaching – [Water Cycle song](#) (3:41mins)

Jack Hartmen – [Water Cycle Dance](#) (2:55mins)

Bob Schneider – [Listen to the Water](#) (4:09mins)

Blazer Fresh – [Water Cycle Rap](#) (3:16mins)

Songs for Teaching

- A site with many educational songs
- Select a song. Lyrics and/or purchase options are available
- Many can be viewed on YouTube



WaterNSW – Water Cycle in a Bag (Hands-on Activity)

[Introduction video](#), [Conclusion video](#), [Instructions](#), [Results sheet](#)

- You can make it rain in a bag! These videos and worksheets show you how to create a water cycle in the bag.

WaterNSW – [Play and learn about the water cycle with Gillie](#)

- Learn about the water cycle with a printable board game.

Attached experience plan:

- Water Cycle creative arts¹

What is a catchment?

A catchment is an area where water is collected by the natural landscape.

Imagine cupping your hands in a downpour of rain and collecting water in them. Your hands have become a catchment.

The outside edge of a catchment is always the highest point. Gravity causes all rain and run-off in the catchment to run downhill where it naturally collects in creeks, rivers, lakes, or oceans.

Rain falling outside the edge of one catchment is falling on a different catchment and will flow into other creeks and rivers.



Resources	
	<p>Australian Environmental Education – What is a catchment?</p> <p>WaterNSW – Catchment information</p> <p>WaterNSW – Special Areas</p> <ul style="list-style-type: none">• Special Areas are zones that protect Greater Sydney's drinking water catchment.
	<p>Buladerang – A Wiradjuri Creation Story of where two catchments meet (4:53mins)</p> <ul style="list-style-type: none">• Sharon Riley, a Wiradjuri woman, tells the story of Gaygar and Biladurang on the River Lett (near Lithgow).
	<p>WaterNSW – Learn with Shellby: What is a catchment?</p> <ul style="list-style-type: none">• Use this worksheet as a provocation for discussion about what happens in the catchment. <p>WaterNSW – Our Changing Catchment Video</p> <ul style="list-style-type: none">• Students build a model of a catchment and investigate weather, erosion, and turbidity. <p>Attached experience plan:</p> <ul style="list-style-type: none">• Create a model of a catchment²

Warragamba Dam

Located about 65 kilometres west of Sydney in a narrow gorge on the Warragamba River, Warragamba Dam is one of the largest domestic water supply dams in the world.

Created by damming Warragamba River and flooding the Burratorang Valley, the storage lake is four times the size of Sydney Harbour and stores up to 80 percent of Sydney's water. Warragamba Dam supplies water to more than 5 million people living in Sydney and the lower Blue Mountains.

The best quality water is selected and drawn through screens on three outlets in the upstream face of the dam. Water flows by gravity through a valve house into two pipelines that feed the raw water to Prospect water filtration plant and via off-takes to smaller filtration plants at Orchard Hills and Warragamba.



Resources	
	<p>WaterNSW – Visiting Warragamba Dam and related information</p> <p>WaterNSW – Greater Sydney Dam Levels</p> <ul style="list-style-type: none"> Discover how much water is in Sydney Dams by using this interactive map <p>WaterNSW – Water Insights</p> <ul style="list-style-type: none"> Explore how much water is available in each water supply across the state via an interactive state map
	<p>WaterNSW – 2012 Warragamba Dam spilling video footage (2:27mins)</p>
	<p>Attached experience plans:</p> <ul style="list-style-type: none"> Build a dam with blocks³

Water as a resource

Water is a precious, natural resource that supports all human, plant, and animal life. We use it to grow food and make goods. Water supports life.

Australia is the driest, permanently inhabited continent, and our frequent droughts and long periods of hot, dry weather make water an even more valuable resource. We store more water per person than any other country, to make sure we have enough during times of drought.

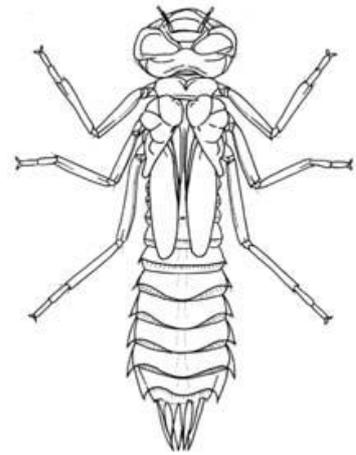
When our dams are full, WaterNSW stores over 500,000 litres (half a megalitre) of fresh water for every person in the Greater Sydney area. However, our growing population and variable climate mean that saving water makes good sense.

Resources	
	<p>WaterNSW – A Precious Resource</p> <ul style="list-style-type: none"> Balancing competing human and environmental demands for water is a critical global issue.
	<p>Gapuwiyak – The Water Song (2:41mins)</p> <ul style="list-style-type: none"> An Indigenous perspective sung in a mix of Djambarrpuyngu language and English by children in Gapuwiyak Arnhem Land <p>Sesame Street – The Water Song (1:27mins)</p>
	<p>South Australia Water – Captain Plop</p> <ul style="list-style-type: none"> A downloadable PDF in the series Captain Plops Tour De Recycle for a parent or teacher to read aloud.
	<p>Halls Creek Community in the Kimberly – Don't waste the water (4:02mins)</p> <p>Singapore's National Water Agency – Let's Go Save Water (1:20mins)</p>
	<p>WaterNSW – Learn with Shellby: Water at home</p> <p>Arizona USA, Water Use it Wisely campaign – Interactive games</p>

Healthy water is home to many creatures

Rivers, streams and dams are a hidden world full of life and diversity. Sheltered bays and shallow inlets, where creeks and rivers flow into the lake, are an ideal habitat for native animals such as turtles, platypus, and water rats.

WaterNSW scientists use the study of aquatic life as bioindicators of potential issues. A change in the health and numbers of aquatic life could tell us that there is a change in water quality. By studying these changes, we can better understand where we need to put measures in place to stop potential pollutants from traveling into the water supply. Populations of macroinvertebrates or “water bugs” are studied on an ongoing basis.



Macroinvertebrates are creatures without backbones that you don't need a microscope to see. An example is the dragonfly larvae picture to the right.

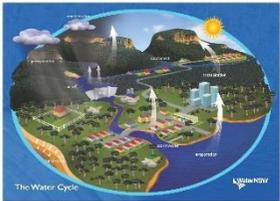
Macroinvertebrates are usually abundant and diverse when water quality is good, but they are sensitive to deteriorating water quality and habitat condition, and to changes in water flow.

Resources	
	National Geographic Kids – Freshwater Habitat
	<p>Melbourne Water – Water Bugs (3:13mins)</p> <p>ABC Science Program Catalyst – Eel Migration (5:13mins)</p> <ul style="list-style-type: none">• Epic story of eels travelling thousands of kilometres to breed. <p>ABC Education – Lives of Platypuses (4:17mins)</p> <p>Deep Look – Water Strider Video (3:33mins)</p> <ul style="list-style-type: none">• Insect Hunters that walk on water <p>National Geographic – Freshwater shrimp clean the water (3:45mins)</p> <ul style="list-style-type: none">• In this short film by Freshwaters Illustrated, dive into a busy tropical stream ecosystem and learn how shrimp, crabs, and other invertebrates are creating a nutrient-rich environment for wildlife to flourish and humans to enjoy.

	<p>NSW Water watch – Water Bug ID Charts and posters</p> <p>Melbourne Water – Puddles the Platypus story and activities</p>
	<p>Peter Combes - Tadpole Blues (3:12mins)</p> <ul style="list-style-type: none"> • Explores the lifecycle of a frog
	<p>Australian Museum – Frog ID project</p> <p>National Water Bug Blitz – Get involved and meet the bugs</p> <p>WaterNSW – Select from a range of engaging printable activities.</p> <ul style="list-style-type: none"> • Fish (Simple colouring) • Goola (Cormorant) (Simple colouring) • Platypus (Complex colouring) • Water rat (Complex colouring) • Crayfish (Mirror-a-bug) • Snail (Enlarge-a-bug) • Tangled eels (Colour and count) • River scene (Colour, Puzzle, Cut-and-Paste) • Long-necked turtle (Activity Choice Board) <p>Melbourne Water – Waterway activity sheets</p> <ul style="list-style-type: none"> • A range of activity sheets to support children to get to know the animals living in their local waterways. <p>Melbourne Water – Water creature colouring-in</p> <p>Attached experience plans:</p> <ul style="list-style-type: none"> • Catch and count aquatic macroinvertebrates⁴

Experience Plan Examples

1. Water Cycle creative arts



Learning objective:

To use the water cycle as a provocation for a layered creative arts creation, exploring concepts of the cycle throughout.

Resources and set up:

Over several days or experiences, set up various creative arts materials your service has readily available, such as:

- paper
- brushes
- paint
- watercolours
- markers
- pencils
- charcoal
- collage materials

Experience description:

Begin each experience with a discussion of the water cycle, such as watching a video or reading a story from the above resources.

Then, concentrate on a specific part of the water cycle, discussing the features of this part. Use this to lead into a creative arts experience using the part of the water cycle as inspiration for your artworks, adding each day to create a multi-layered creation, for example:

- **Evaporation:** Use water colour paints to explore evaporation, noting how quickly the paint dries in the sun.
- **Condensation:** Use sponges to paint with white and grey paint, creating cloud-like patterns on top of the water colours.
- **Precipitation:** Flick and spray acrylic paint onto the artwork, using brushes with stiff and short bristles (see [How to FLICK and SPRAY Acrylic Paint](#) for a step by step video on this technique).
- **Run off:** Use drip paint to add another layer to your art works (see [Drip Painting With Fluid Acrylics](#) for an example video on this technique).
- **Collection:** Use pencils, pastels, markers, or charcoal to draw representations of the collection process, drawing round lakes, long rivers, and dams drawn with square shapes.

You can also explore infiltration, transpiration, and stormwater through other art experiences.

When the art works are completed, add annotations to the pieces or in a display, using the children's voices for explanations of the water cycle to extend their learning and check their understanding.

Links to EYLF:

- Outcome 4 – “Children transfer and adapt what they have learned from one context to another” (p. 55)
 - Children demonstrate their understanding of the water cycle through a variety of creative arts approaches, learning through a variety of contexts.
- Outcome 5 - “Children express ideas and make meaning using a range of media” (p. 61).
 - Children express themselves and their understanding through discussions and art.

2. Create a model of a catchment



Learning objective:

To understand the different uses of our catchments and the ways WaterNSW and the community can protect the catchment and reduce impacts on our drinking water quality.

Resources:

a tray of kinetic sand (optional) or a tablecloth with blocks or pillows to create high points and low points in the catchment.

Resources to represent the different uses of our catchment, such as:

- farm animal toys
- fences
- houses
- trees
- roads
- blocks to represent dams
- blue material to represent lakes and rivers
- other open-ended resources

Use resources you have already and use your imagination – resources can be used to represent several things (leaves can be trees or

Set-up:

If using kinetic sand in a tray, shape the sand so it is higher on the edges, with a low part in the middle, to simulate mountains and a valley in a catchment.

If using a tablecloth and blocks or pillows, place the blocks or pillows under the tablecloth around the edges to create high areas around the outside and a low area in the middle, to simulate mountains and a valley in a catchment.

Offer the other resources (demonstrating uses of our catchment) near the catchment model to support children to create multi-use catchments.

Experience description:

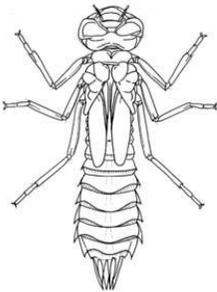
This experience is designed to be set up in an area of your play space, for children to explore in free play, although you may like to introduce the key concepts of catchments in a teacher-led experience first. You should also play alongside children to reinforce the different uses of the catchment and connect these uses to real life by exploring the uses of your local catchment. Some key concepts you could explore include:

- The importance of trees in the catchment – tree roots hold onto the soil so it doesn't wash away into our drinking water when it rains. Support children to use lots of trees in their healthy catchments.
- Farms in the catchment – we don't want the germs from farm animals' poo to get into our water, so WaterNSW supports farmers to build fences away from creeks, rivers, and lakes. Support children to use fences around the farm animals in their catchments.

Links to EYLF:

- Outcome 2 – “Children develop a sense of connectedness to groups and communities and an understanding of their reciprocal rights and responsibilities as active and informed citizens” (p. 39).
 - Exploring the uses in their catchment can support children to understand their role and the role of WaterNSW in protecting the drinking water quality and the environment.
- Outcome 4 – “Children resource their own learning through connecting with people, place, technologies and natural and processed materials” (p. 56).
 - Children can explore a range of resources, connecting this play to the real world through further discussions and investigations.

	<p>shrubs, blocks can be houses, sticks can be fences, rocks can be animals).</p>	<ul style="list-style-type: none"> • Towns in the catchment – towns might contribute to pollution and rubbish in our drinking water systems. Having a Special Area of trees around the main lake in the catchment can protect the drinking water quality. Support children to place the houses away from the main lake in your catchment, and place lots of trees in and around the towns to protect the water quality. • Build dams with blocks in your catchment to reinforce ideas of the managed water cycle and introduce the idea of drinking water. 	
<p>3. Build a dam with blocks</p> 	<p>Learning objective: To explore and construct dam-like structures, taking on the role of an engineer through role play.</p> <p>Resources and set up: Set up blocks, toy vehicles, loose parts materials, and other available resources (such as, hi-vis vests and shirts, hard hats, pipes, and tools) on a mat in the indoor or outdoor play space.</p>	<p>Experience description: Facilitate the children's learning through setting up a free play area with the construction materials. You can extend children's learning through discussions about dams and by providing reference pictures of dams to inspire the children's building. The children can engage in free play, constructing using the blocks and other materials, and engaging in role play with the dress ups. Educators can support children through engaging in play and making suggestions to build dams, connecting to the dam or weir in your catchment. Children can engage in problem solving and dramatic play, extending their learning about the dam. Children can work together to build, construct and play.</p>	<p>Links to EYLF:</p> <ul style="list-style-type: none"> • Outcome 4 - "Children develop a range of learning and thinking skills and processes such as problem solving, inquiry, experimentation, hypothesising, researching and investigating" (p. 53)

<p>4. Catch and count aquatic macroinvertebrates</p> 	<p>Learning objective: To role play as scientists and incorporate mathematical learning in children's play.</p> <p>Resources and set up: Set up an area with available dramatic play resources, such as lab coats and safety glasses. Also provide nets and small balls – you can also add pictures of aquatic macroinvertebrates (water bugs) on them. Nearby, have a whiteboard or clipboard with writing materials for children to record data for the number of creatures collected.</p>	<p>Experience description: The children can use the nets to scoop up the balls representing the aquatic macroinvertebrates. Educators can support and encourage children to count and record the amount of each water bug. Educators will connect this process with the real world through watching the videos listed in the resource section with the children. Educators can also facilitate discussions regarding the role of WaterNSW's scientists in counting the number of aquatic macroinvertebrates in the lakes and rivers to monitor the water quality of our raw drinking water to extend children's understanding.</p>	<p>Links to EYLF:</p> <ul style="list-style-type: none"> • Outcome 4 - "Children develop a range of learning and thinking skills and processes such as problem solving, inquiry, experimentation, hypothesising, researching and investigating" (p. 53). • Outcome 5 – "Children begin to understand how symbols and patterns systems work" (p. 62).
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