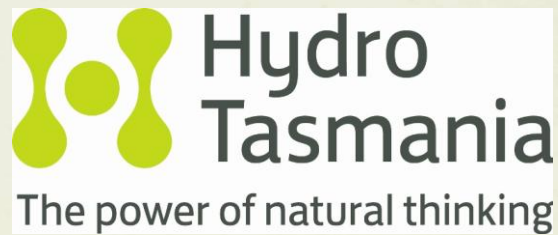




green hub
by Greening Australia

Water for Life – Catchment Care Resource Pack Year 7

Proudly supported by:



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Water for Life – Catchment Care

Resource Pack - Year 7



What is Water for Life?

Water for Life is a call to teachers and students to discover and investigate their local waterway with the aim to inspire Catchment carers now and for the future. It is a supported class inquiry for grade 2 and grade 7 which is done over 6 to 8 weeks. Classroom teaching and learning is supported by three hands-on sessions run by Greening Australia staff. Classes are invited up to the new Sustainability Learning Centre in Mt Nelson, near Hobart, as well as Greening Australia staff visiting the school. The outcomes support the National Australian Curriculum and are outlined in detail further in the document.

Explore. Inspire. Change.

Taking part in Greening Australia's education program will have you **exploring** your natural environment, allowing you to be **inspired** by the beauty and complexity of the natural world at your feet. To spark you to **change** behaviour, ultimately taking action and making more positive choices for the natural world and the humans on it.

How to use this Resource Pack

This pack is a collection of lessons, ideas and thinking stems to aid in classroom planning when undertaking the Water for Life inquiry. Please read through at the start of planning. Further suggestions and links are located at the back of the pack.

Enquiries

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Acknowledgments

This pack is a selection of activities and resources by Greening Australia Tasmania and other sources. Other sources are noted where used.

Water for Life – Catchment Care

Resource Pack - Year 7



Contents

Water for Life Sessions and Outcomes	4
Australian National Curriculum	5
Setting the Scene: Australia's Water	6
Water Cycle Worksheet	7
Water Puzzle	8
Water in a Box	9
What is a Catchment?	10
After Session 1	12
Introducing the Water Users	14
Thinkers Keys Worksheet	15
After Session 2	16
Water Alive	17
Build your own Bio Water Filter	19
After Session 3	21
Catchment Carers	22
Web Links - Teachers	23
Web Links - Students	24

Water for Life – Catchment Care

Resource Pack - Year 7



Water for Life Greening Australia conducted sessions:

Sessions are 90 minutes in length and are conducted outside as a first choice. A detailed plan can be provide on request.

1. What is a Catchment?

- > **Location:** the school grounds on an undulating area, and in the classroom
- > **School provides:** extra iPads if available, pencils
- > **Outcomes:**
 - Understanding of the water cycle and how it works.
 - Understanding how a catchment works and how water flows.
 - Understanding of the scientific method used for experiments.
 - Introduction to your catchment boundaries.

2. Introducing the Water Users & the Water Managers

- > **Location:** the Sustainability Learning Centre, Mt Nelson, near Hobart
- > **School provides:** transport to Mt Nelson*
- > **Outcomes:**
 - Awareness of the different ways we use water in our everyday life.
 - Understanding how water flows and what travels with it.
 - Understanding the role of pollution on river health.
 - Awareness of the complexity of water management for healthy lives.

3. Water Alive

- > **Location:** a local waterway, a good size, moderately healthy, river or creek
- > **School provides:** bus transport to waterway if needed.
- > **Outcomes:**
 - Understanding the food web and food chains.
 - Awareness of the role water bugs play in the ecosystem.
 - Understanding how to classify water bugs and other insects.
 - Awareness of how water bugs indicate river health.

** Where a school cannot travel to Mt Nelson, a choice of 2 sessions will be delivered by Greening Australia. A detailed plan will be provided as a framework to deliver the third by school staff.*

Water for Life – Catchment Care

Resource Pack - Year 7



Supports Australian National Curriculum:

Year 7 Science:

- > There are differences within and between groups of organisms; classification helps organise this diversity. (ACSSU111)
- > Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions. (ACSSU112)
- > Water is an important resource that cycles through the environment. (ACSSU222)
- > Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations. (ACSHE120)
- > Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management. (ACSHE121)
- > People use understanding and skills from across the disciplines of science in their occupations. (ACSHE224)
- > Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate. (AC SIS133)

Year 7 Geography:

- > The classification of environmental resources and the forms that water takes as a resource. (ACHGK037)
- > The ways that flows of water connect places as it moves through the environment and the way this affects places. (ACHGK038)
- > The quantity and variability of Australia's water resources compared with those in other continents. (ACHGK039)
- > Present findings, arguments and ideas in a range of communication forms selected to suit a particular audience and purpose; using geographical terminology and digital technologies as appropriate. (ACHGS053)
- > Reflect on their learning to propose individual and collective action in response to a contemporary geographical challenge, taking account of environmental, economic and social considerations, and predict the expected outcomes of their proposal. (ACHGS054)

Water for Life – Catchment Care

Resource Pack - Year 7

Setting the Scene: Australia's Water Resources

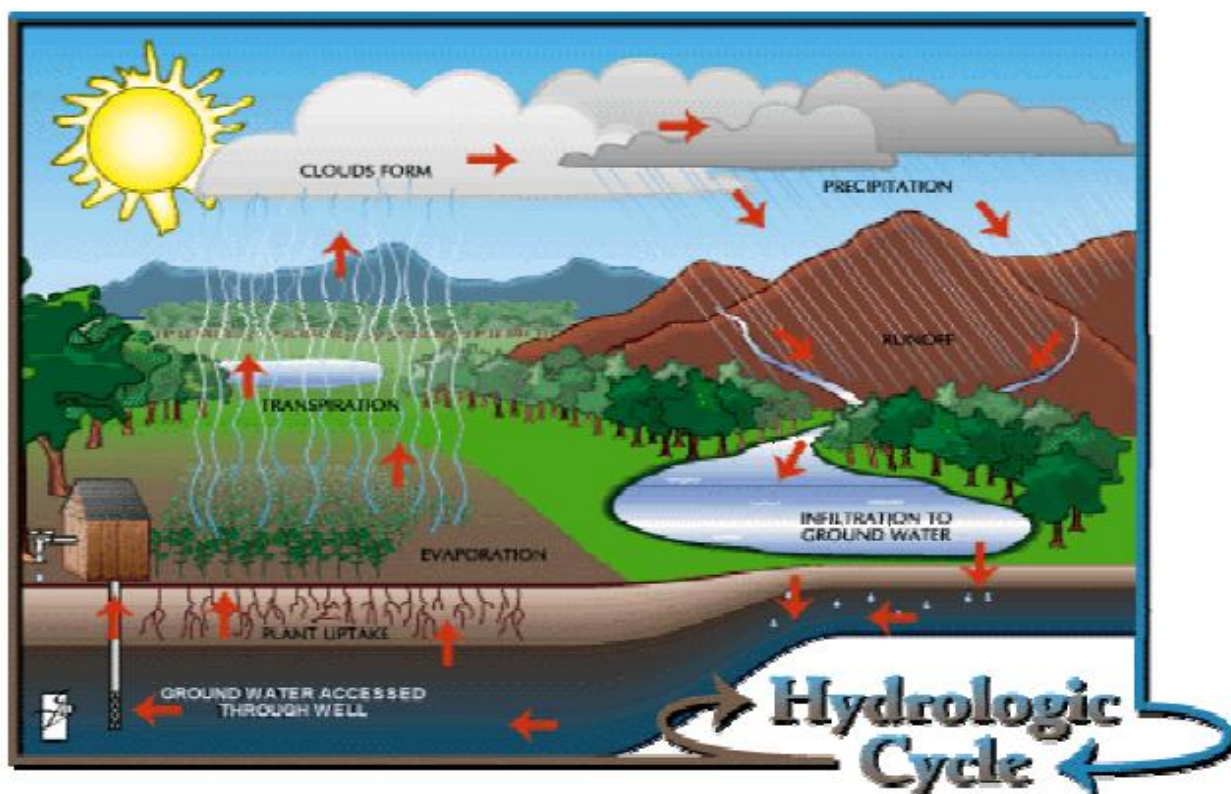
Start with this setting the scene with a slide show presentation. Greening Australia has a 63 slide Powerpoint of images and facts you can download from www.greenhub.org.au. It is recommended that you play the show in full to instrumental music of your choice. It is used to evoke passion on this topic and why we should care for our waterways and water health.

Discuss or set work tasks as you choose to start this inquiry.

Source: adapted from The Water Source, Williamstown High School, Victoria

Water Cycle

It is always good to review and explain the water cycle with the class. Ask students to visit www.greenhub.org.au find the water page and click on **Check This Out** links to find interactive water cycles and videos. We like this one too:



Water Cycle Terms – Mix and Match Worksheet

Condensation

the emission of water vapour from the leaves of plants

Precipitation

the changing of a liquid into a gas, often under the influence of heat. It is the opposite of condensation

Transpiration

the process by which atmospheric water vapour liquefies to form a fog, clouds, or the like, or solidifies to form snow or hail

Infiltration

the falling products of condensation in the atmosphere, such as rain, snow or hail

Evaporation

the downward movement of water through soil

Source: *The Water Source*, Williamstown High School, Victoria.

The water puzzle – worksheet and task

Made by year 7 students on the water cycle. You can use this one for fun. Have students create their own word find and share around the class.

P F V D S M D Z A J I H W D E
R V G Y Y W R G P K S J R L P
H E T R E E S Q E Y Q O C N V
D W T X M R E P L L U Y P O V
A R A A E Z D T F G C S V I Y
O V Y T W B E H H R Z E I T P
U N A C M E X T E V K A O A Y
X W I Q Y X N T H D T W N S R
P S U N T C A R A U V A Z N S
M X A Z L W L W U W Y T X E D
D D I K A E R E L O K E E D U
W E T C Y C L E Y R B R Q N O
D Q J W X X U Y S P R L Q O L
S T N A L P U E Q X T F E C C
A N Y A A S C L Z G N F Y M T

CLOUDS

CONDENSATION

DROUGHT

DRYCYCLE

ELNINO

MELBOURNEWATER

PLANTS

SEAWATER

TREES

WATER

WATERCYCLE

WETCYCLE

Source: *The Water Source, Williamstown High School, Victoria with permission.*

Water for Life – Catchment Care

Resource Pack - Year 7



Water in a Box Activity

Play music in background to signify how long they have at each station. Stop music when it is time to move to the next station.

Each station has 1 or 2 items which you choose that are related to water or more specifically, catchments. The small groups need to sit quietly and reflect on the question on the butchers paper beside each box. Each group writes a response to the question on the **BOTTOM** of the paper. Once their response is completed they fold up the bottom end to hide their answer. The next group responds and folds up their answer until all groups are finished.

At the end the last group at that station reads out all the responses and/or summarises the responses.

Using the 'Thinkers Keys' these questions are written on the top of the butcher's paper and placed beside each station water box.

- > List 5 commonalities between these 2 items.
- > Describe 5 different uses for this item.
- > Name 5 things you would never use these items for.
- > List 5 disadvantages of using this item.
- > Suggest a new invention for using this item.
- > When do you predict this item will be a common household object? Why?
- > Draw a quick picture, as a group, of this item in action.
- > True or False? Justify why you think this is true or false.
- > The answer is 100,000 litres. What is the question?
- > If this was common knowledge, how would the world be different?

Water for Life – Catchment Care

Resource Pack - Year 7



What is a Catchment? - Leading into Session 1

Where Does the Water Flow?

(Source: Cool Australia. www.coolaustralia.org)

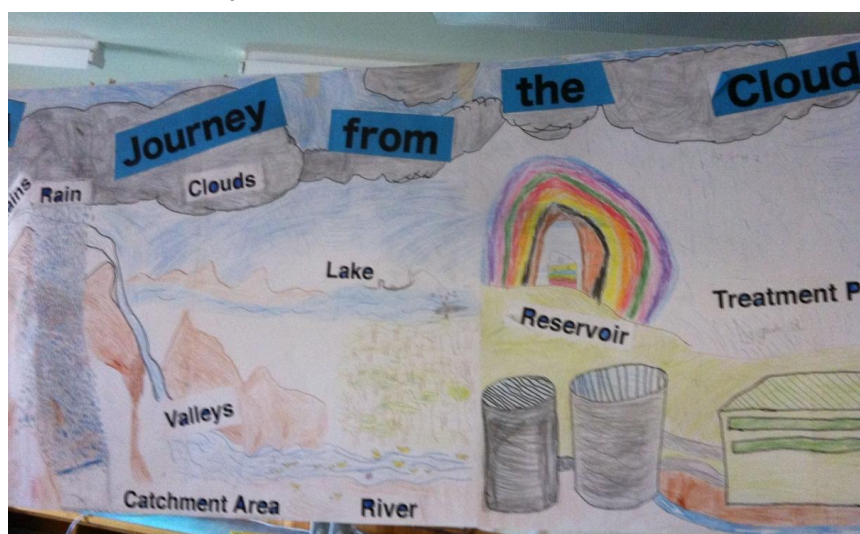
Use this activity to find out what students already know and if they have any misconceptions about water. You may wish to keep the activity so it can be reviewed and changed by students reflecting their new understanding.

Activity Outline

Review with students how a flow chart is designed. Ask students to design a flow chart that tracks the flow of water from its source, e.g., from a dam to the way they as individuals use water and the disposal of waste water. The flow chart can have as many boxes as they wish but they only have a specific amount of allocated time (e.g. 5 or 10 minutes). The flow chart will need to have:

1. The source of the water.
2. The passage of the water before it gets to the student.
3. What the water is used for.
4. And if some of the water is disposed of, where does it go?

Once completed, compile a single flow chart as a whole class, using the students' ideas. As an extension you can make a class poster.



Year 2, St Bridget's Catholic School

Water for Life – Catchment Care

Resource Pack - Year 7



Your River

Make a poster drawing answering - what is a river? There is no right and wrong here, just to see what is created.

The poster will show the life and uses of a river. Encourage creativity, colouring, as much detail as possible.

Water Mind Map

Make a group list or mind map of how water is used. (e.g., drinking, washing, watering, hydropower, swimming, growing things)

Water Words

Make a list of water words in groups in 2 minutes. Compare words by one team reading out their words. If other teams got that word it is not counted. Winning team is the team with the most original words.

Examples:

trickle, flush, river, pool, aquatic, waterfall, wet, rain, hail, lake, lagoon, ocean, pond, creek, sea, drip, rainbow, icicle, stream, wetlands, catchment, vapour, spray, puddle, irrigate, sprinkle, sweat, swim, pool, steam, waterproof, float bath, fountain, swamp, dive, drain, wade, reservoir, snorkel, whirlpool, moisture, juicy, watery, wash, drain

Water for Life – Catchment Care

Resource Pack - Year 7



After Session 1: Back in the classroom

Build a catchment model outside

Use any materials you like, we suggest:

- > School sand pit (or a paddle pool or waterproof tray)
- > Tubs of gravel, sand, garden soil, mulch
- > Building blocks, sheet of plastic
- > Aluminium foil
- > Stick
- > Watering can

Use the gravel, sand, soil and mulch in layers. Use foil for drains and plastic for roads. Use building blocks for houses and sticks for trees. Leave space for a lake at the bottom of the hill. Discuss what will happen when you water the catchment.

Your Catchment

Colour and label the template of a river catchment provided. Ask students to draw as many different things they would find in a river catchment. Have them draw the boundaries of the sub-catchments and add where their school may be onto the diagram. *Source: Landcare for Kids. Junior Landcare.*

Share and Compare your Soil Testing worksheets

Think-Pair-Share. Among the class see what results other groups had and discuss why the results were the same or different.

Water for Life – Catchment Care

Resource Pack - Year 7



Figure 1: A large catchment area can be broken into a number of smaller sub-catchments.

3

Water for Life – Catchment Care

Resource Pack - Year 7



Introducing the Water Users: Leading into Session 2

Mind Map – Our Catchment

As a whole class brainstorm words, people, issues, plants, animals, things in your catchment to create a mind map on your catchment.

Assessment idea: Have students create an individual mind map on the word 'Catchment' at the start of the inquiry and at the completion and compare.

Thinkers Keys

Tony Ryan's Thinkers Keys are an excellent resource to get students thinking outside the square about complex issues.

Use these thinking stems however you like, as a workbook task or as a base for a poster design, new innovation, power point presentation, short film, podcast. It is limitless.

Don't forget you can post your work, or share what you are doing via our blog on www.greenhub.org.au.

Play Catchment Detox and /or Water Island

Learn through these fantastic online interactive games, developed by ABC and the water industry respectively. Interact as a whole class or in pairs or individually. These fantastic resources and more can be found as links from our website on the Water for Life page.

www.greenhub.org.au/waterforlife

Thinkers Keys Worksheet

<p>The Reverse</p> <p>Name 10 things you would never see in your Catchment. Give a reason for each thing.</p>	<p>The Disadvantages</p> <p>Write 5 dot points about the disadvantages of the Catchment Care.</p>
<p>The Alphabet</p> <p>List words associated with your Catchment from A to Z.</p>	<p>The Forced Relationship</p> <p>How might a person working as a water managers use the following items? A straw, a plastic bag and a stick.</p>
<p>The What If</p> <p>What if the water in your catchment stopped flowing down river?</p>	<p>The Different Uses</p> <p>Describe 5 different uses for collecting rainfall data. Explain the advantage for each use.</p>
<p>The Question</p> <p>The answer is Care for your Catchment, what are 10 possible questions?</p>	<p>The Commonality</p> <p>Write 10 dot points about the commonality between your local waterway and the Derwent River in Hobart.</p>

After Session 2: Back in the Classroom

Student Worksheet – PMI

We know now that there are some great things about creating a water management and caring for our catchment but there are also some challenges. What is interesting about the problems you identify?

List creative solutions you can suggest to overcome your “Minus” in your “Interesting” column.

Fill in with at least one comment under each heading.

Plus	Minus	Interesting

Water for Life – Catchment Care

Resource Pack - Year 7



Water Alive: Leading into Session 3

Ask an Expert online @ greenhub

Find the answers to those burning questions you have about catchments, water management, and river life. Ask the experts working in this field every day, how they came to work with water, what they like and dislike about their jobs.

Go to www.greenhub.org.au type in your question, name and age and receive a reply posted on the website within a week!

Meet the Experts from Hydro Tasmania:

Terry Ives
Generation Technician (Electrical)



As a generation technician I am employed to operate, maintain and improve Hydro Power-Generating plants, mainly in the Mersey-Forth generating area, which is located in North-West Tasmania. This involves day-to-day operations, maintenance, equipment upgrades and fault-response, as well as after-hours fault-response activities.



17

Water for Life – Catchment Care

Resource Pack - Year 7



Dr Cindy Hull
Avian Ecologist, Hydro Tasmania Specialist



I study the birds at new sites for wind farms, to estimate the risk of impacts to those birds. As a result of my study, I may then suggest changes to the design of the wind farm to reduce its impact on birds. I also monitor the birds once the wind farm has been built to see if there are impacts on the bird population, and if there are, I investigate and implement management strategies to minimise the impact.



Christina Nebel
Cloud Seeding Operations Supervisor

Cloud Seeding?! What is that? Find out more about Christina and her work by posting your questions on <http://www.greenhub.org.au/ask-expert/>

Find out more about cloud seeding visit at www.hydro.com.au/water/cloud-seeding

Water for Life – Catchment Care

Resource Pack - Year 7



Build your own Bio Water Filter

Source: *Water Filtration* (adapted from Scott Foresman, *Discover the Wonder*)

Students have an understanding of the importance of clean water for healthy living and how the water managers work to ensure we have enough clean water to grow food and use in our homes and workplaces. This experiment brings awareness of the important role plants play in cleaning our water and why a healthy catchment is about the land the water runs through just as much as the waterway.

Materials: You will need

- Clear plastic containers or cups (2 per group)
- About 4 litres of dirty water (you can just mix water with potting soil)
- About ten 2 litre bottles cut in half (you may choose to cut them beforehand) (one per group)
- Gravel and Sand (the soil plants grow in)
- Charcoal (explain how plants are carbon)
- Cotton balls (acts as 'transpiration' through plants leaves, in this model)
- Centimetre rulers

Display the gallon of dirty water at the front of the class. Tell the students that they are to design a prototype of a water filter to solve the problem of the dirty water using only the materials displayed.

Problem: You have been given dirty water which needs to be cleaned.

Solution: Design and build a water filter out of the materials presented.

Water for Life – Catchment Care

Resource Pack - Year 7



Procedure:

1. Allow your water sample to settle undisturbed while you are following the other directions.
2. Cut your bottle nearly in half so that the bottom part is slightly bigger than the top part. Keep the bottom of the bottle to use in step 7.
3. Put a layer of cotton about 3 cm thick into the neck of the bottle. The cotton should fill the narrow part of the neck and go just past the part where the bottle widens.
4. Put a layer of charcoal about 1 cm thick on top of the cotton.
5. Put a layer of gravel about 3 cm thick on top of the charcoal.
6. Put a layer of sand about 3 cm thick on top of the gravel.
7. Place the neck of the bottle over the bottom of the bottle you put aside in step 2.
8. Look at your container of water. Is there some dirt floating on the top or some sediment stuck on the bottom? Skim whatever you can off of the top with a spoon and discard. Leave the sediment alone.
9. Pour the rest of the water into a plastic cup. Leave any sediment behind in the first container.
10. Take the water in the plastic cup and slowly pour it through your filter. You may pour it through the filter as many times as you wish.

Review Food Webs and Food Chains

Preparation: Copy and laminate food web cards from Tasmanian Parks and Wildlife Service at <http://www.parks.tas.gov.au/file.aspx?id=13638>

Who has heard of a Food Pyramid?

We know there are animals that eat only meat (carnivores), animals that eat both meat and plants (omnivores) and animals that eat only plants (herbivores).

What about a Food Chain?

Hand out plant and animal cards (source: Tas. Parks & Wildlife Service) and ask students to make food chains based on who eats who, they need to do so without talking.

Food Webs

Listening skills are important, as each person will need to ask who eats them and pass the yarn to that person. Students stand in a circle and start with the bottom of the food chain, pass the yarn to something that eats them. Next time start with the top of a food chain. There will be a web of yarn across the circle - creating an Ecosystem.

Changes to the Ecosystem

Explain to students that some changes are going to take place. Read scenario cards and take action as required.

Scenario 1

Not far from this ecosystem (food web) one of the local landowners has been having difficulty with her apple farm. Many pests have come in and are eating her apples before she can pick them to sell. She has decided to spray the orchard to kill the aphids and moths. The spray blows over into your ecosystem and has killed all the insects, not just the aphids and moths. (All the insects sit down) What will happen to those connected to the insects?
Ok all stand up again.

Scenario 2

The Tasmanian Devil has been suffering terribly from the Facial Tumour Disease. Your ecosystem has been free of the disease because you are very remote and isolated. However, a new road has been put through and has opened up the area to neighbouring Tasmanian Devils. The FTD is passed on to the Devils in this area through territorial warring: fighting, scratching, biting. Your genetic diversity is not strong enough to fight off this cancer and sadly the Tasmanian Devils have died. (All devils sit down). What will happen to those connected to the Devil?

Water for Life – Catchment Care

Resource Pack - Year 7



Scenario 3

It has been a long hot, dry summer, which has been very hard on the whole ecosystem. Autumn is here and this brings a change in weather: a large lightning storm has passed through at midday. Lightning has struck a tree and started a bush fire. The fire was contained but it burnt off all the small plants. (All the plants must sit down.) Quickly we can see that all life is interconnected in an ecosystem.

Water for Life – Catchment Care

Resource Pack - Year 7



After Session 3: Back in the Classroom

Water Bug live on the web

See close up images and some video of water bugs, and learn more about them from www.thewaterbug.net

Got a water bug with no name? Try posting the photo of it on <https://www.facebook.com/waterbugface> and an expert will try to tell you what it is!

Giant Water Bugs

Make colourful and larger than life water bugs from different coloured play doh. Be sure to ask students to include all the features found on an insect and include as many different features as possible.

Water Bugs from Waste

Or make small size water bugs to add to your catchment model in the classroom, out of old materials that are found in the recycling. Cut up plastic bottles and tops, colour cardboard, use sticks and nut for other features.

Become a Catchment Carer

Have students draw a stick figure of them in the middle of a plain piece of paper. Write Catchment Carer underneath it. Write all the words around that figure of you that you think a catchment carer would do. Share it with a partner and add new words you may have not thought of to your paper. As a whole class write up all those words on the shared board and see how many are the same and how many are different.

Catchment Carers Celebrate

Now is the chance to collate all the things you have discovered about your own river in your catchment. Add photos you took, drawings you made, data you collected to your classroom model or poster. Present your final work to other classes and/or the school. Now you are an expert on your local waterway, it is yours to look after and share the magic of the catchment with others.

Create **Catchment Carer badges** made by the students for the students and adults. Have a parents and families night to inspire others to become Catchment Carers, like you. Don't forget to send Greening Australia photos of your badges and an update on your catchment to post on our blog for all to see your positive action! www.greenhub.org.au

Water for Life – Catchment Care

Resource Pack - Year 7



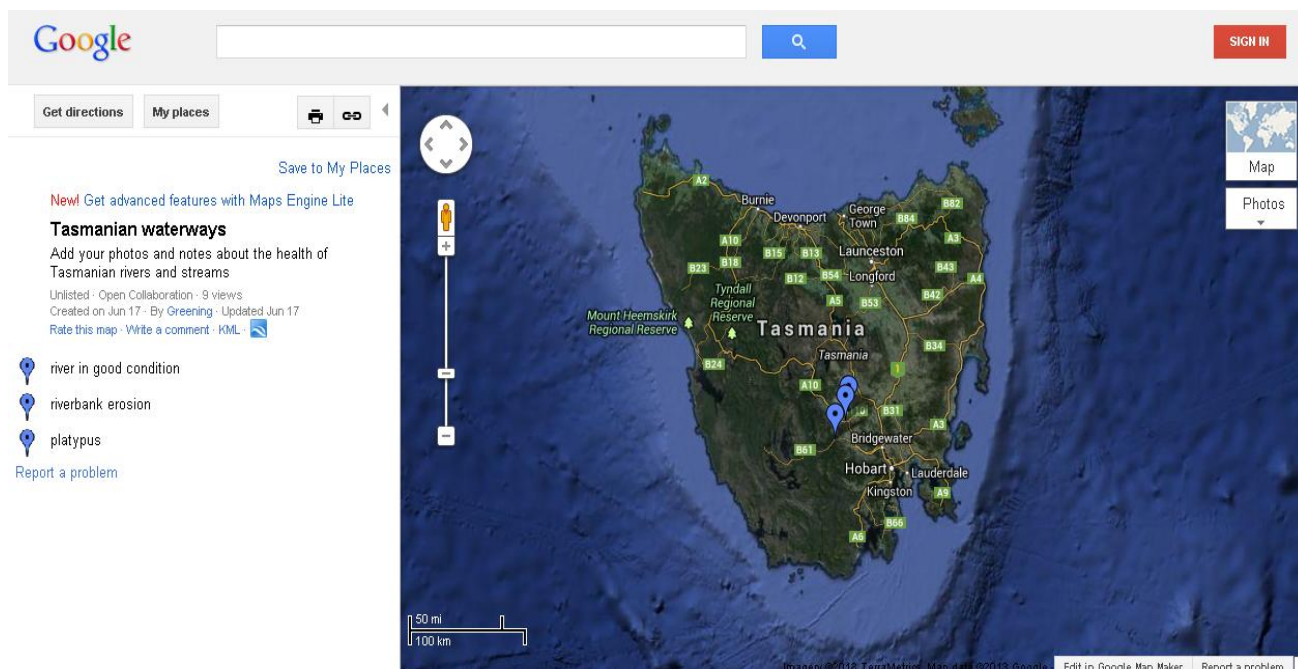
Going Further: Catchment Carers Google Map

Share your knowledge of your catchment with the World Wide Web! As a class choose the best photos and drawings and upload them onto our shared google map where all schools in Tasmania are adding their catchment carer news and photos.

The Catchment Carers map is at <http://goo.gl/maps/2oQ86>

You will need to create a Picasa account to store photos online before you can attach them to google maps (you can't upload them directly from your pc). It is free and easy to use, you will need to download the software from www.picasa.google.com.au

It is easy to upload photos by dragging and dropping them onto Picasa web albums. To attach an image to Google Map you need to right click on the image in Picasa (or any image on the web) and choose 'Copy Image URL' then in the maps make sure you select the red 'EDIT' button so that you can create placemarks, select the placemark icon and click on the map to create the placemark, then in the placemark is an 'Insert Image' icon which you click then paste the URL.



Water for Life – Catchment Care

Resource Pack - Year 7



Web Links Teacher Resources

Link	Name	What does it contain?	How can it be used?
www.greenhub.org.au	Greening Australia Education	Fast Facts / videos/ Ask an Expert / blogs	Activities / sharing / planning
www.projectwet.org	Project Wet Water Education for Teachers	Download Resources Ideas	Planning / Activities
www.landlearn.net.au/curriculum/OtoS.htm	LandLearn - Curriculum Activities	3 links	Lesson activities/poems/questions
http://dailyinfographic.com/wp-content/uploads/2011/11/10-Ways-to-Stop-Wasting-Water.jpg	Every Drop Counts	Image/information	Facts and top tips image
http://coolaustralia.org/curriculum-materials/#body-wrapper	coolaustralia.org - Water	Multiple links	Activities/worksheets
www.youtube.com/watch?v=cWGrok_imJ0	Greening Australia - River Recovery Programme	Video	Information/facts/projects/campaign
www.geographychallenge.nsw.edu.au/Default.aspx	Geography Challenge	interactive site	Facts/information/take action/get involved
www.environment.nsw.gov.au/sustainableschools/teach/waterteach.htm	NSW Government - Environment & Heritage	links	Resources/activities

Water for Life – Catchment Care

Resource Pack - Year 7



Student Resources - adult guidance required for year 2

Link	Name	What does it contain?	How can it be used?
www.greenhub.org.au	Greening Australia Education	Fast Facts / videos/ Ask an Expert / blogs	Activities / sharing / planning
www.angelamorelli.com/water/	Water	Facts and information	Visual resource with information and facts
www.imagineallthewater.eu/EN	Imagine All The Water	Interactive site	facts/information/ ideas
www.watersecure.com.au/pub/site-tour-and-education/water-island-game	Water Secure - Water Island	Interactive site with game	game/information/ interactive
www.catchmentdetox.net.au/play-game/	ABC Science - Catchment Detox	Interactive game	game/information/ interactive
http://apps.southeastwater.com.au/games/education_kidsroom_wcactivity.asp	South East Water - The Water Cycle Game	Interactive game	game/information/ interactive
http://environment.nationalgeographic.com/environment/freshwater/global-water-footprint/	National Geographic - Environment	Interactive site	facts/information
www.generationawake.eu/en	European Commission - Generation Awake	Interactive site	facts/information/ ideas/tips

Water for Life – Catchment Care

Resource Pack - Year 7



Link	Name	What does it contain?	How can it be used?
http://coolaustralia.org/ca_topic/water/	coolaustralia.org - Water	Multiple links	Videos/images/fact sheets/articles/news
www.youtube.com/watch?v=zNdbj3PbX6o	Water Facts	Video	Information/facts
www.youtube.com/watch?v=YswL4dIDQuk	Water Cycle	Video	Facts/images
www.savewater.com.au/mission-h2o-game/	Mission H2O Game	Interactive game	Facts/information/testing
www.savewater.com.au/	Savewater!	Multiple links	Facts/information/games/competitions/what's on?
www.sydneywater.com.au/Education/SecondaryStudents/index.cfm	Sydney Water	Interactive site	Facts/information/get involved/careers