

TAP INTO WATER



Level 3

**Unit of work by Chris Taylor and
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(Gisborne Primary School)**

Background Information

Chris Taylor and Annette Benson are experienced classroom teachers in the Macedon Ranges region. At the time that this contribution was created, both were members of the Grade 3/4 unit at Gisborne Primary School. Over the course of their careers, they have regularly adjusted their teaching approaches to incorporate the many changes to Victoria's education system, acquiring a breadth of new ideas and perspectives along the way.

The pair responded to an initiative by the Department of Education and Training to develop units of work, which are intended to be used as a resource for teachers.

They decided to redevelop an existing unit of work on 'Water', making the necessary adjustments and inclusions to incorporate the [Victorian Essential Learning Standards](#) and the [Principles of Learning and Teaching P-12 \(PoLT\)](#). Gisborne Primary School is a member of the Sustainable Schools program and due to current environmentally-based initiatives taking place in the school community, this topic seemed relevant and appropriate.

Working collaboratively in the Grade 3/4 team, Chris and Annette have planned together and saw the development of this unit as an opportunity to refine and share their ideas and assist others when developing their own curriculum content.

Level 3: Interpersonal Development, Personal Learning, Civics and Citizenship, English, Humanities, Mathematics, Science, Information & Communications Technology, Design Creativity & Technology and Thinking.

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Introduction

Australians are the second highest water consumers in the world despite living on the driest inhabited continent.

Through research, investigation and experimentation students will discover the important issues of water conservation in both their immediate environment and in the wider community.

Students identify current issues relating to water through a series of investigations encompassing an exploration of water environments, water usage and recycling. The emphasis is on developing and applying information in a meaningful way. Teaching and learning strategies include De Bono's thinking hats, Lane Clarke's T charts, the Multiple Intelligence Model and design briefs.

Students will be actively involved using references from a variety of sources including the internet, and present their findings in a range of ways eg PowerPoint presentations, role plays, posters etc.

Students develop an action plan to promote an awareness of water conservation at school, home and the broader community.

Learning focus

This unit addresses learning focus statements from all three strands at Level 3.

Physical, Personal and Social Learning

Interpersonal Development

- Sharing ideas, giving appropriate feedback and working with others to resolve conflict.
- Taking on roles and responsibilities in group work.

Personal Learning

- Work co-operatively and positively to achieve goals.
- Plan and allocate time and resources.

Civics and Citizenship

- Research an issue that is relevant to the local and wider community.

Discipline-based Learning

English

- locate, select and record key information.
- Respond to texts expressing a point of view with supporting detail.

Humanities

Humanities, knowledge and understanding

- describe human and physical characteristics of their local area and other parts of Victoria.
- describe how people use and affect different environments in Victoria.

Humanities skills.

- Students draw simple maps of familiar environments observing basic mapping conventions.

Mathematics

- See mathematical connections and apply mathematical concepts, skills and processes to solve problems.
- Understand the role of mathematics in life.
- Problem posing and solving, investigation and modeling.
- Develop thinking skills to explain and understand.

Science

Science knowledge and understanding

- Describe natural, physical and biological conditions and human influences in the environment which affect the survival of living things.
- Use appropriate scientific vocabulary to describe and explain their observations and investigations.

Science at work

- Collaboratively plan, design, conduct and report on experiments.
- Select simple measuring equipment to record observations.
- Identify variables with an experiment and explain fair test comparisons.
- Describe safety requirements and procedures.
- Explain how scientific knowledge could be used to deal with a social issue or problem.

Interdisciplinary Learning

Communication

- Explore aural, written and visual communication forms eg. Internet, film, texts
- Identify the main message, develop their interpretation and provide evidence to support it.
- Respect others' opinions
- Experiment with formats or presentations.
- Reflect on their own and others' presentations.

Design, creativity and technology.

Investigating and designing

- Generate ideas based on a design brief to meet requirements using labeled sketches and models.

Producing

- Choose appropriate tools, equipment, materials, components and techniques to make their product.

Analysing and evaluating

- Test, evaluate and revise designs in light of feedback.
- Consider design function and suitability for its purpose.

Information and communications technology

ICT for creating

- Use multimedia resources to assist their learning.

ICT for communicating

- Locate information on an intranet and from websites.

Thinking

Reasoning, processing and inquiry

- Collect and organise ideas from a range of sources to answer their own and others' questions.

Creativity

- Apply creative ideas in practical ways and test the possibilities of their ideas.

Reflection, evaluation and metacognition

- Identify strategies to organize their ideas and explain their thinking.
- Give reasons for their point of view and justify changes in their thinking.

Victorian Essential Learning Standards

Tap into Water can be used to address a range of Essential Learning Standards at level 3

Strand	Domains	Dimensions	Key elements of learning focus/standards Students:
Physical, Personal and Social Learning	Interpersonal Development	Working in teams	Take on roles and responsibilities in group work. Share ideas and give appropriate feedback
	Personal Learning	Managing Personal Learning	Plan and allocate time management and resources Work cooperatively and positively to achieve goals
	Civics and Citizenship	Community Engagement	Identify a local issue and plan possible actions and describe the benefits of the planned action

Discipline-based Learning	English	Reading	Use strategies to locate, select and record information
		Writing	Write for a particular purpose Reflect on ideas/issues using information to support a point of view
		Speaking and Listening	Plan and make presentations for different purposes
	Humanities	Humanities Knowledge and Understanding	Compare the way people interact with the environment and how it affects their lives
		Humanities Skills	Draw simple maps of familiar environments and identify locations Use basic mapping conventions
	Maths	Working Mathematically	Pose and solve problems Learn practical applications of Maths in daily lives Develop and apply appropriate methods for collection and presentation of surveys and data. Identify places and routes on maps
	Science	Science knowledge and understanding	Describe human influences on the environment Use appropriate scientific vocabulary
		Science At Work	Plan experiments and report on results / fair test comparisons Record observations and measurements

Inter Disciplinary Learning	Communication	Listening, Viewing and Responding	Provide evidence to support their findings
		Presenting	Develop a variety of formal presentations eg role plays, debates etc
	Design, Creativity and Technology	Investigating and Designing	Develop design briefs with labels ,sketches and models to meet specified requirements
		Producing	Choose appropriate tools materials and techniques to make their product Plan basic steps in production
		Analysing and Evaluating	Test , evaluate and revise designs Consider strengths and drawbacks of designs
	Information, Communications and Technology	ICT for Creating	Use the internet to assist learning
		ICT for Communicating	Use the internet to locate information/use of search engines and key words Locate information
	Thinking	Reasoning, Processing and Inquiry	Collate and sort ideas to answer questions
		Creativity	Test the possibilities of creative ideas
		Reflection, Evaluation and Metacognition	Explain ideas and give reasons for their point of view Justify changes in thinking

For further advice see the assessment section page....

Principles of Learning and Teaching

Students learn best when:	The principles are demonstrated in this unit of work when:
<p>The learning environment is supportive and productive. <i>In learning environments that reflect this principle the teacher:</i></p> <p>1.1 builds positive relationships through knowing and valuing each student 1.2 promotes a culture of value and respect for individuals and their communities 1.3 uses strategies that promote students' self-confidence and willingness to take risks with their learning 1.4 ensures each student experiences success through structured support, the valuing of effort, and recognition of their work.</p>	<p>Inherent in all activities Activity 6, 7, 8 Activity 7 Inherent in all of the activities</p>
<p>The learning environment promotes independence, interdependence and self motivation. <i>In learning environments that reflect this principle the teacher:</i></p> <p>2.1 encourages and supports students to take responsibility for their learning 2.2 uses strategies that build skills of productive collaboration.</p>	<p>Activity 1 , 3, 6 Activity 6, 8</p>
<p>Students' needs, backgrounds, perspectives and interests are reflected in the learning program. <i>In learning environments that reflect this principle the teacher:</i></p> <p>3.1 uses strategies that are flexible and responsive to the values, needs and interests of individual students 3.2 uses a range of strategies that support the different ways of thinking and learning 3.3 builds on students' prior experiences, knowledge and skills 3.4 capitalises on students' experience of a technology rich world.</p>	<p>Activity 2, 6, 7 Activity 3, 7, 8, 9 Activity 1, 6, 7, 8 Activity 4, 8</p>

<p>Students are challenged and supported to develop deep levels of thinking and application.</p> <p><i>In learning environments that reflect this principle the teacher:</i></p> <p>4.1 plans sequences to promote sustained learning that builds over time and emphasises connections between ideas</p> <p>4.2 promotes substantive discussion of ideas</p> <p>4.3 emphasises the quality of learning with high expectations of achievement</p> <p>4.4 uses strategies that challenge and support students to question and reflect</p> <p>4.5 uses strategies to develop investigating and problem solving skills</p> <p>4.6 uses strategies to foster imagination and creativity.</p>	<p>Activity 4, 5, 7</p> <p>Activity 1,5,7</p> <p>Activity 9</p> <p>Activity 3, 5, 6, 7, 9</p> <p>Activity 4 ,6</p> <p>Activity 2, 6, 7</p>
<p>Assessment practices are an integral part of teaching and learning.</p> <p><i>In learning environments that reflect this principle the teacher:</i></p> <p>5.1 designs assessment practices that reflect the full range of learning program objectives</p> <p>5.2 ensures that students receive frequent constructive feedback that supports further learning</p> <p>5.3 makes assessment criteria explicit</p> <p>5.4 uses assessment practices that encourage reflection and self assessment</p> <p>5.5 uses evidence from assessment to inform planning and teaching.</p>	<p>Activity 3, 9</p> <p>Activity 2, 6,</p> <p>Activity 9</p> <p>Activity 9</p> <p>Activity 1, 2</p>
<p>Learning connects strongly with communities and practice beyond the classroom.</p> <p><i>In learning environments that reflect this principle the teacher:</i></p> <p>6.1 supports students to engage with contemporary knowledge and practice</p> <p>6.2 plans for students to interact with local and broader communities and community practices</p> <p>6.3 uses technologies in ways that reflect professional and community practices.</p>	<p>Activity 6</p> <p>Activity 5, 6, 7, 8</p> <p>Activity 4, 6,7, 8</p>

Teaching and Learning Activities 1-9

Activity 1: Students awareness of water

The purpose of this activity is to:

- find out what students know about water. Eg. Using De Bono Hats, T Charts (Lane Clarke).
- identify current issues related to water. Eg. Drought, sustainability etc.
- develop student awareness that water is essential for life.

Children work in groups. Brainstorm 'water' using De Bono's Thinking Hats.

White Hat - what do you know?

Yellow Hat - positives – swimming, drinking to keep us alive etc.

Black Hat - the negatives eg. drowning, drought, salinity, floods.

Red Hat - how do you feel about water? Beach, relaxing, fountains etc.

Blue Hat - where do we go from here? Eg. Issues of drought, sustainability, usage and conservation.

Green hat - are there any different ways we could conserve water in our school?

Groups share ideas and present information on a flow chart, concept map etc.

Activity 2: Exploring water usage

The purpose of this activity is to:

- explore water usage at school and at home.

Introductory Activity:

How much water comes from a tap in a minute?

Students work in small groups to see how many ice-cream containers of water fill up a bucket.

Estimate how many buckets of water would come out of a tap in 1 minute, 3 minutes, 10 minutes etc.

Extension Activity:

Investigate variables involved in filling up the bucket – flow, rate, size of buckets etc.

School Water Use Survey

In groups children identify where water is wasted and use a colour coded leak system to ascertain problem areas.

Learn how to read water meters.

Home Task

Home water use survey. Design your own spreadsheet to record water usage at home.

After completion of the task, discuss water usage and areas where the amount of water they use can be reduced.

Debate

Why is it important to reduce water usage?

Extension Task

How does weather affect the use of school water?

Use the school water meter and monitor weather patterns and water usage for one week.

Activity 3: The water cycle

The Water Cycle

Using interactive websites, children investigate how the water cycle works.

Ref 1: The Water Cycle

<http://www.kidzone.ws/water/>

Ref 2: The Magic School Bus at the Waterworks

Follow up activity:

In small groups children plan a role play using a range of materials to show how the water cycle works (interactive collage – eg. Fluffy fabric for clouds, blue fabric for rivers and cardboard for mountains etc.).

Criteria – circular movements of objects

Experiments – Evaporation – Ongoing class activity experimenting with evaporation in different situations.

Write a creative piece about a day in the life of a drop of water.

Activity 4: Measurement of rainfall

Purpose : Students explore and discover how rainfall is measured.

Design and make a rain gauge.

Develop a water diary. Plot the frequency of rain over several months.

Follow up activity:

Investigate different rainfall patterns in areas of Australia and globally.

I.C.T. activity – Using Excel, graph water usage.

Activity 5: From reservoir to home

How rainfall affects the use of water.

Activity

Develop a flow chart from local reservoir to home.

Extension

Investigate how other countries and communities access water.

Eg. Rwanda – child walks X kms. daily to get water from polluted river.

Excursion

Western Water, Werribee, Centre for Education and Research in Environmental Sustainability (C.E.R.E.S)

Activity 6: Local freshwater environment

To describe their local freshwater environment and identify different plants and animals that live in a pond, discovering the importance of creeks and rivers in the local environment (Gisborne, Jackson's Creek).

Excursion

Visit a local creek or waterway. Liaise with local community group if available eg. Friends of Jackson's Creek.

Children utilize local expertise and equipment to:

- test water quality
- observe turbidity/clarity
- discover pond life
- test for salinity

For example:

Pollution level	Number of species
Unpolluted water	More than five different types of animals
Slight to moderate pollution	Less than five different types of animals
Heavy pollution	Only two or three different types of animals. Worms are common
Extreme pollution	No visible animal life

Ref: Yrs 3-4 Science Technology Education in Primary Schools (STEPS)

Students develop their own Code of Practice for the care of watery habitats.
Eg. Protecting the vegetation (science experiment).

Design Task

Design a net that would be suitable for catching small pond animals.

Consider:

- What will the frame be made from?
- Will it require a handle, if so what will it be made from?
- Type of material used to collect the pond animals.

Children explore different types of materials to make a ponding net.
From the design children construct their net.

Evaluate

Did the net meet the requirements to catch samples of pond life.

Investigate the types of small animals that live in ponds.

Observe the pond.

Predict clarity and types of pond life they expect to find.

Collect samples and test.

Students evaluate the water quality and what can be done to improve it (Think, Pair, Share).

Ref: STEPS Watery World Years 3 & 4

Community Project

Planting of indigenous plants and eradication of weeds.

Related literature: Lester and Clyde

Activity 7: Water conservation

Ref: Western Water – Wonderful Water, Precious Water

Explore and illustrate the costs and benefits of water reuse for long-term development and environmental sustainability.

Highlighting various points of view on water reuse, use the role play to develop an understanding of the realities of decision making with the social, economic, cultural and political influences.

Role Play

Introduce the role-play

The water company is investigating responses to its proposal to improve the use of the available water. The wastewater we create when we wash ourselves, our dishes and clothes, or flush the toilet is piped to water purification plants for treatment so it will not cause disease or pollution. In the past, when the water is safe, it was all released into nearby rivers, which flowed into the sea. Now, rather than letting all of this water go, the water company recycles some of it for use on golf courses and other agricultural activities. The recent drought, rising population and increasing demands for water have meant that consideration needs to be given to extending the recycling program. It is proposed that all large water users – schools, councils and industry – use recycled water. This meeting is to discuss how this might be done.

Distribute role cards to individual students or groups

Give the students 5-10 minutes to prepare their role and consider arguments to support their point of view. Encourage students to use their knowledge to expand on the points raised in the description. They may choose their own name for their role and make a name tag. Those without roles will represent community members. They need to prepare questions of concern. There might be about the effects of the proposal on health, disadvantaged groups, employment or environment.

Role Cards

Participants

1. Local mayor – chairperson
2. Water company representative
3. School Principal
4. WaterWorks Housing Company
5. Agriculturalist
6. Environmentalist
7. Manufacturer
8. Small hobby farmer
9. Health inspector
10. Bill payer
11. Householder
12. Student

Evaluation of role play

- How did you feel about the role you played?
Were there times you felt uncomfortable or threatened?
Why might this have been?
- How did you feel about the final outcome?
Do you think people listened and were prepared to compromise?
- Do you think the outcome is workable?
Is it cost effective?
- Do you think people's opinions have changed through the discussion?
- Were all points of view represented in the final decision?

Activity 8: Taking action

The purpose is to develop an awareness campaign of the need to conserve water.

Activity

Children design posters, write school based articles and local newspaper articles, create PowerPoint presentations and present radio and T.V. jingles to promote the need to conserve water.

Activity 9: Evaluation

<p>White Hat What have you learnt about water? What do you know now?</p>	<p>Yellow Hat What are the positive things being done in relation to water conservation?</p>
<p>Black Hat What are some of the problems or issues?</p>	<p>Blue Hat What could we do to conserve water?</p> <p>Could we help another community?</p>
<p>Green Hat Are there any different ways we could conserve water in our school?</p>	<p>Red Hat How do you feel about water conservation?</p>

Assessment

The Victorian Essential Learning Standards and the Principles of Learning and Teaching P-12 support a combination of assessment practices:

- Assessment for learning
- Assessment as learning
- Assessment of learning

Further information on these can be found at:

<http://www.sofweb.vic.edu.au/blueprint/fs1/assessment.asp>

When assessing student achievement, assessment criteria can be developed from relevant standards and associated tasks or activities. The table below shows a range of assessment criteria, tools and strategies applicable to this unit. Teachers could choose to use some or all of these or use the unit to assess other standards.

Standards	Assessment criteria (Examples)	Evidence
Interpersonal Development <u>Working in teams</u>	Ability to: <ul style="list-style-type: none"> • take on different roles and responsibilities within a group • contribute ideas to class and group discussion 	Teacher observations and records of student contributions to class discussion and working in different roles in teams. Student self evaluation.
Personal learning <u>Managing personal learning</u>	<ul style="list-style-type: none"> • set short term achievable goals • make and justify decisions about learning. • complete short tasks • allocate time and resources 	Research project reflecting individual learning style eg. May be presented as a diorama, story, role play etc. Eg. Rubric
Science <u>Science knowledge and understanding</u>	<ul style="list-style-type: none"> • appropriate scientific vocab to describe and explain their observations and investigations 	Teacher observation Student observation/reports eg. Ponding task at local excursion
<u>Science at work</u>	<ul style="list-style-type: none"> • Use of a range of methods to develop experiments • Select and use simple measuring equipment 	Tasks eg. Making rain gauges, identifying pond life at the local creek, recording amounts of water pollution etc.

English Reading	<ul style="list-style-type: none"> • Interpret main ideas and purpose of texts • Use strategies to locate, select and record key information 	Individual investigations, water cycle presentation. Recording observations and variable in relation to an experiment.
Writing	<ul style="list-style-type: none"> • Write print and electronic texts that express opinions and include ideas and information about familiar topics. • Provide information and supporting detail to express a point of view 	Poster, PowerPoint presentation, story, charts and labels.
Speaking & Listening	<ul style="list-style-type: none"> • Project voice adequately for an audience • Listen attentively • Ask clarifying questions • Volunteer information and justify opinions. 	Awareness campaign, role play, debate, reporting information back to the class.
Civics & Citizenship <u>Civics knowledge & understanding</u>	<ul style="list-style-type: none"> • Ability to convey key concepts to school community and beyond 	Community campaign, De Bono's Thinking Hats. Evaluation at the end of the unit.
<u>Community engagement</u>	<ul style="list-style-type: none"> • Plan possible actions to make community aware of water conservation 	Community campaign, posters, articles etc.
Design, Creativity and Technology <u>Investigating and designing</u>	<ul style="list-style-type: none"> • Investigate how a rain gauge work • Functions of a dip net 	Teacher observation and records of design brief
<u>Producing</u>	<ul style="list-style-type: none"> • Plan, design, make and reflect on finished product • Safely use tools and equipment 	Evidence of a finished product
<u>Analysing & Evaluating</u>	<ul style="list-style-type: none"> • Evaluate how well a design functions 	

Unit Resources

References

Wonderful Water, Precious Water (Western Water)
A Watery World (STEPS program) Level 3&4
Water, Water Everywhere (STEPS program) Level 3&4
The Magic School Bus at the Waterworks, Joanna Cole (Scholastic)
Lester and Clyde, James H Reece (Ashton Scholastic)
Water, RIC publications

Websites

Local Water Sites

Western Water
<http://www.westernwater.com.au>

Melbourne Water Education Primary
<http://www.education.melbournewater.com.au/content/primary/>

Our Water Our Future
<http://www.ourwater.vic.gov.au/ourwater/education/index.htm>

The Water Cycle
The Water Cycle
<http://www.kidzone.ws/water/>

South-East Water-Water Cycle Game
http://www.southeastwater.com.au/games/education_kidsroom_wcactivity.asp

Water Conservation

South-East Water-20 ways to save water
http://www.southeastwater.com.au/sewl/index.asp?link_id=30.490

Water Wasters Quiz
<http://www.waterinschools.com/watercounts/games/waterwise.htm>

General

Water Corporation- Fun Stuff
<http://www.watercorporation.com.au/education/index1.cfm?ID=03>