

Saving water at home

» Lesson overview

In the previous lesson, students made links between the water treasures and what they already knew about water, and learned how some Indigenous communities managed their water resources. Current projections suggest that rainfall over much of Queensland will decrease with the effects of climate change. Population increases are also putting additional pressure on water supplies in many areas. Even if climate change and population increase were not happening, we would still need to look after this precious resource.

In this lesson, students discuss some of the impacts of a reduction in rainfall levels on our current activities, and conduct a home water use audit over a one-week period to gauge their own family's water usage. At the end of the unit, students conduct the home water use audit again to see if there has been any change in their family's water usage.

Queensland is the fastest-growing state in Australia: its population is expected to grow from 4.04 million people in 2006 to 5.5 million people in 2026 (a 40% increase), reaching 7 million by 2051. This information is available from the Office of Economic and Statistical Research at <www.oesr.qld.gov.au>.

» Lesson objectives

In this lesson, students:

- discuss the effects of a water shortage on their family's lifestyle
- conduct a home water use audit over a week-long period
- collate the class results from the home water use audit and determine the average daily usage per person
- collect and collate survey results on the household use of water and attitudes to water conservation.

The use of recycled, reclaimed or reused water is part of the Queensland's Government's planning for the future and is undertaken to reduce demand on traditional water sources such as dams.

» Equipment

For the class

- enlarged copy or overhead transparency of 'Student assessment task' sheet (Resource 1)
- enlarged copy or overhead transparency of 'Home water use—Recording sheet' (Resource 2)
- butcher's paper list of water uses compiled by the students in the previous lesson

For each student

- copy of 'Student assessment task' sheet (Resource 1)
- copy of 'Home water use—Recording sheet' (Resource 2)

» Preparation

- Locate and read the school water meter. Use the instructions on the Target 170 website <www.target170.com.au/How+to+read+your+meter>.
- If possible, organise for a local council representative to visit and to talk about their council's Waterwise campaign.

» Lesson steps

❖ Session 1

1. Review the information about Indigenous people's use of water from the notes that students recorded in their journal. Ask students to explain why water was a precious resource to most Indigenous people in Australia.
2. Discuss the impact of chronic water shortage on students lifestyle. Refer to the butcher's paper list of uses of fresh water identified by the students in the previous lesson. Ask the students which of those activities would be affected if there was an extreme shortage of water. Consider how student ideas about the rankings of water uses might change in an extreme water shortage.
3. Brainstorm ways in which students might save water at home and at school. You can use a Think-Pair-Share strategy to develop a team list of water-saving behaviours.

Creating a Waterwise promotional product

4. Explain that the students will be conducting a promotional campaign at school and in their community to promote water saving. If you have made links with your local council representatives, explain how students' work will link with the council's Waterwise strategy. A representative might be available to visit the class and talk about the work of the council in promoting the Waterwise program in the community. Preferably, this guest speaker would also be able to provide local information about water supply and treatment in Lesson 3.
5. Provide a copy of *Whizzy's Incredible Journeys* (Pick-a-Path book), Whizzy's Waterwise poster and Whizzy's song. Discuss with students how the government has used these products to help spread the Waterwise message with younger students.

Discuss whether these products would appeal to students their age.
6. Talk about the unit plan and the tasks that the students will be completing in the unit. Explain that to gain background knowledge about water conservation, students will learn about topics such as water supply,

distribution and treatment. To prepare their promotional product, they will complete a design challenge related to saving water in the local community.

Home water use audit

The students will conduct a home water use audit to find out how much water their family uses, and the water-saving behaviours they follow. These data can be used to decide on the key Waterwise message that the students will use in their promotional products. A second home water use audit will be conducted at the end of the unit to gauge the impact of the student's efforts to promote waterwise behaviours.

7. Using the enlarged copy or overhead transparency of the 'Home water use—Recording sheet' (Resource 2), model how you would complete the form. Explain to the students that you will show them how to read a water meter in the school grounds in the next activity. Make a note on the class calendar to remind the class to record the second water meter reading on the 'Home water use—Recording sheet' (Resource 2) for homework. After the second water meter reading, you will schedule the 'Session 2' part of this lesson to analyse the data.
8. Talk about how to estimate the percentage of water used in the kitchen, bathroom, laundry and outdoors; explain why these percentages need to total one hundred.
9. Walk the students to the school water meter and show them how to read it. Take a reading. You will return to the meter one week later at the same time and take another meter reading. Remind students that the web page address for the instructions on how to read the meters is included in the 'Home water use—Recording sheet' (Resource 2). Provide a copy of this web page for students who do not have ready access to the internet at home.
10. Ask the students to complete the 'Home water use—Recording sheet' (Resource 2) for homework and to bring it to school the next day for discussion. Explain that students need to complete meter reading 1 only, and that the second meter reading will be completed a week later.

❖ Session 2—One week later

1. Walk the students to the school water meter and record the meter reading. Calculate the volume of water that the school used in one week. After students complete meter reading 2 at home, ask them to add the reading to their recording sheet.
2. The students complete the 'Home water use—Work sheet' (Resource 3). Model how to calculate the daily water use per person in their household for Activity 1, and answer the questions in Activity 2.
3. Explain to students that they will complete Activity 3 at the end of the unit after they conduct their second home water use audit.

In a Think-Pair-Share activity, students spend some time individually thinking about and recording their ideas. The students then share their ideas with a partner and decide on the list for their pair. Two pairs of students form teams of four to develop a team list.

» Optional activity

'Down the drain' collaborative online project

Once the students have their household average daily water use per person per day, they can contribute to a global collaborative online project that compares water usage data from schools all over the world.

The link to the 'Down the drain' project is <www.k12science.org/curriculum/drainproj/index.html>.

Students enter their average class water usage into a spreadsheet and compare their water usage with that of other classes in different parts of the world. It is a good second-hand data analysis exercise. The students can develop hypotheses and analyse data to draw conclusions. There are comprehensive support materials on the website.

A student investigation based on the 'Down the drain' data could be added to the unit assessment task. Make sure that you first model the skills that the students require for generating questions and analysing data. Students also need to practise these skills in a simple investigation before completing their assessable investigation.

❖ Essential Learnings for the 'Down the drain' task— By the end of Year 7

Ways of working	Knowledge and understanding
Science	
<p>Students are able to:</p> <ul style="list-style-type: none"> › identify problems and issues, and formulate testable scientific questions › collect and analyse first- and second-hand data, information and evidence › evaluate information and evidence and identify and analyse errors in data. 	<p>Science as a human endeavour</p> <p>Science is a part of everyday activities and experiences.</p> <ul style="list-style-type: none"> › Sustainability of natural, social and built environments is promoted at local and global levels by resource management.

Resource 2

Home water use—Recording sheet

This form will help you identify how you use water in your home. You will need to ask other family members some questions to help you complete this form.

How many people live in your house?.....What suburb do you live in?.....

Water meter reading

Most homes have a water meter that records how much water your home uses. You need to take a number of meter readings over the next few days and weeks. You should try to take your meter readings at about the same time of day. For instructions about how to read your water meter, go to <www.target170.com.au/How+to+read+your+meter>. There are two types of meter; check which one your home has before you visit the website.

Meter reading 1 → Date: Time: Reading:

Meter reading 2 → Date: Time: Reading:

Home water use audit

Have a look to see how water is used in different parts of your house and garden: put a tick in each circle that applies, then estimate how much of your total household water is used in each room.

> Kitchen

- Dishwasher Washing dishes in sink Washing food Cooking
- Other (Write in) Estimate the percentage of total water used in the **Kitchen**

> Bathroom

- Shower/bath Cleaning teeth Washing hands/face Shaving Toilet
- Other Estimate the percentage of total water used in the **Bathroom**

> Laundry

- Washing machine Hand washing in bucket Washing floors
- Other Estimate the percentage of total water used in the **Laundry**

> Garden/pool/outdoors

- Top up pool Filter to pool Watering garden
- Washing car/boat Cleaning paths/paved areas
- Other Estimate the percentage of total water **Outdoors**

Resource 2 (continued)

Water saving

Which of the following do you have or do in your house to save water?

> Kitchen

- | | | |
|--|---|--|
| <input type="checkbox"/> Use plug when rinsing dishes | <input type="checkbox"/> Use dishwasher when there is a full load | <input type="checkbox"/> Have a water-efficient dishwasher |
| <input type="checkbox"/> Use economy setting on dishwasher | <input type="checkbox"/> Other in Kitchen | |

> Bathroom

- | | | |
|--|---|--|
| <input type="checkbox"/> Use plug when washing hands or face | <input type="checkbox"/> Turn off tap when cleaning teeth | <input type="checkbox"/> Have low-flow showerheads |
| <input type="checkbox"/> Have shorter showers | <input type="checkbox"/> Collect water from bath/shower for use outside | <input type="checkbox"/> Have dual-flush toilets |
| <input type="checkbox"/> Turn off water while washing hair | <input type="checkbox"/> Other in Bathroom | |

> Laundry

- | | | |
|---|---|---|
| <input type="checkbox"/> Use washing machine only when there is a full load | <input type="checkbox"/> Reuse water from washing machine | <input type="checkbox"/> Divert greywater |
| <input type="checkbox"/> Have a water-efficient washing machine | <input type="checkbox"/> Other in Laundry | |

> Garden/pool/outdoors

- | | | |
|---|---|--|
| <input type="checkbox"/> Water garden less, or not at all | <input type="checkbox"/> Have planted drought-tolerant plants | <input type="checkbox"/> Mulch garden regularly |
| <input type="checkbox"/> Have a rainwater tank | <input type="checkbox"/> Installed downpipe diverter to top up pool | <input type="checkbox"/> Check for dripping taps/leaks regularly |
| <input type="checkbox"/> Have a pool cover | <input type="checkbox"/> Other in Outdoors | |

- We don't do anything to save water

Resource 2 (continued)

Interview

Ask Mum/Dad/other adult to answer the following questions. Mum Dad Other

> Q1. How strongly do you agree with the following statements?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
I am concerned about water shortages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think enough is being done to address water shortages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I receive enough information about how to save water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We do as much as we possibly can to save water in our house.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water is precious and we need to make long-term changes to the ways in which we use water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

> Q2. Are there any barriers that prevent you from saving water? Yes No

IF YES, what are these?.....

> Q3. Water from a range of sources can be reused for different purposes. For which of the following purposes do you use rainwater/tank water or greywater around your home?

	Rainwater/tank water	Greywater
On the garden	<input type="checkbox"/>	<input type="checkbox"/>
Other outdoor use (e.g. washing car, cleaning house, paths)	<input type="checkbox"/>	<input type="checkbox"/>
Toilet flushing	<input type="checkbox"/>	<input type="checkbox"/>
Washing/bathing	<input type="checkbox"/>	<input type="checkbox"/>
Washing clothes	<input type="checkbox"/>	<input type="checkbox"/>
Don't have a rainwater tank/ don't reuse greywater	<input type="checkbox"/>	<input type="checkbox"/>

Resource 3

❖ Home water use—Work sheet

» Activity 1—Amount of water used

Calculate the daily water use per person in your household. You will need the following information:

- A. Number of persons living in your household
- B. Number of days between meter readings
- C. Meter readings 1 and 2 (ideally a week apart).

» Activity 2—Water usage

What are the main areas where you use water in and around your house?

Kitchen: _____

Bathroom: _____

Laundry: _____

Outdoors: _____

Can you identify any areas where you are wasting water or where you could use less water?

Kitchen: _____

Bathroom: _____

Laundry: _____

Outdoors: _____

In what ways might you be able to save water?

Kitchen: _____

Bathroom: _____

Laundry: _____

Outdoors: _____

In what ways might you be able to reuse water?

Kitchen: _____

Bathroom: _____

Laundry: _____

Outdoors: _____

» Activity 3—End of unit comparison

Towards the end of the unit, you will repeat this exercise, calculate what changes have occurred, and reflect on how these were achieved.

Calculate your daily water use per person and compare this to original usage:

Litres per person per day Original: _____ Final: _____

What changes have occurred in relation to:

Water usage in the home: _____

Water-saving measures adopted in the home: _____

Attitudes to water: _____