WATER CONSERVATION

Water is Important

Lesson time: 45 minutes + optional activities

Outcomes

By the end of this lesson, students will understand that:

- water is vital in our lives
- water is a resource that is valuable and scarce
- we need to use water wisely and conserve it where possible.

Integrated lesson

This lesson covers elaborations from:

- Science
- Mathematics
- Economics and Business
- Ethical Capability

Materials

Lesson

- Coloured pencils
- Materials for making posters
- 1-litre container

Game

- Die or dice
- Scissors

Vocabulary

- **disinfect**
- **filter**
- **greywater**
- **irrigation**
- **potable**
- **sediment**
- **urban**

Victorian Curriculum

SCIENCE
VCSSU073, VCSIS083, VCSIS085

MATHEMATICS
VC2M5N04, VC2M5N06, VC2M5N09, VC2M6A02

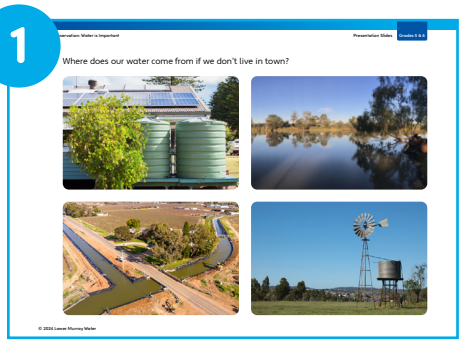
ECONOMICS AND BUSINESS
Resource allocation and making choices, Consumer and Financial Literacy

VISUAL ARTS
Present and perform

ETHICAL CAPABILITY
Decision Making and Actions

LOWER MURRAY WATER

Presentation Slides



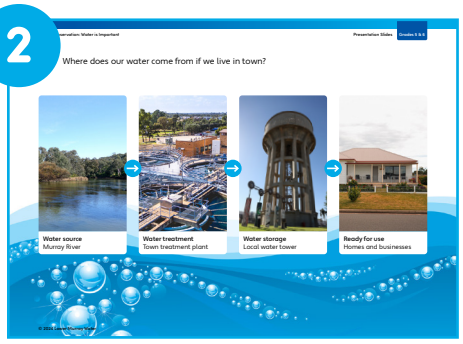
Where does our water come from if we don't live in town?

Discuss with students why we need fresh water: to drink, wash in, water our plants etc.

Talk about water sources for people not connected to town water supply, such as:

- rainwater tanks
- bores
- dams
- streams
- rivers and creeks
- irrigation channels.

Although water may be all around us (e.g. in rivers and seas, lakes and as snow), it is not necessarily available or suitable for us to use, or for crops or animals. It may be polluted, saline (salty) or inaccessible. For example, sea water is too salty for us to drink. Our bodies cannot process the amount of salt in sea water.

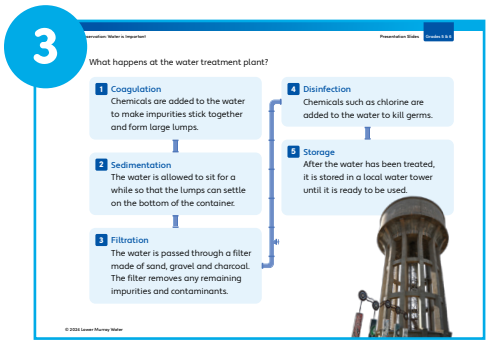


Where does our water come from if we live in town?

Explain that some people get their water from the urban water supply provided by (Lower Murray Water) and others get theirs from other sources (e.g. water tanks or dams). Mains water is treated to make it safe to drink (potable).

Rainwater tanks can provide good drinking water if they are properly installed and maintained.

We should not drink water from bores, rivers, creeks or dams, unless it has been treated to make it safe to use. But this water can be used for irrigation and stock purposes.



What happens at the water treatment plant?

Water from the Murray River is treated to remove impurities to make it safe to drink. Several steps are involved:

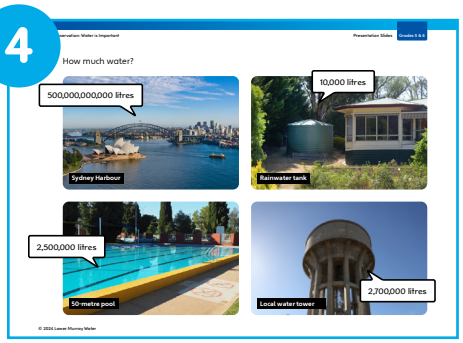
1 **Coagulation:** Various chemicals are added to the water to make impurities stick together and form large lumps.

2 **Sedimentation:** The water is allowed to sit for a while so that the lumps can settle on the bottom of the container (this is a sediment).

3 **Filtration:** The water is passed through a filter made of sand, gravel and charcoal. The filter removes any remaining impurities and contaminants.

4 **Disinfection:** Chemicals such as chlorine are added to the water to kill germs.

5 **Storage:** After the water has been treated, it is stored in local water towers until it is ready to be used.



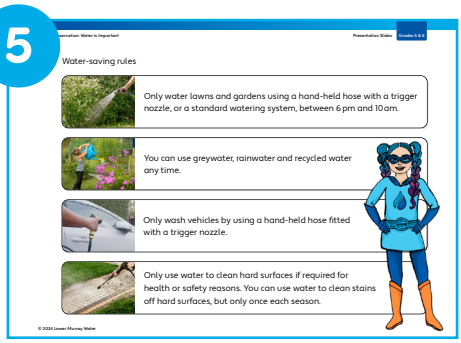
How much water?

Introduce the prefixes kilo- and giga- and relate their usage to the real-world examples.

Sydney Harbour:	500,000,000,000 litres (500 gigalitres)
Water tank:	10,000 litres (10 kilolitres)
50-metre pool:	2,500,000 litres (2500 kilolitres)
Local water tower:	2,700,000 litres (2700 kilolitres)

Ask students if they can think of some other examples where this unit of measure would be appropriate. For example:

- dam on a farm
- water used for irrigating crops
- water fountain.



Water-saving rules

Water-saving rules help us to use water wisely, and ensure clean water is available for the whole community. You can:

- Discuss the rules with students. Ask them if they think they are fair? Are there more things we should do?
- Discuss the effects of water-saving rules on people who live on farms, compared to those in town. Should the rules be the same or different?
- Discuss how our individual water use has consequences for a whole community.

Greywater is water from baths, showers, bathroom sinks, laundries and kitchens. Water from toilets is not classed as greywater – it is classed as blackwater and is not safe to re-use without proper treatment.

Student Worksheet

1 Answers will vary, but could include:

- **By you:** Drinking, cooking food, washing ourselves (and our teeth etc.)
- **Inside your home:** Washing our clothes, cleaning the house, pets to drink
- **In the backyard:** Watering the garden, washing the car
- **At school:** Washing hands, to drink
- **In the community:** Growing food, home for wildlife (e.g. fish, frogs), fighting bushfires, fun (e.g. using the swimming pool)
- **On a farm:** Growing of crops, livestock to drink

Discuss the items written down with the class. Were they similar, or vastly different across the class?

2 Discuss the answers as a class. How close were students to the correct number of litres?

3 Students might use drawings to represent the different areas or choose images from the internet.

4 If students are struggling to come up with ideas for tips for their poster, you could suggest some of the following:

- Don't leave taps running after use.
- Use a bucket to wash paint brushes etc.
- Place a bucket under taps or bubblers to catch excess water. Use the water on the garden.
- Form a team of Water Detectives to monitor water use (dripping taps etc.) and to find out where water is being used and wasted.
- In the garden, grow plants that don't require much water.

Optional activity: To find out which plants grow best under dry conditions (e.g. native plants), students could:

- do some internet research
- visit a local nursery (e.g. GrowAbility Nursery https://christiecentre.com.au/social-enterprises/growability-nursery/)
- talk to the park ranger at a local state park and read relevant signage.

5 **Aquasaver family:**
Total volume of water used is 650 litres

Dripdrop family:
Total volume of water used is 1300 litres

6 The Dripdrops use twice as much water as the Aquasavers (the difference is 650 litres).

7 According to the Australian Bureau of Statistics, in 2021 the population of the Mildura local government area was 56,972 and there were 14,729 families, with an average of 1.9 children per family. Doing the calculation for 15,000 families of 4 will overestimate, but it will give students an idea.

8 Answers will vary, but could include:

- Turn off the tap while brushing your teeth (use a glass of water to rinse).
- Only run the dishwasher when it is full.
- Have a short (3-minute) shower.
- Don't fill the bath right to the top.
- Install a dual-flush toilet.
- Use a front-loading washing machine.

Encourage the students to talk to a parent or carer about wise water use.

9 7 × 650 = 4550 litres

10 52 × 4550 = 236,600 litres

Students may be interested in some volume comparisons.

Introduce students to the standard multipliers of units for large volumes:

- 1 kilolitre (kL) = 1000 litres
- 1 megalitre (ML) = 1,000,000 litres
- 1 gigalitre (GL) = 1,000,000,000 litres

For example:

- water tanks for houses can be 5000, 10,000 or 20,000 litres – or even larger
- an Olympic-sized swimming pool holds 2,500,000 litres (2500 kilolitres)
- the Sydney Harbour holds 500 gigalitres (500,000,000,000 litres)

11 **a** In 91 days, the Aquasaver family uses:

91 × 650 = 59,150 litres

This volume of water would cost:

59,150 × 0.05 = 2957.5 cents
= $29.58

b In 91 days, the Dripdrop family uses:

91 × 1300 = 118,300 litres

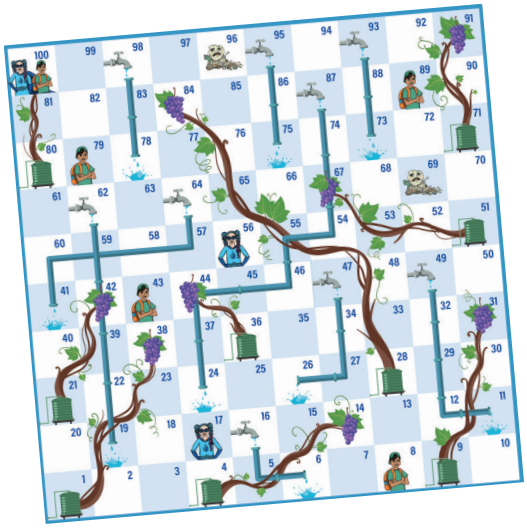
This volume of water would cost:

118,300 × 0.05 = 5915 cents
= $59.15

Note: Although we have provided a value of 0.05 cents per litre to simplify the calculations, the actual cost of water is:

- **0.0538 cents per litre for less than 100 kL**
- **0.0917 cents per litre for between 101 kL and 200 kL**
- **0.1179 cents per litre for more than 201 kL.**

So this would mean that the families would be charged at different rates. Students might note that, in reality, some families will have water tanks, so they will not get their water (or at least, not get all their water) from the town water supply.



Game

Students can play the game in small groups or in teams.