



## Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Water supply</i> teacher guide	This guide helps teachers use the board game in their classrooms to explain decision-making processes required to provide a sustainable water supply.	teachers
	<i>WaterWorks</i> board game	The board game requires students to purchase and operate a water supply system for an imaginary town.	students
	<i>WaterWorks</i> player's sheet	Each student has a player's sheet on which to record their transactions during the game.	students
	<i>How to play WaterWorks</i> procedure sheet	This sheet provides both playing procedure and rules of the game.	students
	<i>WaterWorks</i> chance cards	These present a variety of scenarios that may affect water supply.	students
	<i>Reflections on WaterWorks</i> worksheet	This set of questions guides students' reflections on what they learned from playing the game.	students

## Purpose

To **Explain** to students what is involved in decision-making and planning processes for a sustainable water supply in a community. Students need to consider variables that affect planning decisions, including: size of/changes in population and its density, climate, energy costs, taxes, maintenance costs, and social and personal behaviour.

## Outcomes

Students:

- consider economic, social and environmental factors and outcomes involved in planning a water supply;
- identify a range of different water supply facilities available for a sustainable water supply;
- identify resources required to operate facilities;
- identify actions that may maximise use of facilities; and
- appreciate how climate and climate change create challenges for water supply.

## Activity summary

ACTIVITY	POSSIBLE STRATEGY
Prepare materials for playing the game, and familiarise yourself with the rules. Hints for preparation are given in the Teacher notes below, under the heading <b>Game preparation</b> .	teacher
Discuss with students how to play the game. They may like to plan a game strategy, also described in Teacher notes below, under the heading <b>Game preparation</b> .	whole class, small groups
Play the game.	groups of 3 – 6
Discuss what students have discovered/learned from playing the game. Possible strategies for doing this are described in Teacher notes below, under the heading <b>After the game</b> . Students complete the worksheet.	whole class

## Teacher notes

### Game preparation

Organise, print and copy (where necessary) required materials. As the game is complex, it's useful to explore/read materials, in order to understand how the game works, prior to introducing it to students.

Organise students into groups of 3 – 6 players.

Each group needs: playing board, 1 die, and 1 set of CHANCE cards.

Each player needs: 1 playing counter, 1 PLAYER'S SHEET, 1 copy of *How to play WaterWorks*, and a pencil and eraser to record account details.

Time required: at least a 40 minute lesson, 60 minutes is preferable. In a previous lesson, it's a good idea to ask students to read and discuss rules and look at the playing board and PLAYER'S SHEET.

Students may plan a playing strategy and buying plan using their PLAYER'S SHEET. To do this they need to ask themselves: 'What would make a good water supply set up, that'll be least affected by weather, energy supply and social factors?'

To ensure all class members get into the game quickly, before the lesson you may like to play it with a select group of students so they understand it, and may each lead a group when the class plays.

To help students understand the aim of the game, you may like to create a scenario for them:

'You're head of a water supply company with the job of extending the water supply from a town, to a new satellite town. To get started, the government supplied you with \$40 million and 20 GL of water. You must purchase water supply facilities, and infrastructure and energy you need to operate them, in order to collect water you'll need, continually, to supply your customers with water. In the game, you'll get paid for water you supply, but you have to pay to maintain your facilities. Random events will impact your water supply business. Purchasing actions will help you survive and build up a sustainable water supply.'

A further option is to appoint game umpires for groups. They don't play but oversee recording of: buying facilities, supplying, recording water and money exchanges, and trading.

When playing the game on subsequent occasions, extend students by asking them to pick a location in Western Australia, where a substantially increased water supply may be required, and plan for that location.

### Rule interpretation, troubleshooting, and answers to possible questions.

- You only collect water, and adjust your water amount on your ACCOUNT, when you land on or pass COLLECT WATER ... not when you land on or pass your facilities.
- When you pick up a CHANCE card that applies to you, you need to adjust your account immediately.

- You have to land on most spaces to have the option of buying them, and so forth, but every time you PASS a corner space, reckoning of water or money balance is required.
- In reality, sewer mining and recycling wastewater need a water supply, but in the game we assume a town water supply is already there. So, you can purchase SEWER MINING and/or WASTEWATER RECYCLING and then claim when you pass COLLECT WATER from operational facilities.
- If a player lands on ENERGY SUPPLY or INFRASTRUCTURE they may purchase more than one each time they land. They don't need to have facilities first. If they have surplus energy or infrastructure they can always trade it later, for money or water.
- Water may be collected from a purchased CENTRALISED WATER SUPPLY FACILITY only if the required infrastructure and energy supply has been purchased so the facility is operational.
- CHANCE cards and operating costs only apply if a facility is operational.
- Collect water (on passing COLLECT WATER) from DECENTRALISED WATER SUPPLY facilities as soon as they're purchased, as these need no infrastructure or energy supply.
- ACTIONS don't provide water but do affect some CHANCE card outcomes. Players may buy each ACTION only once.
- In the first round CHANCE cards are unlikely to affect anyone. Most apply after players purchase facilities, and resources to make them operational.
- The bottom line of the ACCOUNT (Operating costs; Water supply demand; Water collect capacity) is to help players make decisions and move quickly. By recording accurately they can see if: they've enough money and water to stay in the game; they need to acquire more facilities; or they can trade.
- CENTRALISED WATER SUPPLY FACILITIES collect water in one central place and distribute it to customers.
- DECENTRALISED WATER SUPPLY FACILITIES collect/save where the customer is.
- The reason why RAINWATER TANKS and GREYWATER SYSTEMS are so expensive is that you're paying the total cost of supplying them to all customers.
- DESALINATION can use seawater, or brackish water if inland.
- Sewer mining means extracting and treating water from sewers for reuse, before it reaches the wastewater treatment plant.
- Alternate sources of water currently being researched (or investigated) include: cloud seeding, a pipeline from a water-abundant area, devices that take water out of air, and towing icebergs from polar regions.
- Water efficiency is about technologies such as: leak detection and prevention, and smart meters which let you know when and how much water you use. This helps save water.

## After the game

Students may keep their PLAYER'S SHEET to remind them of what they've learned. Playing the game a second time would assist consolidation of learning.

Another activity to reinforce learning is to ask small groups of students to read through all the CHANCE cards. Then, they can make a written plan of what ideally they would purchase in the game to set up a sustainable water supply.

Students may complete the worksheet either individually or in small groups; or you may choose to conduct a class discussion using questions on the work sheet.

## Technical requirements

The teachers guide, game sheets and worksheet require Adobe Reader (version 5 or later), which is a free download from [www.adobe.com](http://www.adobe.com). The worksheet is also available in Microsoft Word format.

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## Associated SPICE resources

*Water 3: Water supply* may be used in conjunction with related SPICE resources to to teach the topic of water supplies in Western Australia.

DESCRIPTION	LEARNING PURPOSE
<i>Water (overview)</i> This learning pathway shows how a number of SPICE resources can be used in teaching students about how Western Australia secures its water supply.	
<i>Water 1: Finding water</i> A video shows a range of potential ideas for how water could be supplied to people living in Western Australia.	<b>Engage</b>
<i>Water 2: Water sources</i> Students use an interactive learning object to explore water sources in a number of regions across Western Australia.	<b>Explore</b>
<i>Water 3: Water supply</i> Students play a board game to investigate the economic, social and environmental factors that must be considered when planning a sustainable water supply.	<b>Explain</b>
<i>Water 4: Recycling water</i> Students investigate the Water Corporation's groundwater replenishment scheme by conducting background research, an experiment and a survey.	<b>Elaborate</b>

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