

Teacher notes

One third of the earth's land surface lacks enough water. This causes extreme difficulty, known as water-stress, for the people who live there. The World Health Organisation (WHO) estimates that one in six people do not have access to safe water. Many value water because they walk several kilometres to fetch it; others take it for granted because access is as easy as turning on a tap. Accessing safe water provides challenges and opportunities for people everywhere, because everyone needs water.

Social Studies in the New Zealand curriculum:

Through the conceptual strands, particularly Place and Environment, students will explore these key understandings:

Place and Environment key understandings:	
Level 2: People depend on places of water <u>Key idea:</u> People cannot live without places of water <u>Key questions:</u> How much water is there in the world? What are our water needs?	
Level 3: People's access to places of water affects how they use water <u>Key idea:</u> People use water differently, depending on how much they have <u>Key questions:</u> How much water do you use? How much water do others in the world use?	
Level 4: Finding safe water (water exploration) creates challenges and opportunities <u>Key idea:</u> Access to safe water (not just any water) is important for healthy living <u>Key questions:</u> What challenges do people face when safe water is hard to find? What are the opportunities when people do find safe water?	
Level 5: Water management impacts sustainability <u>Key idea:</u> Sustainable access to safe water is possible if people manage water resources <u>Key questions:</u> With science, technology and development how can we: • Access water from rainfall, rivers, lakes, springs or wells? • Make water safe for drinking? • Distribute water effectively with pipes and storage tanks? • Protect water for the future by managing water supplies and preventing contamination?	

Settings: New Zealand – Asia – Global

Social Inquiry: Inquiry research, values exploration, social decision-making and action.

Preparation: Set up your unit of inquiry choosing a focus that is suitable for your students. Select from all the learning activities on pages 2 and 3. Although arranged by level, many suit a range of levels. Adapt the resource pages to incorporate appropriate skills and competencies.

Activities:

Level 2	A	B	C	D	E	F			I							
Level 3	A		C	D			G	H	I	J					O	
Level 4	A						G	H		J	K	L	M		O	
Level 5	A										K		M	N	O	P

Resources: Request or order additional Social Studies resources from World Vision:

Website	<i>Water Matters Connection</i>	Years 1 – 13	free
Poster	<i>Everyone Everywhere Needs Water</i>	Years 3 – 10	free
Video/DVD	<i>Water for All</i>	Years 1 – 13	\$50 or loan
Resource folder	<i>Just Add Water</i>	Years 3 – 6	\$40
CD version	<i>Just Add Water</i>	Years 3 – 6	\$30
CD-ROM + notes	<i>Not a Drop to Drink</i>	Years 7 – 8	\$30
Student textbook	<i>Water Wise</i>	Years 9 – 11	\$10
Resource folder	<i>Water Wise</i>	Years 9 – 11	\$50

Go to www.worldvision.org.nz/catalogue or contact the Education Team.

World Vision Global Education

To contact the Education Team:
World Vision, Private Bag 92078,
Auckland, New Zealand
Ph: 0800 800 776
Fax: 09 580 7799
education.nz@worldvision.org.nz
www.worldvision.org.nz/education

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This poster may be photocopied for classroom use.

Water Matters Connection

This interactive, student-friendly website explores:

Abida's world – life in Niger with stories, photo albums, puzzles, quizzes and information pages.

Connect Niger – with three kiwi children in Niger through online postcards, questions and answers

Water matters – quests, information, and opinion polls on water issues

Take action – ideas for social action in your local community or overseas

Teacher resources – Social Studies links, student worksheets, website tips.

FREE Register online

www.worldvision.org.nz/watermatters

Level 2 People depend on places of water

- A Where on earth is all the fresh water?** Demonstrate how much water there is in the world.
1. Fill a 20-litre container with water. This represents the total water supply in the world.
 2. Pour out two mugs into a bowl. This represents the proportion of fresh water, found in the ice caps, rivers, lakes, clouds, soil and rock – up to 14,000 cubic kilometres in total.
 3. Add a salt water label (or 650 gms of salt) to the 20-litre container. All the rest of the world's water is salty.
 4. Show the bowl of remaining water. Three-quarters of the fresh water (one and half mugs) is locked up in the Antarctic and Arctic, and almost one quarter (half a mug) is deep underground and can't be reached.
 5. Measure out three teaspoons from the bowl into a cup. Less than one per cent of the world's freshwater can be easily reached in lakes, rivers, the soil, the air and plants.
 6. Copy the circle diagram and key on page 4 for students to complete after your demonstration.
- B Where does your water come from?** Find out where your water comes from. Contact your council or water provider for information and a map or arrange to visit your local water source.
- C Water shortage:** Describe a time when you have been short of water or not able to use your usual supply (camping, beach, water shortage, etc). Which poster photos show places that are short of water?
- D People in other places:** Copy and trim the photo labels (page 4) minus the numbers. Match these to the poster photos to find out what's happening and where. Enlarge the map (page 8) and build a display with the photos and labels. Add other labels showing how much water people use in each country (details on page 7).
- E I spy quiz:** In the photos spy different ways to carry water. Answers: plastic bag, watering can, jar, pot, pan, bucket. Challenge students to make a water carrier from clean recycled equipment at school or home.
- F People need water to live:** Brainstorm a list of things that we use water for in our daily lives. Underline the things on your list you could not live without. Draw a picture to show that people need water to live, or complete this sentence starter: People cannot live without water because...

Level 3 People's access to places of water affects how they use water

- G How much water do I use?** Use the *Quantities* table on page 4 to complete your own table showing how much water you use in one day for drinking and keeping clean and healthy. Also work out the amount of water your household uses for laundry, cleaning, dishes, etc. How much water do you estimate your household would use in a week? Ask an adult at home to help you check this against your water rates or if you have a water meter, take readings every day for a week.
- H Water on a budget:** Set this activity up outside.
- Part A**
1. Measure out 50 litres of water in 50 one-litre plastic milk bottles, with lids.
 2. Prepare four labels for the basic water needs (drinking, washing, sanitation, food preparation).
 3. Group the bottles beside the labels, as recommended for one person's basic water needs per day (see page 4).
 4. Discuss if this looks like the amount of water you use in a day.
(Note: New Zealand is an industrialised country so on average we use more than 200 litres per person per day.)
- Part B**
1. Divide into groups of 4 – 6 students.
 2. Remove 40 bottles (leaving just 10 litres) and tell groups that they live in a water-stressed area (water stress is a state of extreme difficulty caused by lack of water). Ten litres is all the water each person has for the day (remember you can also recycle the waste-water). Give them time to allocate the 10 litres for the following tasks
- | | | | |
|-----------------------------|--------------------------|-------------------------|-------------------------------|
| <i>Enough to drink</i> | <i>Wash your clothes</i> | <i>Water the garden</i> | <i>Wash the dishes</i> |
| <i>Make porridge to eat</i> | <i>Wash yourself</i> | <i>Clean the toilet</i> | <i>Water for the chickens</i> |
3. Each group reports back to the class how they would use their allocation.
 4. Groups evaluate their allocation. Did you have enough water? Which tasks are the most important? Which water did you recycle? What is the minimum amount needed to wash? (In some parts of the world people wash using only 250 ml.)
 5. Compare this activity with the amount of water they actually use in a day. What effect would a lack of water have on your use of water, your health and your living conditions?
- I What's it like?** Read about five children in other countries on page 5. List the places/ways they get their water. What do you notice about the water they use compared to you? What problems do they face? How has your appreciation of water changed after reading these case studies? What can you do to protect and value water in your own daily life?

Level 4 Finding safe water creates challenges and opportunities

J Getting water: Did you know that the average distance that someone in Africa and Asia walks to collect water is six kilometres. The water that an adult carries on their head (20 litres) is equivalent to the airport luggage allowance of 20 kg (1 kg = 1 litre of pure water). Older children carry around 10 litres but young children may manage only 1 – 2 litres.

Part A How heavy is water? Weigh 1 litre of water on kitchen scales. Use a measuring jug to fill a suitable carrying container with 20 litres of water. Can you lift 20, 15 or 10 litres of water?

Part B How long would it take? Work out how long it would take you to carry 20 litres for six kilometres.

1. Measure how far students can carry 20 litres of water.
2. Reduce the quantity of water by measuring an amount they can easily carry.
3. Calculate the time it would take to carry this quantity for six kilometres.
4. Calculate how many trips are needed to carry the equivalent of 20 litres and the total time it would take.

Reflection: How would you feel if it was your job to carry this amount of water every day? What challenges would you face so you can get enough water for your family? What current activities would you have to give up?

K Challenges:

Problem / Challenge	Hope / Opportunity

Copy the table then read each child's story on page 5. Identify points to add to both columns. (See page 7 for information about their countries.) Write or present a day in the life of someone your age facing the challenge of limited access to safe water. Describe how their life would change if there was better access to safe water.

How has your appreciation of water changed after reading these case studies?

L Opportunities: Read the four examples on page 6 *Safe water is possible*. Create an imaginary person who has benefitted from one of the changes described. Prepare four interview questions with answers that describe how their life has changed because of this opportunity. Role play your interview with a partner.

Level 5 Water management impacts sustainability

M Where in the world? Cut out the 12 poster photos and enlarge or copy the world map on page 8. Blank out the *Answer key* on page 7 and enlarge the other 13 boxes to cut out. Discuss the definition of domestic water use. On the map, arrange the photos and country information boxes beside the correct country. There is no photo for New Zealand. Students can add their own to represent water access in New Zealand.

N Patterns of water access and use:

1. Give students a copy of *Where in the world?* (page 7) and complete the following table ranking the 13 countries. (New Zealand has been done as an example.)

Country	% Access to water	Rank	% of Domestic use	Rank	Water/person/day	Rank
NZ	99% (1% have no access)	1	46%	1	741 litres	1

2. From your table, identify one pattern about water access or use, e.g. In countries with low access to water people use less water per day. Write your pattern as a one sentence statement.
3. Draw a graph using data from your table to visually show the pattern you have described.

O Water Alert! www.unicef.org/voy/explore/wes/explore_1818.html

Play UNICEF's online game – Water Alert! Students address problems in their online village to ensure water is safe to drink and the environment healthy to live in. Characters, factoids, a glossary, tool kit and pdfs explain a range of water issues (water management, environment, sanitation). Suitable for Year 6+.

P Safe water is possible: Read four aspects of sustainable access to safe water on page 6.

Part A Complete at least one of the following research tasks:

Accessing water – Research and present information about ways of accessing water in different climates, grouped by source – rainfall, surface water collection (rivers and lakes) and groundwater (springs and wells).

Making water safe – Find out how water is treated for household use in your area. Compare this with information on different household water treatments from the World Health Organisation pages 30 – 32 (3.3 to 3.3.5)

www.who.int/water_sanitation_health/hygiene/settings/hvchap3.pdf

Distributing water – Draw a cause and effect diagram showing the direct and flow-on impacts of not having a water distribution system. Consider education, health, work/economic activity, and community participation.

Protecting water – List positive water management/sanitation activities from the Niger example. From the rest of the poster list negative contamination/overuse examples. Find examples from NZ under these same headings

Part B Form 'mixed' groups so all research topics are represented. Present your research to the group. Together use everyone's research, the information, poster photos and stories to decide on the five most important actions needed by world and community leaders to achieve sustainable access to safe water for all.



Eila – 10 years old

Finding water in Kenya

Eila's small village lies near a river edged with palm trees, however this river is nearly dry after three years of drought. Eila comes here twice a day to get water, something she has done since she was old enough to carry a bucket. She sits on the edge of the 60 cm deep hole and removes handfuls of sand from the bottom, one scoop at a time. Then she carefully bails out the dirty water and stones and flings them out of the hole. Finally she scoops up less than a cup of water which is littered with sand and stones. With practised care she pours the water into her jug and then throws away the stones and sand from the bottom of her cup. She repeats this hundreds of times until she finally gets enough to fill her bucket. It takes about 30 minutes. Then with some help she lifts the heavy bucket onto her head and walks three kilometres to her home.

Carrying water in Ethiopia

Enatnesh – 15 years old

"I hate fetching and carrying water from the river," says Enatnesh. "Sometimes I quarrel with my mother when she asks me to bring water. I usually prefer carrying small cans but then I have to walk there a number of times and it's several miles away. Thanks to World Vision, I no longer quarrel with my mother or walk long miles for water. We have got clean water at a distance of only a five-minute walk."

Where Enatnesh lives in Ethiopia, World Vision capped a spring and installed 27 kms of pipeline with water points that supply over 17,000 people.



Water-related disease in Sudan

Dal and his family stay in camps far from their home village to get enough grazing for their cattle. "Life at the camp is very different, the only source of water is the river, so we all have to drink it as it is."

The river contained **guinea worm** eggs and now everyone in Dal's family is sick.

"I feel when the guinea worms are moving. It is itchy and the pain is burning my flesh. You see, I cannot move unless I use this stick or someone in the family helps me. Today I feel better, so I can sit here and help my mother sort the groundnuts. I used to walk two hours every day to get to school. I also used to help my mother weeding the groundnut garden, but now I can barely move."

Tiny water fleas carrying the guinea worm larvae thrive in stagnant water. Drinking this water lodges the guinea worm in the intestines, where it can grow up to one metre in length. A year later, the whole worm slowly bores its way out through a blister on the skin over two to three months. It's painful and debilitating, causing serious infection if the worm breaks while it's still in the body. To ease the burning, people immerse the affected area in water, but as soon as the female worm touches water it releases hundreds of thousands of larvae, and the cycle continues. Filtering water prevents people ingesting the larvae. Boiling drinking water actually kills the larvae.



A guinea worm coming out through the skin

Drinking contaminated water in Romania

Dumitru walks four kilometres every day to get to his nearest school. Each student needs to bring their own bottle of water to drink because the well near the school is contaminated.

"I was once very thirsty and didn't bring water to school with me. I drank water from the polluted well. I started to feel sick, with headaches and my throat hurt. My mum gave me medicine for the pain. I stopped drinking water from that well. This happens a lot to other students as well."



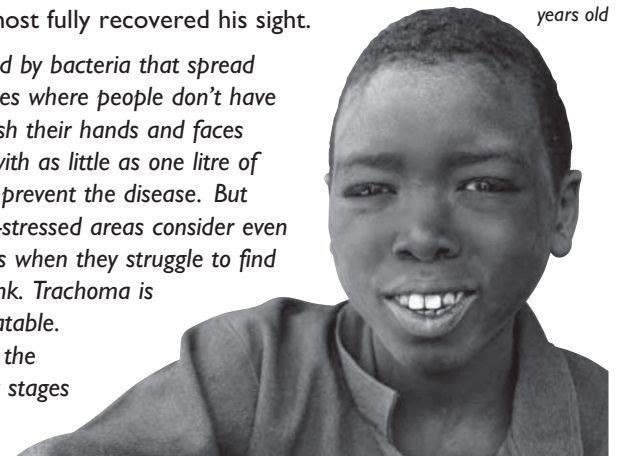
Dumitru – 9 years old

Unhealthy living conditions in Niger

"I remember what it was like before I lost my sight. My eyes were so itchy and sore that I thought my eyelids would fall off. When I woke up in the morning, I could see, but by noon everything became dark. Then gradually after a few months, I couldn't see at all. It even hurt to open my eyes." Adamou had **trachoma** but, after surgery, he has almost fully recovered his sight.

Adamou – 12 years old

Trachoma is caused by bacteria that spread rapidly in communities where people don't have enough water to wash their hands and faces regularly. Washing with as little as one litre of water each day can prevent the disease. But those living in water-stressed areas consider even one litre too precious when they struggle to find enough water to drink. Trachoma is preventable and treatable. Antibiotics can clear the infection in the early stages and surgery corrects advanced cases.



Safe water is possible

With science, technology and development, people everywhere can:

- access water from rainfall, rivers, lakes, springs or wells
- make water safe for drinking
- distribute water effectively with pipes and storage tanks
- protect water for the future by managing water supplies and preventing contamination

Accessing water – Afghanistan

Problem: In Afghanistan, water deep below the ground can't be accessed and water from shallow wells is salty and unfit for drinking.

Solution: Harvesting rain (and snow) is an alternative to accessing ground water. A daba is a water tank made from a large hole in the ground. It is lined with bricks and reinforced with mesh which is then plastered, inside and out. The opening at the top lets in the rain and snow. It holds 25 cubic metres when it is full, enough to supply a family for nine months. The hand pump, connected by pipes to the daba, protects the supply from contamination.



Making water safe – Sudan

Problem: A lack of safe water means people drink water infected by guinea worm larvae. Guinea worms grow in a person's intestines and cause months of pain while they leave through the skin. People can't work or go to school and risk serious infection if the worm dies inside them.

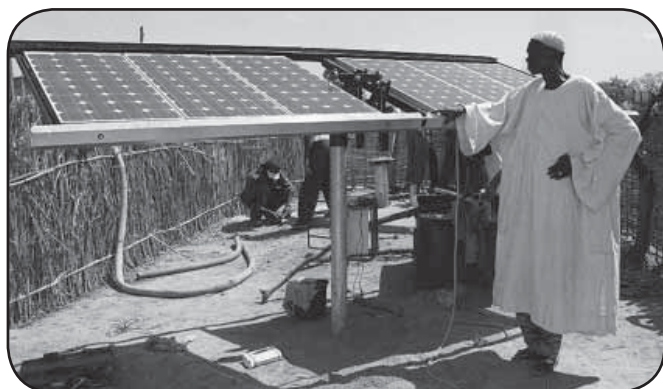
Solution: Boiling water kills the guinea worm larvae, but in Sudan, firewood for boiling water can be difficult to get. Drinking water through a filter pipe safeguards against guinea worm. Plastic filter tubes are simple to make and use. Children wear one around their neck making it easy to drink safe water, anytime.



Distributing water – Senegal

Problem: In places where there's no electricity supply, human effort is used to distribute water, using valuable time and energy that could be invested in other activities.

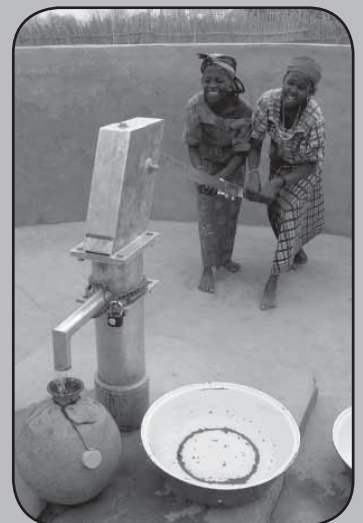
Solution: In Senegal, solar-powered pumps draw water from the ground then gravity pulls the water through pipes to places around villages. Simply turning on the tap provides fresh safe water. The water irrigates crops and supplies households. With the time saved not collecting water, women now grow vegetable gardens. They can sell their excess produce at the market and earn a small income for their efforts. To ensure a sustainable supply, local people maintain and repair the pumps, and make decisions about water management.



Protecting water – Niger

Problem: Safe water supplies can be contaminated or exhausted if people use unhygienic practices or overuse the supply.

Solution: In Niger, communities prevent contamination by using separate animal drinking troughs and concreted laundry areas. Improving household latrines and supplying a water outlet within 30 minutes walk of every home also prevents contamination. If water is too far away then it takes more effort to be hygienic. Trained community volunteers advise on sanitation, maintain water pumps and test water quality. Village water committees monitor and manage water use. A seedling nursery and tree-planting programme promote soil conservation and water retention to give long-term protection against the effects of drought.



Where in the world?

<p>Water use types <u>Agriculture:</u> mainly irrigation, but also livestock maintenance <u>*Domestic:</u> drinking water plus water used for homes and town/city buildings (libraries) commercial places (shops), and public services (hospitals) <u>Industrial:</u> cooling machinery and equipment, producing energy, cleaning and washing goods produced as ingredients in manufactured items, and as a solvent</p>	<p>A Large areas of farm land, as well as gold, cotton and oil give hope for a better future after a long-running civil war. The war displaced many from their homes and periods of drought have meant searching deeper for water. This country of deserts, mountains, swamps and rainforests borders the Red Sea. 69% have access to safe water *Domestic water use is 4%, 87 litres per person per day</p>	<p>B Once dependent on sugar and other agricultural exports, this country is now the most popular tourist location in the Caribbean. There is a huge gap between the rich and the poor, but with financial help, poor communities are installing water storage and pipes, providing access to water. 93% have access to safe water *Domestic water use is 11%, 332 litres per person per day</p>	<p>C The dry, cold climate is harsh for most of the year with winter temperatures dropping to -25°C. With vast amounts of semi-desert and desert plains, many people are nomadic or live in isolated settlements. Access to safe water in rural areas is just 30%. Increased access to water for crops improves food production. 62% have access to safe water *Domestic water use is 20%, 100 litres per person per day</p>	<p>D Water is critical to sustain life in this parched, remote country of cold winters and hot summers. It's the worst country in the world for access to safe water. Water supplies need rebuilding after years of war that have ruined the economy. Drinking unsafe water means children are often sick. 13% have access to safe water *Domestic water use is 1%, 55 litres per person per day</p>
<p>E The Great Rift Valley is famous for evidence of early human ancestors. Situated on the equator, tourists also visit for a safari experience. Poverty, high unemployment, and crime plus a long-running drought have put millions in need of food aid. Digging near a dry riverbed is sometimes the only place to find water. 62% have access to safe water *Domestic water use is 20%, 48 litres per person per day</p>	<p>F With the world's highest rainfall (about 12 metres) arriving mainly in the monsoon season, flooding is a problem. Water sources get contaminated, increasing the risk of waterborne diseases. It's a huge challenge to provide enough safe water for the second largest population in the world. 86% have access to safe water *Domestic water use is 5%, 81 litres per person per day</p>	<p>G This is one of the world's most densely populated countries. It has problems with naturally occurring arsenic in the water. Many village tubewells are contaminated. Pumps with safe levels are painted green. Low-lying river plains flood frequently making water salty. Poverty is widespread. 75% have access to safe water *Domestic water use is 12%, 44 litres per person per day</p>	<p>H Although the cities are well-developed, only 16% of rural people have piped water in their homes. For rural people water comes from village wells, but these have been contaminated through heavy fertiliser use. People must travel longer distances to get safe water, which they use sparingly. 57% have access to safe water *Domestic water use is 8%, 250 litres per person per day</p>	<p>I Being on the edge of the Sahara Desert threatens this country's agriculture and makes it prone to droughts. Dry, dusty conditions make washing essential. Its main export is uranium but water is a precious resource. Living conditions for most people are basic with limited access to education or healthcare. 46% have access to safe water *Domestic water use is 16%, 30 litres per person per day</p>
<p>Answer key: Afghanistan = D Bangladesh = G Cambodia = M Dominican Rep. = B Ethiopia = L India = F Kenya = E Mongolia = C New Zealand = K Niger = I Romania = H Senegal = J Sudan = A</p>	<p>J This country is known for its peaceful democracy. It's the western-most point in Africa, low-lying, with semi-desert areas and forests. Many people work in agriculture but poverty is widespread and unemployment is high in the cities. Safe water may still need to be carried some distance so water use is low. 72% have access to safe water *Domestic water use is 5%, 28 litres per person per day</p>	<p>K The moderate climate suits agriculture which is the main economic activity. Manufacturing and tourism are growing in importance. Hydro-power provides a significant proportion of electricity in this mountainous island country. Access to safe water is not measured but is estimated to be 99%. *Domestic water use is 46%, 741 litres per person per day</p>	<p>L Addis Ababa is the capital of this country known for long-running droughts, a past border war, famine and starvation. Access to safe water is the second worst in the world. Relying on rainfall means many people use rivers, streams or ponds for all their water needs, resulting in illness. 22% have access to safe water *Domestic water use is 11%, 15 litres per person per day</p>	<p>M One of the poorest countries in the world, it relies heavily on aid from other countries. People survive mainly through rural subsistence farming along the Mekong River. Even water in city taps is unsafe and has to be filtered or boiled. Water sold on the street for locals and tourists is a luxury many people can't afford. 34% have access to safe water *Domestic water use is 5%, 8 litres per person per day</p>

Source of statistics: www.unicef.org/sowc http://earthtrends.wri.org/country_profiles/index.php?theme=2

World Map

