

THE THIRSTY THREE

THE MYSTERY OF
THE IMPURE WATER



BROUGHT TO
YOU BY THE



WATER
RESEARCH
COMMISSION

THE THIRSTY THREE

Meet the cast!



The Thirsty Three

Royston

The cautious one in the group. As the oldest member of the Thirsty Three, he is the most responsible and makes the hard decisions.

Mpho

A down-to-earth, pretty young woman, Mpho is the clever one in the group. When she's not hanging with her friends she has her head in a book.

Steyn

The youngest in the group, with more bravery than brains, Steyn is a scrappy young fellow who gets into a lot of trouble. He always jumps in head first.

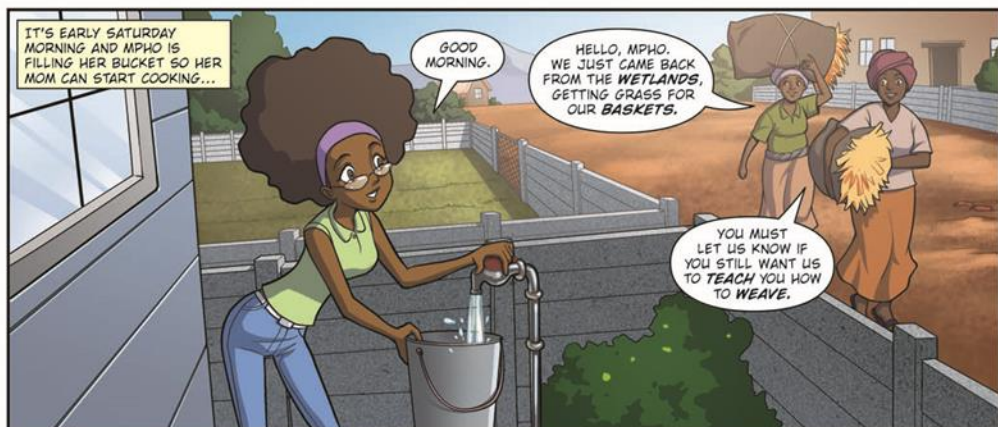
Also starring

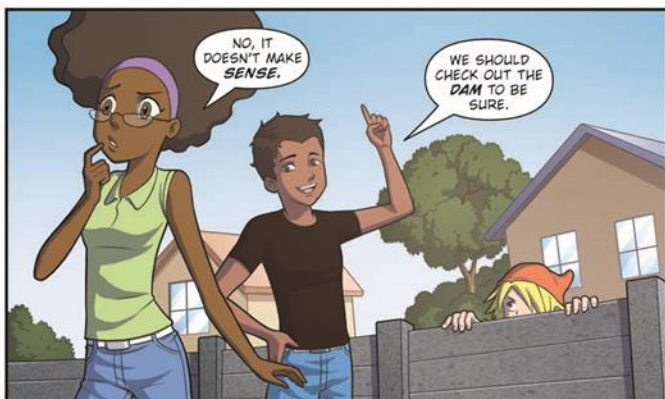
Jacob

The grumpy old caretaker at the dam. This reclusive figure does what he can to keep the dam and river clean, but maybe he should learn to open up and accept help from others.

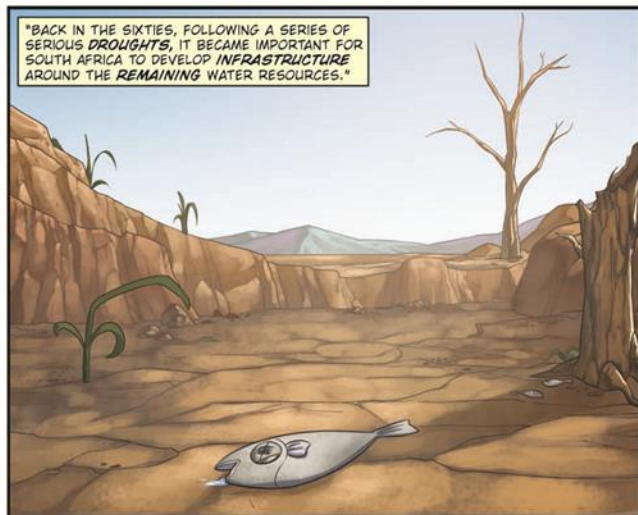
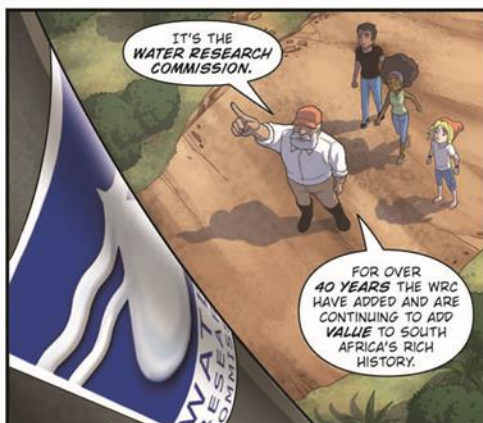
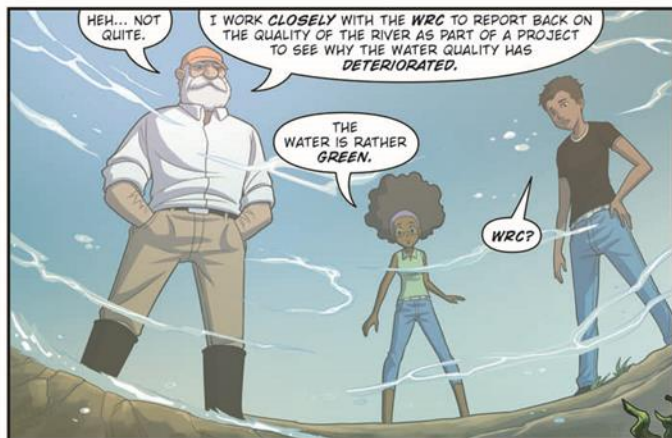
Lara

The water conservationist who is working on a research project for the WRC right there at the Soetriver dam. She's helpful, polite, and very informative.









"IN THE EARLY SEVENTIES I WAS **THRILLED** WHEN THE WATER RESEARCH COMMISSION WAS **STARTED**..."



"...TO GET WATER RESEARCHERS TO WORK **TOGETHER** TO SOLVE OUR WATER PROBLEMS..."



"...TO **DISCOVER** SOUTH AFRICA'S MOST **PRESSING** WATER PROBLEMS..."



"...AND FIND **SOLUTIONS** TO THESE PROBLEMS BY **FUNDING** WATER RESEARCH..."

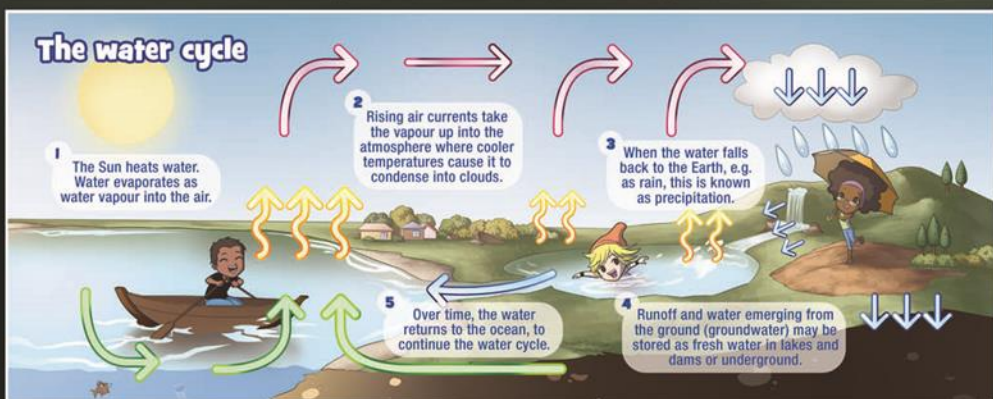
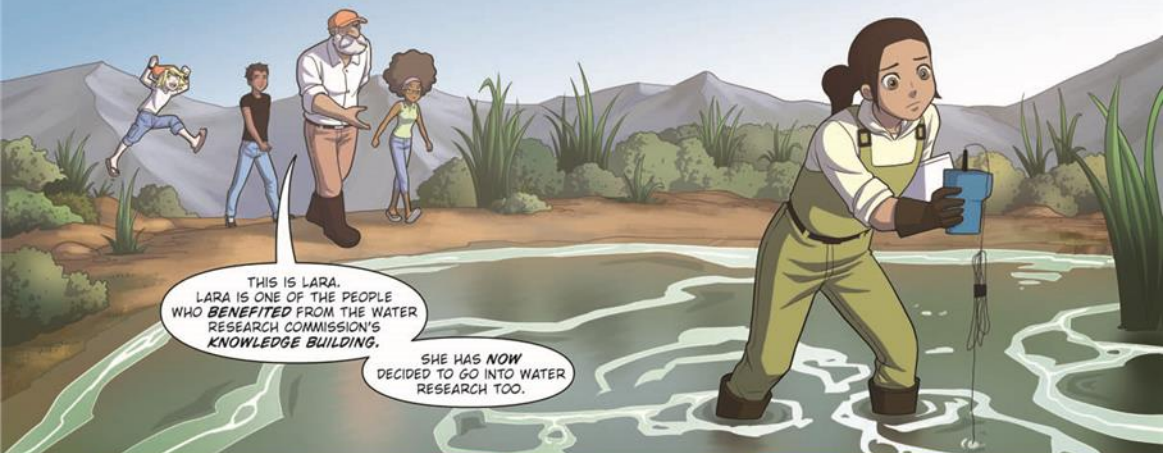


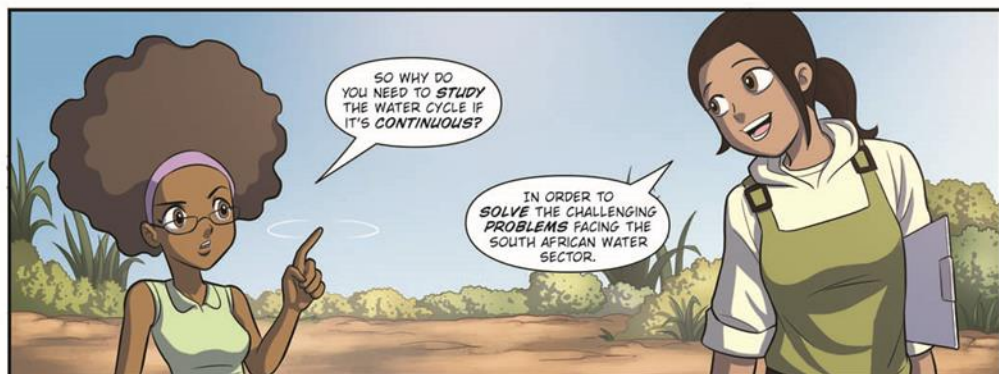
"...BY GETTING THE **SOLUTIONS** TO THESE PROBLEMS TO THE **RIGHT** PEOPLE SO THEY CAN **ACT**..."



"...AND AT THE SAME TIME BUILD A **NEW GENERATION** OF WATER EXPERTS."







TO PROPERLY **MANAGE** OUR WATER WE NEED TO NOT ONLY LOOK AT RIVERS AND STREAMS...



...BUT THE LAND OR CATCHMENT SURROUNDING THEM AS RAINWATER WASHES OVER THESE LANDS AND ENTERS OUR RIVERS. THIS IS CALLED **WATER RESOURCE MANAGEMENT**.



RIVERS AND WETLANDS SUPPORT RICH **ECOSYSTEMS**; THE ANIMAL AND PLANT LIFE WHICH NEED CLEAN WATER TO BE **HEALTHY**.

WE RESEARCH **WASTE MANAGEMENT** BECAUSE WE ALL NEED CLEAN WATER, BUT THEN GENERATE DIRTY WATER THAT NEEDS TO BE CLEANED AND DISPOSED OF SAFELY.



BECAUSE IT RAINS SO LITTLE IN SOUTH AFRICA A LOT OF FARMERS USE IRRIGATION TO WATER THEIR CROPS. SO WE RESEARCH **WATER IN AGRICULTURE** TO HELP FARMERS USE THEIR WATER BETTER.

THAT'S WHY THE WRC DOES **EVERYTHING** IT CAN TO SHARE ITS WATER KNOWLEDGE WITH OTHER PEOPLE.

EVERYTHING WE LEARN ABOUT WATER NEEDS TO BE **SHARED** AND KEPT FOR FUTURE GENERATIONS SO THAT THEY ALSO KNOW HOW TO **TAKE CARE** OF THEIR WATER.



The water cycle word search

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Here are some definitions of words in the water cycle. How many of these can you find in the word search below?

The **SUN** drives the water cycle by heating the water.

A **LAKE** is a large area of water surrounded by land.

A **RIVER** is a large natural stream of water flowing in a channel to the sea, a lake, or another river.

LAND is the part of the Earth's surface that is not covered by water.

A **CLOUD** is a visible mass of condensed water vapour floating in the atmosphere, typically high above the general level of the ground.

RUNOFF is the variety of ways by which water moves across the land. This includes both surface runoff and channel runoff.

VAPOUR is a gas that cannot be seen.

PERCOLATION is water that flows horizontally through the soil and rocks under the influence of gravity.

EVAPORATION is the transformation of water from the liquid to the gas phase as it moves from the ground or bodies of water into the above atmosphere.

PRECIPITATION is condensed water vapor that falls to the Earth's surface. Most precipitation occurs as rain, but also includes snow, hail, etc.

TRANSPIRATION is the release of water vapour from plants and soil into the air.

CONDENSATION is the transformation of water vapor to liquid water droplets in the air, creating clouds and fog.

Look forwards, backwards, up, down and diagonally.

I	D	U	W	I	Y	W	P	T	O	I	P	Z	D
N	O	I	T	A	T	I	P	I	C	E	R	P	S
C	D	R	G	Y	S	E	I	A	X	L	B	P	U
O	U	F	J	H	Y	R	U	N	O	F	F	D	N
N	O	V	U	A	R	P	J	V	X	S	P	I	W
D	L	D	P	E	R	C	O	L	A	T	I	O	N
E	C	X	R	J	X	E	T	I	N	O	M	I	P
N	T	R	A	N	S	P	I	R	A	T	I	O	N
S	M	U	N	O	I	T	A	R	O	P	A	V	E
A	K	C	T	M	V	A	A	W	I	B	S	D	C
T	R	U	O	P	A	V	R	Z	U	V	X	D	V
I	P	H	M	M	U	Y	R	L	A	K	E	Q	D
O	J	Y	B	T	V	P	L	A	N	D	V	R	X
N	W	H	Q	E	P	X	H	G	T	Y	L	B	R



Water facts

HERE'S THE IMPACT
YOU AND I HAVE ON
OUR WATER SUPPLY.



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World water figures



5000m³ – The volume of water there would be available for each person if all the freshwater on the planet were divided equally among the world population.



2 – The number of planets we will require by 2030 to keep up with humanity's demand for environmental goods and services.



9 billion – The estimated number of people in the world by 2050, increasing competition for scarce water resources.



60 000 – The estimated number of deaths a year as a result of climate-related natural disasters.



70% – The average percentage of industrial waste dumped untreated in developing countries' water resources every year.

South African water figures



13% – The contribution of groundwater to bulk water supply in South Africa.



2% – The percentage of South Africa's water used by the power generation sector.



95% – The percentage of households who had access to potable water in 2014.



50% – The percentage of wetlands lost due to impacts such as agriculture and urban sprawl.



19 500t – The amount of medicinal plant material provided annually by South African wetlands.

Africa water figures



40 000 – The work hours lost every year to the need to fetch drinking water.



58% – The percentage of Africa's population that has access to safe drinking water.



70% – The percentage of Africa's urban population who stay in informal townships. It is estimated that more than 1,6 billion Africans will be staying in informal urban settlements by 2020.



9% – Africa's share of global water resources.



20kg – The average weight of water that women and children carry (mostly on their heads) in Africa and Asia. This is equivalent to the permitted airport luggage.

Sanitation figures



90% – The average percentage of global cholera cases stemming from Africa every year.



16 000 – The average number of people that die in South Africa every year from diarrheal diseases.



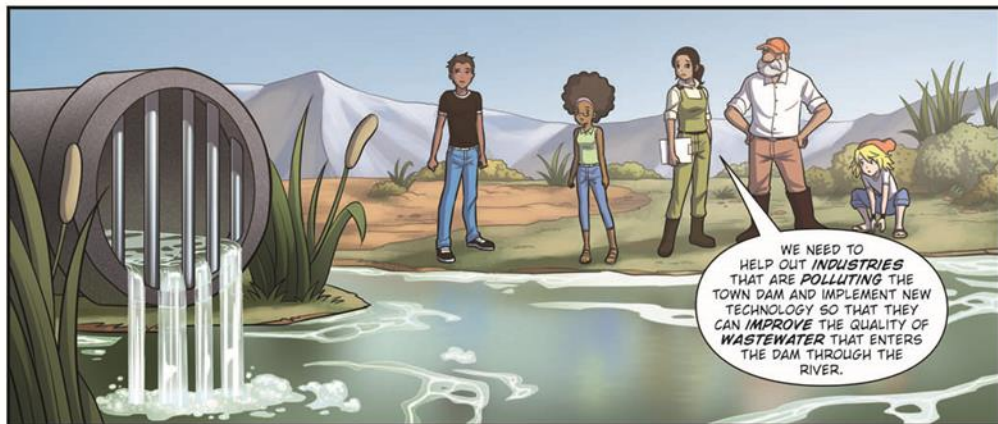
8 000 – The number of schools in South Africa (out of 24 000) that have flushing toilets.



90% – The percentage of South African households that have access to some form of sanitation.



10% – The percentage of the world's crops being irrigated with sewage effluent, often untreated.



How to make your own filter

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WHAT YOU NEED

Bottle

Dirty water

Sand

Stones

Beaker/glass

Rubber bands

Cheese cloth



STEPS

1

Cut a plastic soda bottle in half and remove the lid. Put three layers of cheese cloth over the narrow mouth of the bottle and use rubber bands to hold them in place.

2

Put the top half upside down into the bottom half if you do not have a beaker or glass. This will catch the water.

3

Put a layer of stones in the top half of the bottle followed by a layer of sand.

4

Get some dirty water. If you do not have dirty water you can make some water dirty by using cooking oil, dirt, bits of food, etc.

5

Pour dirty water into the top half of the bottle. It should run through the sand and gravel, out the cheese cloth and come out clearer in the bottom half of the bottle.

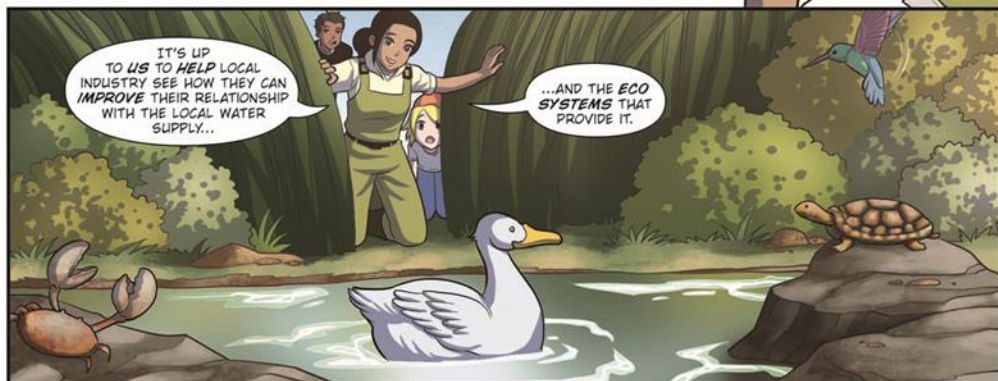
Filtration through a sand and pebble filter removes most of the impurities in water

What other materials do you think would work to filter water?

Examples: charcoal, coffee filters, paper towels, cotton balls.

Even though you've filtered the water it may not be clean enough to drink yet.

For clean drinking water boil the filtered water or buy purifying tablets at the store.



The true/false maze

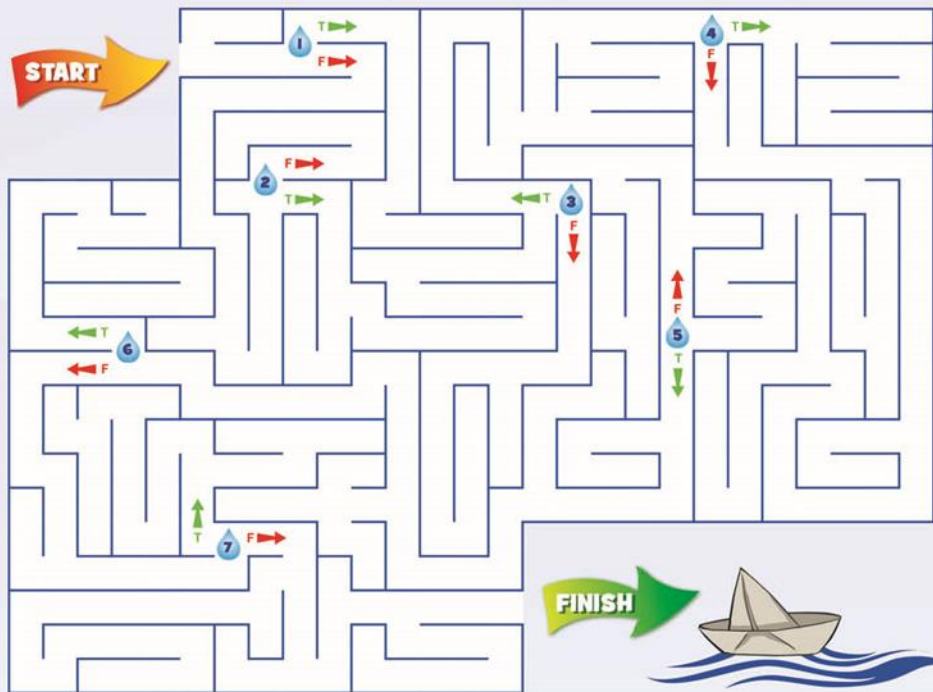
THE THIRSTY THREE

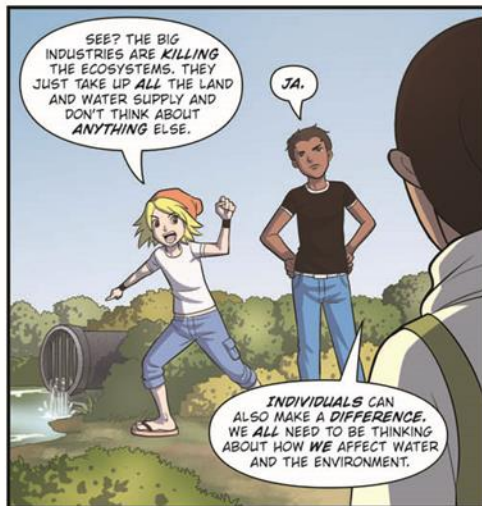
The kids are trying to float a paper boat through a maze. Find the correct route by answering true/false questions. The maze has many forks. At these forks the correct answer will take you along the right path. The incorrect answer will result in a dead-end.

IF YOU ANSWER CORRECTLY, IT SHOULD BE PLAIN SAILING.

TRUE/FALSE STATEMENTS

- 1 Farm animals should drink any kind of water.
- 2 The mining industry needs water.
- 3 Farmers use irrigation systems.
- 4 Plants can grow without water.
- 5 Humans are to blame for poor water quality.
- 6 The economy doesn't really need water to sustain it.
- 7 We should not help local industry to understand the importance of water.





The yes/no ladder

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Help the kids get down the dam ladder and cross the river without tampering with the environment.



THE YES/NO LADDER QUESTIONS:

- 1 Will we need another planet by 2030 to keep up with humanity's demand for environmental goods and services?

- 2 Is Africa's share of global water resources more than half of the world's share?

- 3 Do more than half of Africa's population have access to safe drinking water?

- 4 Is the average weight of water that women and children carry in Africa and Asia less than 10 kg?

- 5 Does groundwater make up most of South Africa's bulk water supply?

- 6 Do South African wetlands provide medicinal plant material?

- 7 Have half of South Africa's wetlands been lost due to impacts such as agriculture and urban sprawl?

- 8 Are all of the world's crops being irrigated with clean, treated water?

- 9 Do most of the world's cholera cases stem from Africa every year?

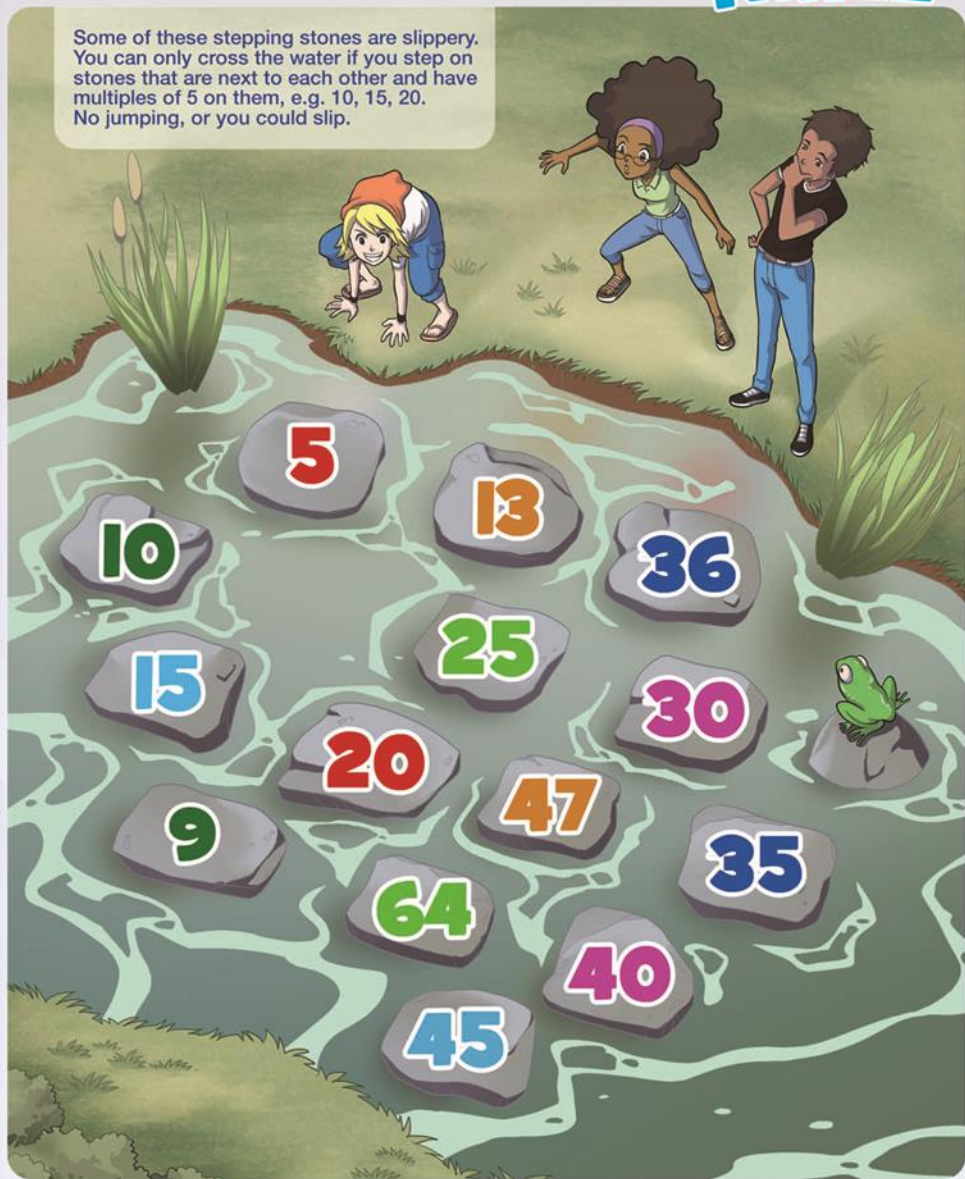
- 10 Do all South African schools have sanitation?

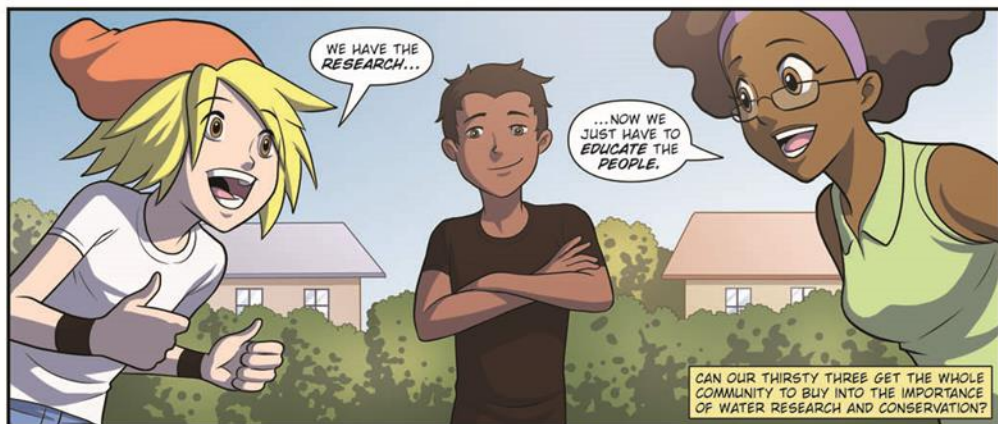
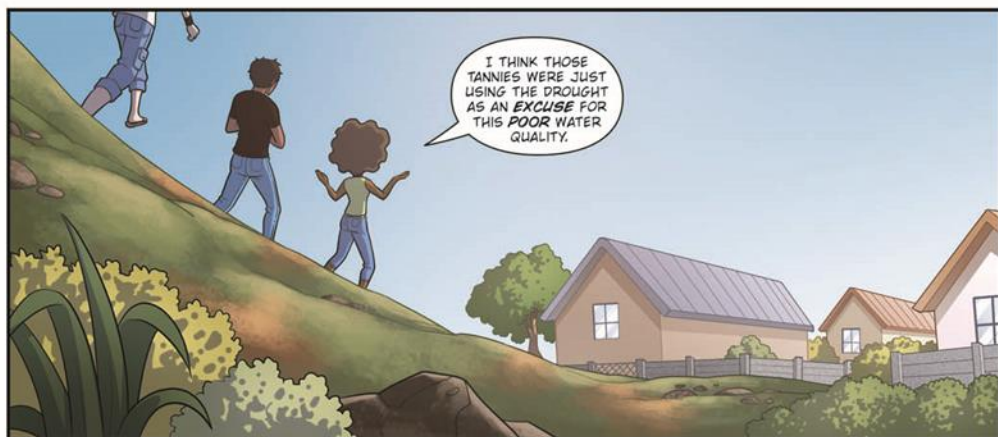
YOUR ANSWERS:

Stepping stones

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Some of these stepping stones are slippery. You can only cross the water if you step on stones that are next to each other and have multiples of 5 on them, e.g. 10, 15, 20. No jumping, or you could slip.





STEYN FINDS HIS FRIENDS WHO LIKE PLAYING IN THE RIVER. HE EXPLAINS TO THEM THE IMPORTANCE OF THE ECOSYSTEMS SURROUNDING THE DAM AND RIVER.



MPHO TELLS THE TANNIES THAT THEY SHOULD TAKE CARE NOT TO OVERHARVEST TO ALLOW THE PLANTS TO REGROW.

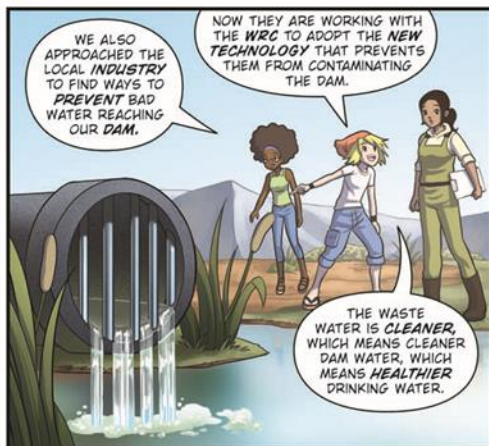
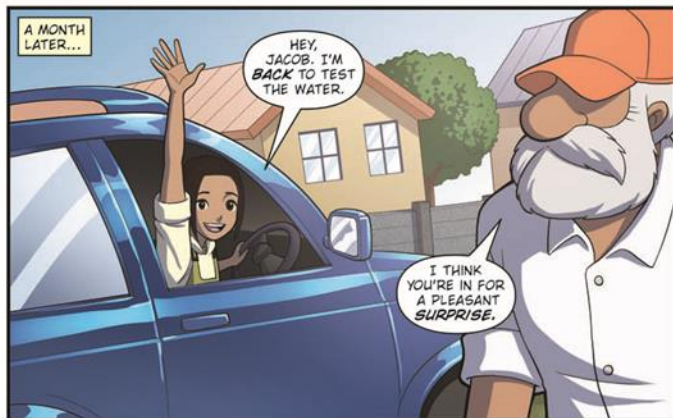


ROYSTON EXPLAINS THAT EVENTUALLY EVERYONE'S LITTER GETS INTO THEIR WATER SUPPLY AND MAKES WATER TREATMENT DIFFICULT.



BUT CAN OUR THIRSTY THREE HELP LOCAL INDUSTRY CHANGE THEIR WAYS?





**ALSO
AVAILABLE
FROM THE
WRC**

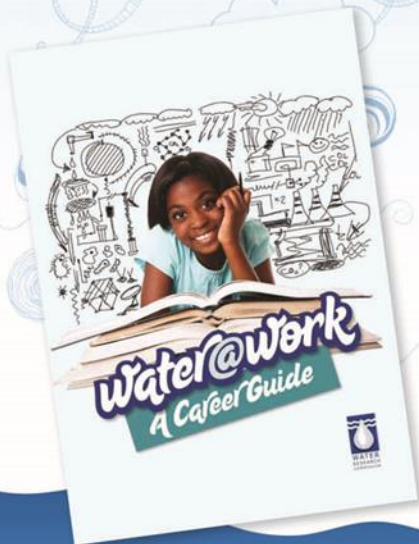
Water Kidz

The **Water Wheel Water Kidz Edition** contains the best of educational pages from the WRC's research and development magazine – ideal for **school projects** and the **classroom**. Individual articles can also be downloaded from the WRC website by clicking on the Learning tab.



Water@Work – A Career Guide

The **WRC Water@Work Career Guide** lists detailed information on no less than **62 career options** in the water sector, ranging from accounting and agriculture to social science, water history and zoology. The colourful guide, which is available electronically or in hard copy, is an ideal resource for learners ready to make subject choices or prospective students exploring possible areas of study. Readers can also find an exhaustive list of useful contacts, including those institutions which offer bursaries and internships.



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