



*How to teach...*

# SAVING WATER

WATER READING

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## *Introducing the Live Better Challenge*

**T**he Live Better Challenge is a nationwide campaign introducing a series of challenges to help inspire and motivate individuals and families to create a better, more sustainable life.

We are asking Guardian writers, staff and topic experts, plus readers and families across the UK, to participate in monthly challenges and contribute tips and advice on topics such as reducing food waste, getting fitter and lowering energy costs – generating engaging content and visuals to show how, as a nation, we are making an impact. This month we're working to save water.

Will your school be taking the challenge? We've compiled lots of facts, figures and lesson ideas to help you explore the topic of saving water in class and engage students in our Live Better Challenge.

Over the following pages, we outline the challenges facing a world of growing population and climate change, and provide statistics, stories and ideas designed to provoke and inspire students to discuss the issues.

Share your experiences with us at [livebetterchallenge@theguardian.com](mailto:livebetterchallenge@theguardian.com)



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WATER READING

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# A BEGINNER'S GUIDE TO SAVING WATER

*The planet's most precious resource needs our care and respect*

**T**ime to raise your hands and own up if you have ever enjoyed a deep, relaxing soak in the bath after a stressful day, filled the kettle to the top for a single brew or gleefully given the lawn a good drenching with the hose on a blistering summer's day. Living in a part of the world where clean drinking water is available at the turn of a tap and rain is a daily inconvenience makes it easy to forget that millions of people live without an abundant supply of water.

According to the charity WaterAid, around one in 10 of the world's population (748 million) do not have access to safe drinking water. One in three (2.5 billion) people don't have access to adequate sanitation and more than 500,000 children die every year from diarrhoea as a result.

## Why is this?

Poor infrastructure and management are partly to blame in many countries, but climate change and shifting weather patterns also have an effect. The forces of nature could wreak havoc this year with the global El Niño weather phenomenon expected to strike again.

El Niño begins as a giant pool of warm water swelling in the eastern tropical Pacific Ocean, which sets off a chain reaction of weather events around the world. India, in particular, is expected to suffer, with weaker monsoon rains undermining the nation's fragile food supply, followed by further scorching droughts in Australia and collapsing

fisheries off South America. Some regions could benefit, in particular the US, where El Niño is seen as the "great wet hope" whose rains could break the searing drought in the west. Governments, commodity traders, insurers and aid groups like the Red Cross and World Food Programme all monitor developments closely and water conservation and food stockpiling is already underway in some countries.

## Water in the UK

Closer to home, the UK has seen its fair share of drought and deluge. In 2012, a prolonged dry spell over the winter and an unusually hot March left reservoirs depleted and ground water resources worryingly low. It was the worst drought to grip the UK in more than 30 years, killing wildlife and threatening farmers' livelihoods.

Luckily, the wettest April on record came to our rescue, bringing water levels back to normal for the time of year. A winter washout followed in 2013, with storms and torrential rain in January and February causing devastating floods in several villages, towns and cities.

So what is the best way to protect Britain's water resources? According to the Institution of Civil Engineers (ICE), an expanding population and rising demand are putting increasing strain on the UK's water supply. One solution is to introduce compulsory water meters with

differential pricing. That would mean everyone could have a certain amount of water - ample to cover drinking, cooking, bathing - provided cheaply, but would have to pay much more for anything above that amount, including activities that use large quantities of water, such as washing the car with a hose or filling a swimming pool. The measure could help bring down domestic water usage by as much as a third.

Laws and regulations only go so far in addressing the problem of water wastage, however; a radical shift in attitude is also needed. According to the ICE, cheap water has been taken for granted for far too long and the current rate of £1 a day for an unlimited domestic supply is

too low to encourage people to cut back and reduce usage by the 30% needed to secure water supplies for the future.

Too much of our drinkable water is needlessly used for purposes such as gardening and flushing the toilet - tasks that could easily be carried out using rainwater harvested with water butts or "grey water" recycled from washing.

The United Nations has stated that water for health and hygiene is a human right and should be affordable to the whole of society. By making small changes to our own lives, such as taking shorter showers and turning off taps, we can help protect this precious resource for future generations.

*Cheap water has been taken for granted for far too long*





# 12 WAYS INTERESTING STATS ABOUT SAVING WATER

*How much do you really know about water?*

FACT

1

748 million people in the world do not have access to safe water. This is roughly one in 10 of the world's population.

FACT

2

Around 500,000 children die every year from diarrhoea caused by unsafe water and poor sanitation – that's more than 1,400 children a day

FACT

3

Every year, approximately 60 million children are born into homes without access to sanitation.

FACT

4

Lack of water, sanitation and hygiene costs Sub-Saharan African countries more in lost GDP than the entire continent gets in development aid.

FACT

5

The average person in the UK uses 150 litres of water a day. In Australia it's around 500 litres and in the USA, more than 570 litres.

FACT

6

A running tap wastes more than six litres of water a minute, while a dripping tap can waste more than 5,500 litres of water a year.

FACT

7

Water in Accra, Ghana, costs three times as much as in New York. Women in Africa and Asia often carry water on their heads weighing 20kg

FACT

8

More than 90% of the world's fresh water is in Antarctica. 2% of the Earth's total water supply has a frozen home in ice caps and glaciers.

FACT

9

If the adult population of England and Wales turned off the tap when brushing their teeth, we could save 180 mega litres a day.

FACT

10

Around 25 baths full of water go into producing one cotton t-shirt, while it takes 170 litres of water to make one pint of beer.

FACT

11

Water covers around 70% of the Earth's surface, but only about 1% of the world's water is available for human use.

FACT

12

The Pacific is the largest ocean on Earth. The Atlantic comes in second and the Indian Ocean is the third largest.



CHILDREN  
CHALLENGE

WATER READING

7 3 5 0 0 0 9 2

# THE SAVING WATER QUIZ



*Time to put your new knowledge about water to the test*

**1. How many people in the world do not have access to safe water?**

- a) 748 million
- b) 848 million
- c) 948 million

**2. Diarrhoea caused by poor sanitation is the third-biggest killer of children under five worldwide.**

**True or false?**

**3. By how much can washing hands with soap reduce risk of diarrhoea?**

- a) 30%
- b) 50%
- c) 70%

**4. How many litres of water can a dripping tap waste a year?**

- a) More than 3,500 litres
- b) More than 4,500 litres
- c) More than 5,500 litres

**5. If the world's water were to fit in a 4-litre jug, how much of that would be fresh water?**

- a) A teaspoon
- b) A dessert spoon
- c) A tablespoon

**6. What percentage of human blood is water?**

- a) 73%
- b) 83%
- c) 93%

**7. Where is 90% of our fresh water?**

- a) Europe
- b) South America
- c) Antarctica

**8. In which part of the home do we use the most water?**

- a) The kitchen
- b) The bathroom and toilet
- c) The living room

**9. How many days can the average person go without drinking water?**

- a) Three days
- b) Five days
- c) Seven days

**10. How many litres per second of water does it take to grow food for the planet?**

- a) 100,000,000
- b) 200,000,000
- c) 300,000,000



# THE SAVING WATER QUIZ ANSWERS FOR TEACHERS

**1. How many people in the world do not have access to safe water?**

- a) **748 million**
- b) 848 million
- c) 948 million

**2. Diarrhoea caused by poor sanitation is the third biggest killer of children under five worldwide. True or false?**

**False - it is the second biggest killer. It is the third biggest killer in Sub-Saharan Africa.**

**3. By how much can washing hands with soap reduce risk of diarrhoea?**

- a) 30%
- b) **50%**
- c) 70%

**4. How many litres of water can a dripping tap waste a year?**

- a) More than 3,500 litres of water
- b) More than 4,500 litres of water
- c) **More than 5,500 litres of water**

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**6. What percentage of human blood is water?**

- a) 73%
- b) **83%**
- c) 93%

**7. On which continent is 90% of our fresh water located?**

- a) Europe
- b) South America
- c) **Antarctica**

**8. In which part of the home do we use the most water?**

- a) The kitchen
- b) **The bathroom and toilet**
- c) The living room

**More than half (63%) our daily water consumption at home originates from the bathroom and the toilet.**

**9. How many days can the average person go without drinking water?**

- a) **Three days**
- b) Five days
- c) Seven days

**10. How many litres per second does it take to grow food for the planet?**

- a) 100,000,000
- b) **200,000,000**
- c) 300,000,000



# LESSON TASKS AND ACTIVITIES

*Peru's farmers fight climate change using modern and Inca techniques*

**W**hen he is not watching his flock, Silverio Chiquenayra-Quispe takes care of the Pumatalya weather station, located between the brightly coloured local council building and the chapel. At 3,800 metres above sea level, on the high plateaus of the Andes, the little town is four hours by road from the provincial capital of Cusco in Peru.

Three times a day, at 7am, 1pm and 5pm, Chiquenayra-Quispe records the temperature, wind speed and rainfall. He takes readings for four months a year. "Every morning I send the data to the municipal radio station which broadcasts an update in Spanish and Quechua [the local language]," the shepherd says.

"The weather changes very suddenly and it may rain at any time," Chiquenayra-Quispe explains, showing us the figures he marks on big sheets of white paper.

The data collected at Pumatalya since 2011 backs up eyewitness accounts by villagers who have been baffled by the weather for several years. The weather station was built as part of the first phase of the Climate Change Adaptation Programme (Pacc) launched four years ago by the Peruvian environment ministry in partnership with the Swiss Agency for Development and Co-operation (SDC). Local residents were involved in the project from the start.

"The changes impact the lives of shepherds. There is no longer enough water to keep the pasture in a decent state all year round or allow subsistence crops. With shorter, violent showers, the degraded soil no longer stores the



**A llama farmer on his homestead in the Cusco region, Peru. Photograph: Dan Chung/The Guardian**

moisture," says Victor Bustinza Urviola, Pacc's deputy-co-ordinator.

Models produced by Peru's National Meteorology and Hydrology Service (Senamhi) show that these trends are going to accelerate in the coming decades. The eastern part of the Cusco region could see a 15% to 30% drop in rainfall by 2030, one of the most severe forecasts for the whole country.

Bernarbe, 68, poses proudly with his dog in front of the stone dyke he built with his nephew Jorge. It is not high, but sufficient to contain rainwater in a natural hollow between neighbouring hills. "Before I built this, I used to run out of water in September and it was hard going until January. I had to sell stock," the old man says, gazing out over the reservoir where sheep and alpacas gather to drink.

To build the structure, a copy of the rain-fed qocha reservoir system used by

the Incas, Bernarbe received technical assistance and some funding from Pacc.

About 100 qochas have been built, but it would take 1,000 more to meet the needs of the whole plateau.

Pacc chose Elio Ayaza Hullca, 33, as one of the 40 or so community "messengers" tasked with raising public awareness of how much is at stake with adaptation to climate change. He travels from village to village equipped with a ring binder containing a dozen illustrations, which he uses to explain the problems and solutions. The residents of Pumatilla (population 250), where he lives, have voted to establish a conservation area to restore the pasture and plant trees again.

"These changes are beginning to show results," says Lenkiza Angulo, the Pacc national co-ordinator. "Everyone has a part to play. We're just here to accompany them. But it does show that even under conditions of severe poverty people can be mobilised."

There are now plans to extend the experiment to other areas of Peru.

*The weather  
changes suddenly  
and it may rain  
at any time*



# NOW ANSWER THESE QUESTIONS

**01** How many metres above sea level is the Pumatalya weather station?

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**02** What are Silverio Chiquenayra-Quispe's responsibilities at the weather station?

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**03** By how much is rainfall expected to drop in the eastern part of the Cusco region by 2030?

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**04** Describe how a lack of adequate rainfall is affecting the lives of indigenous communities living in the Peruvian Andes.

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**05** What measures have the local population taken to tackle the problem?

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**06** How many qochas need to be built to meet the needs of the whole plateau?

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## CONTINUED

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**07** What is Elio Ayaza Hullca's role as a community "messenger"?

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**08** Imagine you are a farmer living on the high plateaus of the Andes. Write a short story describing a typical day.

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**09** What have you learnt from reading and studying this article?

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# HOW MUCH WATER DO YOU USE IN A DAY?

Keep a record of your daily water use, then add it all up to see how much you use in a week

HOW MUCH WATER DO YOU USE IN A WEEK?	Litres of water used	Number of times per day	Total litres of water used per day	Times per week	Total volume of water used, in litres, per week
Activity					
Wash hands and face with tap running	50				
Wash hands and face with water in sink	5				
Brush teeth with tap left running	6				
Brush teeth with tap turned off	1				
Half-fill a 5ft circular paddling pool	335				
Take a five-minute shower	30				
Use a power shower for five minutes	100				
Take a bath	80				
Flush a "dual flush toilet	5				
Flush the toilet	9				
Let one tap drip for a day	35				
Total volume of water used, in litres					

# BOTTLED WATER: JUSTIFIABLE OR A WASTE OF MONEY?

*Is bottled water the answer to a problem, or a luxury we can ill afford?*

**D**uring this lesson, pupils will debate whether bottled water is justifiable or whether it is a waste of money and something that squanders environmental resources.

## You will need the following resources

- Five different bottles of water. Make at least one of your bottle samples a supermarket own brand and try to get one expensive brand. Fiji Water, which travels halfway round the world, makes a good statement.
- Tap water.
- Six cups or beakers per student participant.
- Paper and pencil for participants.

## Getting started

Pour samples of bottled water into beakers to prevent students being able to identify different brands from the labels. Pour equal volumes to ensure a fair test. Next decide and note down the tasting order and number pupils' beakers 1-6. You could prepare a results chart for the taste test with younger pupils.

Explain that you're going to do a taste test and that you aim to see if there's any difference in between tap water and bottled water. Bring three (or more) volunteers to the front of the class and bring out the first water sample. Ask pupils to taste the water and not merely swallow it. Ask pupils to note: "Sample one - bottled/tap" and repeat with all six samples. When all results have been noted, supply the answers. Pupils cannot usually identify the tap water.

## Discussion

- Was there any difference in taste?
- Who was able to pick out the tap water from the bottled water?
- Was this a fair test? For example, do aftertastes prevent accurate testing of the next sample?



## The debate

Finally, involve students in a debate surrounding the topic of bottled water. If we find it difficult to taste the difference between tap water and bottled water, why do we drink so much of it? Introduce pupils to a few facts, outlining the arguments for and against bottled water.

### For

- Bottled water is convenient. You can carry a bottle easily at any time. You can't take a tap or a cup out with you.
- A bottle can be capped so the water doesn't spill.
- Bottled water is safe. When going on holiday, you can't be sure if there will be clean and safe drinking water at your destination or on your journey there.
- Profits from bottled water sometimes support environmental projects like Water Aid.

- Bottled water is purified and filtered to remove any harmful chemicals found in tap water such as chlorine and fluorine. These can give tap water a taste.

### Against

- We have perfectly good tap water, so why spend around £2bn on bottled water, when a billion people around the world don't have safe water to drink?
- There is little evidence of any difference in taste between tap water and bottled water.
- In the UK, 350,000 tonnes of carbon dioxide are produced by the bottled water industry every year. We would need to plant nearly 100,000 trees to absorb that carbon dioxide.
- 93% of bottled water comes in plastic bottles and only one in four bottles is recycled.
- Bottled water comes from boreholes or springs. When water is taken out it can disrupt water supplies and food chains.
- UK tap water is among the safest in the world. It is checked 30,000 times a year for chemicals and bacteria.
- Bottled water has to be delivered to the customer, which generates a carbon footprint. The energy to make the plastic bottle, fill it, transport it to consumers and deal with the waste is equivalent to filling 25% of each bottle with oil.

### Making the argument

Split the class into groups of four to six. Half the pupils pick out points for bottled water and half pick out points against it. They then prepare a spoken argument.

The teacher should select the groups with the most convincing arguments and ask them to debate at the front of the class. If a careful eye is kept on timing, it should then be possible to open the debate to the floor.

At the end of the lesson ask the whole class to vote on the issue. Is bottled water a waste of money?