Gulp!

Education Pack

This pack has been produced by Severn Trent Water, in collaboration with The Bone Ensemble.

Parts have been written by a Key Stage 2 teacher with a view to most class sessions taking up around a day to complete. Most general resources are provided.

The first slide of each PowerPoint presentation, with information mainly for the teacher, is included here for reference: each presentation can subsequently be downloaded separately in full, ready for use in class.

All information has been taken from a variety of age appropriate sources and compiled to provide an interesting and varied set of activities and outcomes.

This resource pack is designed to give you:

- some background information on the performance of *Gulp!*
- further resources to support thinking about the performance and the curriculum
- activities to do at school, linked the curriculum, and at home
- links to further information

Contents

1. Reflection on Performance

Meet the cast and crew

Gulp! was created by a team of people. There wasn't a writer – we made it up together! Our company, The Bone Ensemble, had already created a show about climate change, called *Where's My Igloo Gone?*, which went on a tour for two years! So we had already been thinking a lot about the environment and had become aware of some of the problems around water. We also wanted to create another performance that the audience could take part in, and which made people think and want to make a difference to how we treat the planet.

We asked each person involved in creating *Gulp!* to say what they did to help create *Gulp!*, to tell us something about the show, and one thing they think about the word 'water':

Director: Adam Ledger directed *Gulp!* He said, 'I organised rehearsals and helped the actors with their performances, and made sure the action is clear to an audience. I think the main thing about the show is that the audience understands why we should care about water. When I think about water, I remember all the videos I watched during rehearsals, showing how so many people in the world have to walk for hours to get clean water.

Actor: Jill Dowse performs lots of characters in *Gulp!* She also runs The Bone Ensemble with Adam. She said, 'I created all sorts of characters to perform in *Gulp!* Some of them are people and some are animals. I am also really interested in all the sounds we make in the show, with our voices as well as instruments. When I think of 'water', I think of calmly looking out at the sea, watching the waves come and go, and having a think!'.

Actor: Zoe Bullock plays Maya in *Gulp!* She had to learn new things, like being able to speak without English words (do you remember some of the sounds she made and what they might mean?). She said, 'the most important thing about the character Maya is that she's just like all of us! She's curious, and she has a lot of fun, and she makes mistakes - but she'll always try to fix them and learn from them. When I think of the word 'water', I think of swimming, and jumping in pools, and getting in nice hot showers (bit not for too long!), but also how nice it is to splash cold water onto your face!'.

Designer: Alison Neighbour. She said, 'I designed the set and costumes for *Gulp!* I think it's very important that water is on stage and can be seen, heard and touched. Everyone sits in the same place as the characters, so the audience can take part too. The costumes needed to look like people we could recognise around us today, but we also found ways to use objects in unusual ways. When I think of water, I want to go swimming!

Themes of the performance

There are lots of things that are important about water. The main themes of *Gulp!* are:

what happens because of climate change

what the wrong things to put in water and the water system are

how some people take water for granted, but some people find it hard to get water

Here are some quick multiple-choice questions to help you think about these themes and remember parts of the show:

Climate change makes the weather behave in strange ways. In the show, do you think it was climate change that made:

a flood happen

Maya get sucked up the tap

pollution go in the river

We see the wrong kinds of things put in water and the water system during Gulp! Some of them are:

Pollution from things like factories

Animals

Plastic

Fish

We see Maya and her sister waste water at the beginning of the show. Do they:

Drink too much water

Leave the tap on when cleaning teeth

Wash their faces

2. Water in the KS2 National Curriculum

Water in the national curriculum KS2

Geography

Pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. They should develop their use of geographical knowledge, understanding and skills to enhance their locational and place knowledge.

Pupils should be taught to:

Locational knowledge

- name and locate counties and cities of the United Kingdom, geographical regions and their identifying human and physical characteristics, key topographical features (including hills, mountains, coasts and rivers), and land-use patterns; and understand how some of these aspects have changed over time

Human and physical geography

- describe and understand key aspects of:
    - physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes, and the water cycle
    - human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

Core Theme 1. Health and wellbeing

Building on Key Stage 1, pupils should have the opportunity to learn:
H1. what positively and negatively affects their physical, mental and emotional health
H2. how to make informed choices (including recognising that choices can have positive, neutral and negative consequences) and to begin to understand the concept of a 'balanced lifestyle'
H3. to recognise opportunities and develop the skills to make their own choices about food, understanding what might influence their choices and the benefits of eating a balanced diet

Science Curriculum – Year 3 programme of study

Plants Statutory requirements
Pupils should be taught to:
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers

- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Non Statutory

They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

Year 4

States of matter

Statutory requirements

Pupils should be taught to:

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Notes and guidance (non-statutory)

Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.

They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

Living things and their habitats – Year 6

Animals including humans

Statutory requirements Pupils should be taught to: identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - describe the ways in which nutrients and water are transported within animals, including humans.

3. It's Great to Hydrate!

The Importance of Hydration

Learning Intention: the students will be aware that drinking enough water and being hydrated is important for optimal physical and mental function and development.
Curriculum Links: Health and Well Being – H2 & H3 - students to recognise opportunities and develop the skills to make their own choices about food; understanding what might influence their choices; and the benefits of eating a balanced diet.

Activity A: To create a Hydration Fact Sheet

Show 2 fruits – one that is fresh and one that is dried, e.g. a banana and a banana chip, or a plum and a prune.
Discuss the difference between the 2 fruits. Lead on to the word HYDRATION.
*Discuss the meaning of hydration and how we as humans can become dehydrated easily. What factors can contribute to dehydration? Add to Fact Sheet
Class to create a brainstorm of all their ideas for display – add to Fact Sheet
*Explore ways that we can identify dehydration. Share with class classic signs of dehydration. Class to add these points to their fact sheet
* ***" 1 to 3 is healthy pee, 4 to 8 you need to hydrate"*** – Devise a poster to promote this information to others
*Discuss how much water is recommended per day per person – 8 to hydrate
Class to add this to their fact sheet
* Body Parts – why do they need water? Look at the Body Part Fact sheet, cut out the body parts and stick them in the correct places. Now write a short sentence about how water is used with this body part.

Activity B: Develop creative ways of sharing hydration information with others

*Devise a persuasive poster or a lively leaflet to encourage children to stay hydrated over the summer - some useful ideas to help you:
1. Enhance it with flavour – put cut up fruit/veg into your bottle; develop a water bar at home/school
2. Set up your water timetable – use an alarm to help you drink sips of water through out the day
3. Should I snack or gulp? - sometimes our brains confuse thirst with hunger; drink a glass of water before eating and your hunger "pains" might just disappear.
4. Drink more water than anything else – compare qualities of water with that of a fizzy drink – debate.
5. Eat more high water content foods - approximately 20 to 30 percent of our daily hydration needs come from food. All whole fruits and vegetables contain some amount of water, but there are some that are better options

Cucumbers: 97% water Celery: 96% water Grapefruit: 90% water
Tomatoes, radishes, lettuce, pineapple, blueberries: 95% water
Red, yellow green bell peppers, peas: 93% water
Spinach, strawberries, broccoli, cabbage: 91% water
Cauliflower, watermelon, cantaloupe: 92% water

Teacher Notes

Factors contributing to dehydration:

- Hot weather
- Exercise
- Not drinking enough water
- Drinking substitutes that are sugary
- Fevers and other illnesses
- Diseases such as diabetes
- The inability to get appropriate water and food (e.g. a young child or disabled person)
- An inability or difficulty to drink (for instance, someone in a coma or sick baby who cannot drink from a bottle)
- No access to safe drinking water
- Major injuries to skin, such as burns or mouth sores, or severe skin diseases or infections

Ways to spot dehydration:

- Urine colour should be clear. The more yellow it is, the less likely you are to be hydrated.
- Being thirsty! Inform the students that being thirsty is a sign that their bodies are already at a low level of hydration.

Ways to spot dehydration:

- Urine colour should be clear. The more yellow/brown it is, the less likely you are to be hydrated.
- Being thirsty! Inform the students that being thirsty is a sign that their bodies are already at a low level of hydration. Remember:

" 1 to 3 is healthy pee, 4 to 8 you need to hydrate"

4. Stay Hydrated!

(the first PowerPoint slide is the same as the previous section)

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* ***"1 to 3 is healthy pee, 4 to 8 you need to hydrate"*** – Devise a poster to promote this information to others

*Discuss how much water is recommended per day per person. – 8 glasses to hydrate.

Class to add this to their fact sheet

* Body Parts – why do they need water? Look at the Body Part Fact sheet, cut out the body parts and stick them in the correct places, now write a short sentence about how water is used with this body part.

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2. Set up your water timetable – use an alarm to help you drink sips of water throughout the day
3. Should I snack or gulp? - sometimes our brains confuse thirst with hunger; drink a glass of water before eating and your hunger 'pains' might just disappear.
4. Drink more water than anything else – compare qualities of water with that of a fizzy drink – debate this!
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Teacher Notes

Factors contributing to dehydration:

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Ways to spot dehydration:

- Urine colour should be clear. The more yellow it is, the less likely you are to be hydrated.
- Being thirsty! Inform the students that being thirsty is a sign that their bodies are already at a low level of hydration.

Look at the chart below, and remember
"1 to 3 is healthy pee, 4 to 8 you need to hydrate"

"1 to 3 is healthy pee, 4 to 8 you need to hydrate"

5. Down the Sewer!

The Importance of Looking After Our Sewers

Learning Intention: The students will learn what they should and shouldn't being put down their toilets and sinks and why this is important in looking after the environment.
Curriculum Links: Science – States of Matter - observe that some materials change state when they are heated or cooled. Some changes are reversible others are irreversible

Activity 1: Down our toilets

Show flooded bathroom picture and ask what do you think has happened? Class discuss.
Explain that toilet has flooded with raw sewage because the waste water pipe has been blocked.
What do they think has blocked the pipes? Discuss.

Bin It or Flush It Activity

Class use sheet to decide whether to Bin or Flush the objects shown on Bin it or Flush it Sheet. NB all items should go in the bin other than pee, poo and toilet paper – washing up liquid, bleach also fine.
Explain that when people flush the wrong items down the toilet, the waste pipes often get blocked and this causes the waste water to spill out elsewhere.
Get class to recite short rhyme "**Only flush down the loo, Toilet paper, pee and poo."**

Toilet Paper Verses Wipes Experiment

Hold up a packet of wipes and ask how many of the class currently flush these down the loo. Explain that whilst wipes are easily flushable, they don't act like toilet paper in any other way.
Fill two half-litre water bottles with water and add a wipe in one and a piece of toilet paper in the other. The class will all shake each of the bottles for 30 seconds over 2 or 3 days – predict what they think will happen to both items. Pass each bottle around and let them shake the bottles. Repeat this over 2 or 3 days. Discuss what they discover on day 3. NB class could record this as a teacher led observational experiment.
3 days later – explain that wipes don't disintegrate like toilet paper does. They often collect together with other incorrectly flushed items and form balls of rubbish called 'rags'; it is these balls of rags that block up the waste pipes and cause flooding. These rags cannot be recycled, so they will eventually end up in Landfill Sites, which is NOT good for the environment.
https://www.stwater.co.uk/about-us/education-zone/learning-zone/why-do-sewers-block/
Ask class if they know what most wipes are made of? Plastic!
Explain that plastics are becoming a major problem in our water courses. A lot of plastic is still not biodegradable or recyclable.
https://inews.co.uk/news/environment/wet-wipes-environmental-hazard/
https://friendsoftheearth.uk/plastics/wet-wipes-keeping-them-out-our-seas-and-sewers

CHALLENGE

Set the class a task to discover as much information as they can about wipes and why they are so harmful to the environment. There is also an episode of the TV series 'War on Plastic', which deals with this. https://www.bbc.co.uk/programmes/m0006347
Class to present their finding to each other and compile an individual Fact File on wipes.

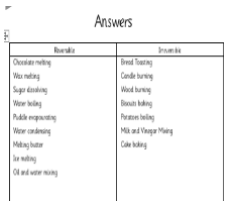
Activity 2: Down our Sinks

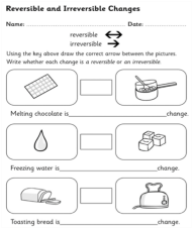
Show class slide with iceberg – ask what it is. Now show picture of Fatbergs – ask same question.
How are they made? Do they know where these are found?
Explain that Fatbergs are made from all the fats, oils and greases (FOG) that people put down their sinks once they have finished cooking. Explain that when FOG gets cold it goes hard; it turns from a liquid into a solid.
FOG collects in the waste pipes underground and blocks them up, so the waste water can't get down to the sewage treatment works and will spill out somewhere else, often having a negative impact on the environment NB show them the pictures of Fatbergs and how waste water can impact on the environment.

CHALLENGE

Class devise a poster to prevent people putting FOG down the sink

Reversible and Irreversible Changes – Do they think FOG is a reversible change? Discuss.
Children complete the Identifying Changes Sheet





6. Water: climate change and the weather

Water Aid - The Climate Change Challenge

Learning Intentions: to be aware of the difference between climate and weather; to recognise that the Earth's climate is changing and that human activities are contributing towards this change; to understand how the greenhouse effect works and be able to communicate this information in a variety of ways to others
Curriculum Links: Science - Living things and their habitats - to recognise that environments can change and that this can sometimes pose dangers to living things.

Activity 1: Weather and Climate – What's the Difference?
Ask children as a class what 'weather' means (i.e. what is happening outside your window on a particular day in a particular place). Can you write/draw the symbols for the different types of weather we experience in the UK? Discuss.
- **Now explain CLIMATE means the long term weather patterns for a particular region**.
Explain that weather can change mainly in 4 different ways which can be measured and monitored, and used to predict what the weather will be like the next day or into the future.
Movement: winds blow from all directions; knowing which way the wind is blowing can help predict the weather.
Moisture: the moisture content of the air causes mists and fogs, rain, and frost if it's cold.
Pressure: pressure affects whether we have clear, cloudless days or thunder and lightening storms.
Temperature: is influenced by all of these, as well as how much sunshine reaches the Earth.
Do you know why the UK has so many types of weather? = Temperate climate.
What other climates are there around the world? Discuss

Explain that since the 18th century scientists known as meteorologists have been monitoring and recording the weather. These records show that the Earth's atmosphere is beginning to get warmer, which is causing our climate to change. This is known as climate change.
So why does climate change matter? Discuss
Human activity has caused the Earth to get warmer in the last 100 years. Climate change is caused by our greenhouse gases changing the weather patterns, which are damaging our natural environment.
Go through slides on what The Greenhouse Effect means and why it is often called global warming.
Glass Jar experiment – Discuss that this shows two thermometers, one in a glass jar and one in the open air. Explain that glass acts like carbon dioxide in the atmosphere by trapping heat emitted by the sun.
Teacher use teacher notes to explain what the investigation shows about Greenhouse gases



Think back to the places around the globe you named earlier. How do you think weather extremes and climate change will affect the animals and people that live there?
https://www.youtube.com/watch?v=gEvmwNoMYEg
3 www.metoffice.gov.uk/research/climate/understanding-climate/uk-extreme-events- heavy-rainfall-and-floods

Activity 2: Global Warming Alert!
Children to research a different part of the world to see how global warming is effecting the environment and the way in which people live there – use slides for ideas but laptops will also be needed to be used for further research.
Pupils can deliver this information in a variety of ways:

Posters
Explanation Text
Leaflet
What about the UK? Do you think global warming is having an affect on weather? Discuss
Explain that there are several large organisations that are very worried about global warming and feel that our government should start to take action right now… such groups include The Environment Agency, Greenpeace
Read through slides and discuss

Activity 3: We Have Some Alarming Weather News!
Explain that they are going to become News and Weather Presenters of the future. They will have to present the weather and weather related news to the public, where it is obvious that global warming is having an effect on the weather in their area or in fact in the country as a whole (they can decide). Discuss the scene in the *Gulp!* performance. Recap on earlier symbols and meanings:
http://news.bbc.co.uk/weather/hi/about/newsid_8775000/8775922.stm Children will watch a weather forecast from this site and discuss features of it as a class.
Class compile a list of features that weather report must include to be used as a checklist.
In groups, pupils to create a weather report using sigs and symbols and a text which they will have to read from – these could be videoed and uploaded for others to watch

7. The water cycle

Water Usage – The Water Cycle

Learning Intention: the students will learn where their water comes from, how it is cleaned and understand how this then fits into the water cycle. Pupils will also become familiar with the main stages of the Water Cycle process through a series of science experiments.
Curriculum Links: Science – States of Matter - identify the part played by evaporation and condensation in the water cycle. students should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.

Activity 1: Where does our water come from?
If you want a drink where do you go? Discuss
Do you know who puts the water in your taps? Explain that there are 10 water companies in England and Wales (Severn Trent being the second largest). Water companies are responsible for the vast majority of the water that we use. This obviously includes the whole water cleaning process.
Relate this to the slide on Water Companies - Water companies take water from several different sources such as rivers, reservoirs and aquifers (boreholes where water is found underground). These different sources can have a slight effect on the taste of the water depending upon it's source. However, ALL water is cleaned under strict regulations and guidelines and ALL water leaving water treatment works being supplied to customers is potable (safe and great to drink).
These water companies are a very important part of the water cycle, as they also have to clean the waste water that arrives at sewage treatment works. This water is known as effluent and has to be discharged back into the rivers; rivers then obviously feed back in to the water cycle.
Show pupils the Severn Trent animation of the journey that a raindrop makes throughout its life and relate this to the water cycle that the pupils are going to go on to look at.
Ask the pupils to note the key stages that the raindrop goes through on its journey and discuss at the end.
https://www.stwater.co.uk/about-us/education-zone/learning-zone/what-is-the-water-cycle/

Activity 2:The Water Cycle
Do we think we could ever run out of water? Discuss
Explain the water we drink is the same water that has been around since before the Jurassic Period, so we could be drinking water that a dinosaur has weed in!
What do know about the Water Cycle? Discuss
Explain that it is the name we give to describe the way water moves throughout the Earth. The water cycle has two other names: the hydrological cycle or the H2O cycle.
Explain that they are going to look at how the water moves around in a cycle by examining each of the 4 main parts of its cycle.
Within this phenomenon, there are 4 main parts: EVAPORTAION, CONDENSATION, PRECIPITATION and ACCUMULATION – ask if pupils have any ideas what these terms mean. Discuss their understanding as they share their thoughts.

Activity 2 cont:
Use slide to go through each process with the class.
Divide the class into 4; give them each one of the 4 processes and ask them to devise an action/series of actions to act out what is happening.
Groups to show to each other and guess what the term/process is.
Class then decide on a series of actions to put together to help them remember and be able to retell the whole Water Cycle story.
Class practise re-telling the whole water cycle before completing the Water Cycle Recording Sheet.

Activity 3: Water Cycle Experiments
Explain that the class are going to set up a series of experiments to highlight the different processes of the water cycle. Explain that they are going to predict what they think will happen, observe and then record what they see happening and explain how this relates to the water cycle

Split the class into 4 groups.

Experiment 1 – Making a Cloud in a Jar Using Hairspray

Experiment 2 – Making Rain – Precipitation

Experiment 3 – Water Cycle in a Bag

Experiment 4 – Cloud in a Jar Using Shaving Foam

N.B This session could lead on to the global issue of how much access to clean water people have in their homes all over the planet.

8. From our scientist friends at the University of Birmingham

By Anne Van Loon

Floods and droughts happen everywhere around the world, also in the UK. In this short guide, we will look at floods and droughts, including some small exercises.

1) How your garden influences flooding

In Birmingham, we had flash flooding in 2016 and 2018. This was caused by heavy rainfall on paved surfaces and a drainage system that could not cope. The first activity described below looks at how your garden might influence flooding.

What does your garden look like?

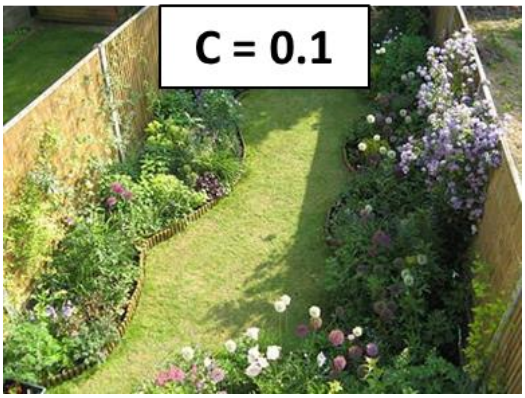
If it looks more like the top pictures, then rain can sink into the ground and follow a slow pathway via groundwater (water already in the ground) to a river. If it looks like the bottom pictures, the paving prevents the rain from soaking in – or 'infiltrating'. Instead, it will make a kind of pond on the surface and then run off quickly over the surface, eventually finding its way to a river.

There is a simple way to calculate the effect of this on what is called 'discharge' in the river; it is called the rational method. The rational method relates the peak discharge (the most it could get to) in the river (in cubic meter per second) to the area (in hectares), the rainfall intensity (in millimeter per hour), and the runoff coefficient (denoted with the letter C).

River discharge = 0.0028 x C x rainfall intensity x area

For a typical rain storm falling on your garden, let's assume that the:

- Area = 100 square metres = 0.01 hectare
- Rainfall intensity = 2.5 millimeters per hour
- C factor: estimate from the pictures below (or go in between):



Calculate the flood peak (the highest amount of water caused by the flood) in the river created by your garden, using the rational method equation.

This is a very small number, but your garden is only a very small part of Birmingham! Let's now calculate the flood peak in the river caused by all gardens in Birmingham. The area to put in the equation would be 40, 000 hectares and the C factor would be dependent on what the gardens in Birmingham look like.

So let's first assume that the whole of Birmingham would have completely natural (unpaved) gardens with a C factor of 0.1. What would be the peak flood in the river?

And what if the whole of Birmingham would have completely paved gardens with a C factor of 0.95. What would be the peak flood in the river?

So, knowing the effect that your garden has on flooding in Birmingham, what can YOU do to prevent flooding?

If you want to know more about your local river, go to the National River flow Archive: nrfa.ceh.ac.uk. If you want to see the current river level or discharge, look at these websites: www.gaugemap.co.uk / www.riverlevels.uk. Or download the RiverApp.

And if you want to know whether you are at risk of flooding – just like the character in the city in *Gulp!* - look here: https://www.gov.uk/check-flood-risk.

2) Water footprint

In the summer of 2018, there was a drought in the UK, with hosepipe bans being implemented in some parts. This drought was caused by a lack of rainfall for several months and it was combined with a heatwave. This increased evaporation made the drought worse, but it also increased water use, as farmers needed more water and people wanted to fill up their swimming pools.

Our research has shown that these summer heatwave droughts result in droughts in groundwater because we end up taking more water from what is stored underground already. This second activity looks at how we can reduce our water use in some unusual ways.

Crop failure and bankruptcy threaten farmers as drought grips Europe

Abnormally hot temperatures continue to wreak devastation across northern and central parts of the continent

▲ A blighted wheat field in Täby, central Sweden. Photograph: Christine Olsson/AFP/Getty Images

Farmers across northern and central Europe are facing crop failure and bankruptcy as one of the most intense regional droughts in recent memory strengthens its grip.

We think we live in a wet country and that we don't have to worry about drought. But our demand for water is also very high and we do have droughts that challenge our water supply (for example in 2018, but also in 2010-12 and 1976) and will have more of them in the future.

Do you know how much water you use in your house? (see later in this Education Pack for how to calculate this). Do you have a water meter (only half of UK households have a water meter)? If so, check you water meter every day for a week or a few weeks, write down the numbers and calculate when you use most water. Is it when the washing is done or when the whole family is taking a bath?

We can all save water! For example, by turning off the tap when you are brushing your teeth, by taking a shower instead of a bath, or by watering your plants with rainwater. Do you have a water butt in your garden to save winter rain to water your plants in summer? Do you reuse water from washing up? Most of us are watering our gardens and washing our cars with high quality drinking water. This is not needed. If we have a water butt for rainwater harvesting, we can collect 24,000 litres of water each year from the roof of an average house, which would be enough for all our outdoor use. Or you can use the water from doing the dishes or from running the tap until you get warm water to water your plants.

Most of the water we consume is not the water we drink; it's the water we eat or the water we wear. We don't see the water that is used for making our food or clothes or other stuff, but the Water Footprint shows how much water is included in a variety of products. For example, 1 litre of bottled water takes 1.5 litres of water to produce. And it also produces a lot of plastic waste that pollutes our groundwater and rivers that we take our drinking water from! So, just drink water from the tap.

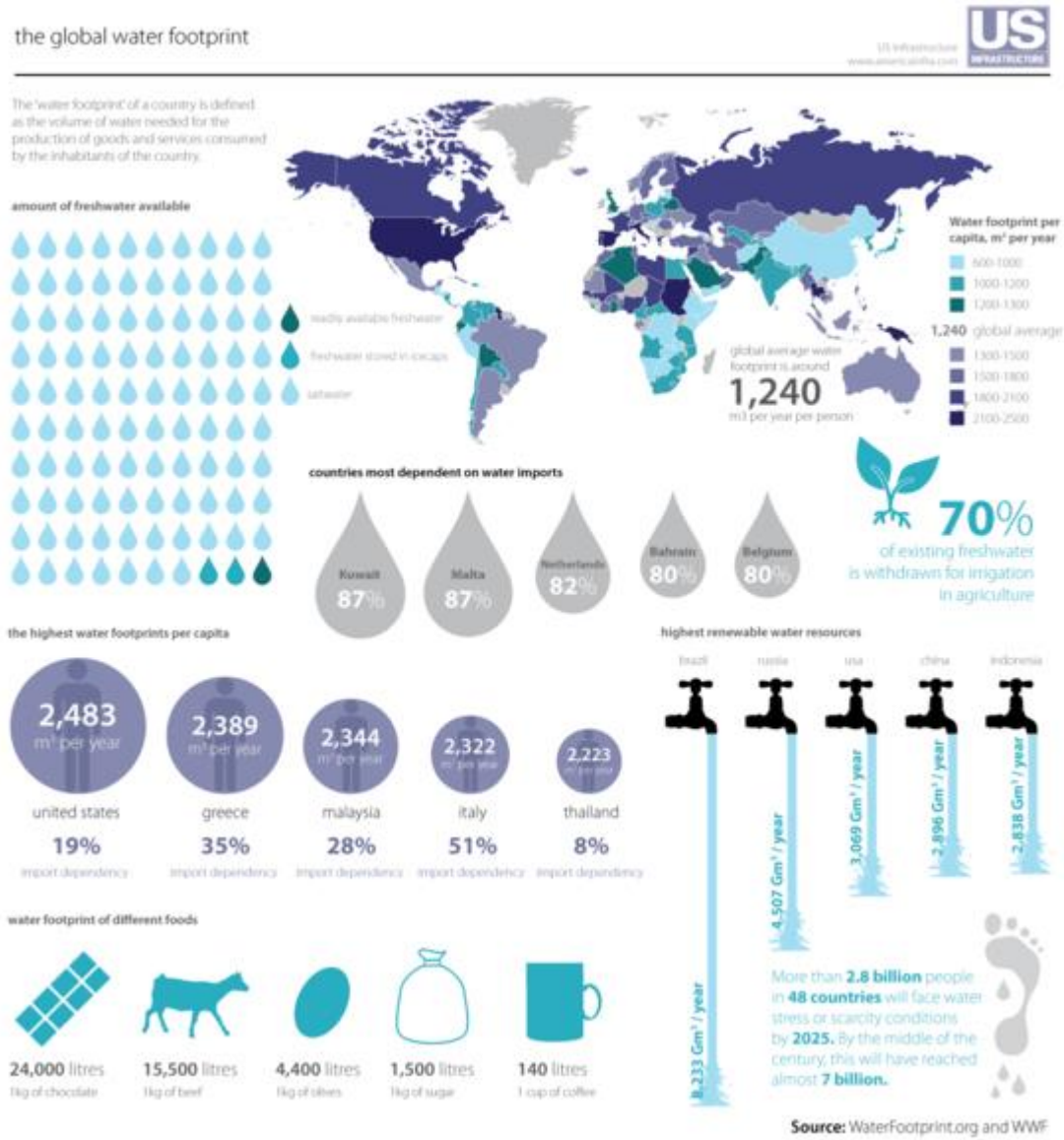
Globally, most water is used in farming to produce the food we eat here in the UK. Different products need different amounts of water, but most water is needed for meat. For example, 15,500 litres of water are needed to produce 1 kg of beef. If you eat less meat you are saving water both in the UK and elsewhere in the countries where they often have even less water available.

Calculate your water footprint on this website: https://waterfootprint.org/en/water-footprint/personal-water-footprint/

Compare with others in your family or in your class to find out who uses least water. What are they doing that saves water?

Look at the water use of different products (for example here: https://waterfootprint.org/en/resources/interactive-tools/product-gallery/ or in the WaterFootprint App). Which food product uses most water? Which uses least?

So, knowing how much water you use in your house and how much water you consume by eating and buying stuff, what can YOU do to save water?



If you want to know more about drought and water use, here are some websites for you to check out:

- https://historicdroughts.ceh.ac.uk/
- http://dryproject.co.uk/
- https://www.waterwise.org.uk/
- https://www.uk-home-information.co.uk/water-butts/
- https://www.ccwater.org.uk/

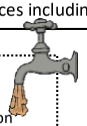
For more information about me and my research go to: https://hydrologicalextremes.org/

Anne Van Loon is a hydrologist at the University of Birmingham (https://www.birmingham.ac.uk/schools/gees/people/profile.aspx?ReferenceId=88172). She researches the relationship between water, people and the environment, especially focussing on floods and droughts. She currently works on projects that look at floods and droughts in Southern Africa, at groundwater drought in Europe, at water management in Chile, and at flood perception in the UK. Before coming to Birmingham in 2014, Anne worked at Wageningen University in the Netherlands on a PhD and postdoc project related to drought in Europe. Before that, Anne worked for the consultancy company FutureWater on projects on water management in Kenya and Turkey and for the NGO PROFAFOR investigating the effect of forest plantations on soil and water in Ecuador. For more information about Anne and her research, go to:

9. Clean water: everyone's right!

Clean Water – Everyone's Right How Can We Make a Difference?

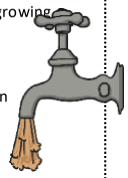
Learning Intention: Pupils to learn that access to clean water is not a right that everybody in the world experiences; to learn what 'water vulnerable regions' means and how this impacts on the communities there; and to develop a set of positive actions that will help raise the awareness of such regions.
Curriculum Links: Human Geography- to understand the distribution of natural resources including water



Activity 1: How far would you walk for clean water?
Where is the quickest and easiest and cheapest place to get a drink of water from? Discuss.
As we have already discussed, TAP water is by far the best water to use in this country and is on hand in every household in the UK.
On average we use 150 litres per day, 30% of which is used to flush the loo; if you add in water used for food production it's 3400 litres – (**show class a litre bottle of water - 150 of these)**
Explain that not every country in the world is the same as ours; there are places in the world where people have to walk a long way to get hold of water and sometimes this isn't even that clean!! (refer to scene in the *Gulp!* performance here).
How far would you walk to obtain clean water on a daily basis? Let class discuss in groups, then report back as a class
Use notion of 1 kilometre = 2 and half times around an average school field

Explain that the class are going to write a newspaper article based upon this information, to create awareness of the difficulties many people face in obtaining water for their everyday lives.
They could compile these news reports as individuals, in teams or even as a whole class. This report could even go out in the school newsletter or be published on the school website in relation to a water event - e.g. World Water Week, National World Toilet Day.
Go through slides that give some statistics on global water usage – children can use these stats in reports.
Ask children to note down any bits of information that they would like to use in their articles as the video is shown.
Show the clip - https://www.youtube.com/watch?v=yRXmG1nBKiA
Discuss what they think of the clip and the facts they recorded.

Explain that they are now going to have a look at the daily life of a young person in Somalia, which is in Africa. Explain that their life is very different. As they watch the clip, they need to discover how long the young girl is walking for to find water – and is the water clean? How can they tell? How many different ways do they see people using water there- cleaning, washing clothes, growing crops, drinking, cooking, sanitation…
Show the clip - https://www.youtube.com/watch?v=teX2I_E40mw
Discuss clip with class
Explain that now they have had an insight into the problems many people face to obtain water, they need to decide how they can help.



Activity 2: Access to clean water – How can we help?
Ask the class if they believe that everybody has the RIGHT to easily obtain clean water.
Explain that there are many things that they can do to help raise the awareness of these problems and as a class they are going to choose several that they are going to organise.

Explain that there are several charities that also believe in the right to clean water for everybody such as Water Aid and Oxfam

WaterAid OXFAM

Show the OXFAM Slides – Discuss
Explain that the class are going to do their bit towards 'making a difference' to water vulnerable areas.
Recap on the main problems that water vulnerable people suffer with:
need to spend a lot of time getting water; at risk of waterborne disease; do not have enough water to drink; do not have enough water to grow crops.

What ideas do they have initially about how they could make people more aware of water vulnerable areas in the world? Discuss - create a class brainstorm of initial ideas.
Go though the slides showing them many different ideas for making a difference e.g. water bottle collections – plastic bottles filled with all their loose change; water races: completing water-based assault courses or running with buckets of water and trying not to spill any; make a t-shirt to wear with a slogan that increases awareness.
Class to decide on 3 or 4 activities that they are going to adopt and plan out how they are going to organise these over a period of time. A timetable of events, with who is in charge of organising each would be advisable, to ensure that everybody in class has a role to play.
Other water aid organisations for ideas:
https://www.wateraid.org/uk/get-involved/all/schools-and-teachers
https://www.dropinthebucket.org/getinvolved/?gclid=EAIaIQobChMIx6Sb7LWR5AIVl53VCh1R2QC0EAAYAiAAEgLnzPD_BwE

christian aid unicef Save the Children.

This may well involve them competing a Whole School Assembly to tell the rest of school about their campaigns and to get everybody on board.

10. Water Use Warriors!

Water Usage – Water Saving Warriors

Learning Intention: the students will learn that water is a precious resource that shouldn't be wasted and become more conscious of using water at home more wisely. Pupils will collect, input and interpret data collected both with graphs and charts. Pupils will be able to use information collected to create non-fiction posters and checklists.
Curriculum Links: Maths – Data handling; English Non Fiction Writing – Non Chronological

Activity 1: Conserving Water at Home
Children to write down how many different ways they use water at home in 2 minutes. Group into different rooms/areas of the house, e.g garden, kitchen, bathroom, utility. Groups discuss
Diamond Ranking Activity
Ask groups to select the 9 most important ways that they use water at home onto Post-It notes and then rank them in a diamond shape – most important at the top, least at the bottom.
Should drinking water be the most important? Class discuss

Show them a litre of water and explain that on average we use about 150 litres of water a day. Using this information children are to guess how many litres some everyday activities take to complete.

Give them the 10 activity cards and 10 amounts and ask them to record which amount goes which activity – class discuss the answers - were there any answers that surprised them?

Explain that on average we waste one third of our 150 litres of water everyday = 50 litres
Discuss what and why we think this is ?
Explain that most of us don't really think about the way we use water at home and we often waste it on activities where we are not as water conscious as we could be.
Discuss some of the activities that we complete at home and how we could change the way we complete them to become more water efficient, e.g. brushing teeth – leaving a tap on for 2 minutes whilst brushing your teeth uses 12 litres of water!

How could we become more water efficient? TURN THE TAP OFF WHEN BRUSHING YOUR TEETH saves about 9 litres
Bath – just have it half full, or better still have a quick shower (36 litres) – Severn Trent provide 4 minute Shower Timers for free https://www.stwater.co.uk/wonderful-on-tap/save-water/free-ways-to-save/
Washing dishes – load the dishwasher on full once a day – (16 litres)
Running tap – instead fill up an empty bottle/jug full of water and leave in the fridge overnight to get cold – (0 litres)
Pupils to select one water efficient activity used at home and devise a poster to promote it.

Activity 2: Water Usage Survey
Explain to the class that just like other utilities, we have to pay for the water that we use and so becoming more water conscious is not only great for the environment but it also saves us money.
Explain that they are going to conduct a water usage survey to establish how much water they use at home over three days. Using the sheet, the class are to use a tally system whenever someone in their house completes one of these water activities. They DON'T have to work out all the totals etc until they bring the data back into school. This data can then be used to develop both maths and computer skills in relation to the collection, input and interpretation of the survey findings.
Once the results have calculated the class can then answer these questions:

1. What was your average daily water usage? (3 daily uses of activity and divide by 3)
2. What activity used the most water?
3. In which room/area was the most water used?
4. Was you average use of water more or less than the national average? (150litres)

Activity 3: Using Water More Wisely at Home Checklist/Poster
https://www.stwater.co.uk/wonderful-on-tap/save-water/you-can-make-a-difference/ - for water saving advice around the home.
Explain that with all the information, they now know about being more water wise at home, so they are going to devise a Water Wise Checklist for home to remind everybody about using water more conscientiously.

Class discuss together what will be needed to be on their checklist.
Top 10 water activities; description of how to complete the activity being water wise; the amount of litres used completing that activity; check off those activities that family already complete in a water wise way; proposed actions and dates by those activities that will need to be implemented at home at a later date.
Class could devise a poster ticking off the water wise activities they currently do and put dates by those that they will work on.
N.B This session could lead onto the global issue of how much access to clean water people have in their homes all over the planet.

11. Activities for families at home

Teachers, parents, carers and anyone interested – activities and information for you!

As well as our project website, there is also a wealth of great – and free! - resources to check out online. Here are just a few of our favourites:

Websites

http://www.kidsgoglobal.net/the-issues/water

Today, 1 billion people live without clean drinking water. Water effects everything including education, health and poverty. This website not only explores the issues of the global water crisis but it also has a wealth of activities and resources for you to explore. We particularly like all the interactive games reinforcing the use of water on this website:

https://www.oxfam.org.uk/education/resources/water-week

Oxfam Water Week for Schools provides opportunities for young people to learn and think critically about water issues, before taking informed and meaningful action. It can be undertaken at any time of the year.

https://www.natgeokids.com/uk/?s=water+wiz+interactive+water+quiz

National Geographic Kids has some very interesting information about water usage and plastic pollution, as well as lots of engaging, interesting articles, activities and quizes to keep your children amused for hours.

https://www.wateraid.org/uk/get-involved/teaching/ks2-resources

Excellent set of teacher resources, including lesson plans, PowerPoints and fundraising activities for the whole school.

https://friendsoftheearth.uk/plastics

Friends of the Earth have a created a fantastic page, crammed full of all you'll need to know about the plastic pollution problem, providing very useful, proactive ways of using less plastic in your everyday lives. If you would like to be more vocal with your opinions, then this site suggests ways in which you can get your views listened to by those in authority.

https://www.plasticpollutioncoalition.org/blog/2018/5/3/how-to-talk-to-your-kids-about-plastic-pollution-cartoons-books-and-activities-to-involve-the-whole-family

This website has been compiled by the PlasticPollutionCoalition and provides a variety of ways on how to talk to your kids about plastic pollution, through cartoons, books, and activities to involve the whole family.

What Can We Do At Home?

Water Usage

1. Water Saving Warriors – have you ever wondered if you could be more 'water wise'?

https://www.energysavingtrust.org.uk/sites/default/files/reports/AtHomewithWater%287%29.pdf – very useful information on how we use water at home
Try the Water Saver Survey at the end of this information sheet…
Would you like to save water and save money at the same time? Here are some water saving tips for you to try:
https://www.stwater.co.uk/wonderful-on-tap/save-water/you-can-make-a-difference/
and water saving products to help you around the home
https://www.stwater.co.uk/wonderful-on-tap/save-water/free-ways-to-save/

2. Key Stage 2 Water Cycle Explanation -
https://www.bbc.com/bitesize/articles/z3wpp39

3. Simple Science Experiments that you can complete at home, which demonstrate different parts of the water cycle:
Rain Cloud in a Jar Experiment – Appendix 2
Water Cycle in a Bag – Appendix 2

The Plastic Pollution Problem – How Can We Help?
Did you know that:
**Every second 160,000 plastic bags are being produced*
by the end of this year 5 billion bags will have been produced! 5 million of these will make their way to the oceans (do you remember what happened to the turtle in the Gulp! performance?)
Currently only 1 % of all plastic bags are being recycled
More than one million bags are used every minute
(these are just a few!)
This website is a great way to check and improve your knowledge of the environment, recycling, and reducing pollution. Your whole family can act as detectives, who need to solve riddles to protect the environment. The web page includes several printable colourful PDF documents with the tasks and hints you must follow to solve the case and protect the planet:

https://www.epa.gov/students/planet-protectors-activities-kids - Planet Protectors - Activities for Kids
LOOK at what Friends of the Earth is doing to **"Put a STOP to pointless plastic being produced"** – sign up and petition:https://act.friendsoftheearth.uk/protest/ask-environment-secretary-act-end-plastic-pollution

What else could you do?
•Support a new law to phase out non-essential plastics
•Use reusable bags for your groceries
•Get a reusable bottle and coffee cup
•Wash your clothes at low temperatures

Clean Water – Everybody's Right
https://www.dropinthebucket.org/about/
A drop in the Bucket is a non-profit organisation building water wells and sanitation systems in schools in Africa, enabling youth to fully harness the life-changing power of an education. This site gives you a wide variety of ideas for how you can donate to the cause and build a well, from Donate Your Birthday to Start a Fund Raiser
https://www.wateraid.org/uk/get-involved
Water Aid would like you to get involved by challenging yourself and your family to help the cause. There are many ways you can do this, so have a look at their ideas on the website.

Hey You! Not down the loo!
It's really important that we make sure that all ours fats, oils and greases – FOG - don't go down the sink, so why not have a go at making your own Fat Trap to collect all this unwanted fat.
Make your own Fat Traps - https://www.stwater.co.uk/content/dam/stw/my-severn-trent/documents/activity-sheet/Make-your-own-fat-trap.pdf
Did you know that if you add in nuts and seeds to the hardened FOG, you can use it as Fat Balls to feed the birds with in the Winter months

It's Gr8t To Hydrate
REFILL APP – Find out what this is all about-https://refill.org.uk/
Want to reduce the amount of single use plastic that you consume? The REFILL Initiative will inform you just how FREE and easy it is for the whole family to stay hydrated when you are out and about.

Would You Know If You Were Hydrated?
" 1 to 3 is healthy pee, 4 to 8 you need to hydrate"

Signs and Symptoms of dehydration you may want to know, along with other interesting information and imaginative ways to enjoy drinking water daily:
https://www.naturalhydrationcouncil.org.uk/hydration-facts/

Rain Cloud in a Jar

You will need:

Method:

1. Fill the large jar with water, leaving 2 inches at the top.
2. Add the shaving cream to the top of the water until it reaches the top of the jar.
3. Next, add 1 cup of water to the small bowl and 3 drops of blue food colouring.
4. Mix the water and food colouring together.
5. Use the pipette to add drops of the water mixture to the top of the shaving cream cloud.
6. Continue adding the water mixture until you begin to notice the raindrops begin to break through the bottom of the cloud.

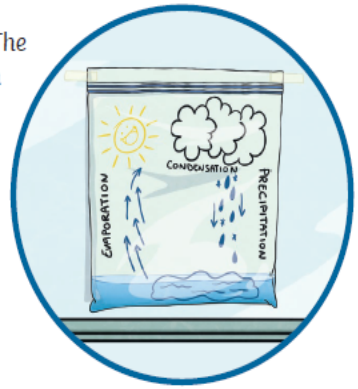
Water Cycle in the Bag Model Activity

You will need:

- Sealable plastic sandwich bag
- Permanent markers
- Tape
- Water
- Blue food colouring
- Window with exposure to sunshine

Instructions:

1. On the plastic sandwich bag, draw a diagram of the water cycle. Be sure to include:
   a. sun
   b. clouds
   c. water accumulation (at the bottom of the bag)
2. On the plastic bag, draw arrows and labels for:
   a. evaporation
   b. condensation
   c. precipitation
   d. accumulation
3. Fill approximately $\frac{1}{4}$ of the bag with water.
4. Place 2 drops of blue food colouring into the water.
5. Seal the bag.
6. Tape the sealed bag onto the window. The window will need to have plenty of sun hitting it to show the process of the water cycle.
7. Allow the bag to be in direct sunlight for about an hour, then observe the process in the bag and identify the different stages of the water cycle.



Home Water Use Audit

Calculate your daily water usage as well as the usage of your family members.
Record how many times/day your family completes each activity. Multiply that amount by the quantity of water using normal practices and conservation practices.
Total both the Normal Water Usage amounts and the Water Conservation Usage amounts at the bottom of the chart.

Activity	# of times/day	Normal Water Usage Description	Amount of Water Used	Total	Water Conservation Usage Description	Amount of Water Used	Total
Flushing Toilet		Using a regular toilet	14 L		Using a low flow toilet or displacing water with a 2L pop bottle	6 L	
Taking a Shower		Using a regular showerhead, having a long shower	100 L		Using a low flow showerhead, taking shorter showers	60 L	
Taking a Bath		Filling the bath ¾ full	150 L		Filling the bath ½ full	70 L	
Brushing Teeth		Leaving the tap on while brushing	14 L		Turning the tap off while brushing	2 L	
Drinking Water from the Tap		Running the tap until water is cold	5.5 L		Keeping a jug of water in the fridge to keep water cold	.05 L	
Handwashing Dishes		Leaving the tap on while washing	110 L		Turning the tap off while hand washing	22 L	
Dishwasher		Using the long cycle	47 L		Using the short cycle	32 L	
Car washing		Leaving the hose running	400 L		Using buckets instead of the hose	100 L	
Watering the Lawn		Watering the lawn in the middle of the day	35 L/min		Watering the lawn in early morning or late evening	18 L/min	
TOTALS		**Normal Water Usage**			**Water Conservation Usage**		

How much water could you save by using water conservation practices around your home?
Subtract the Total Water Conservation Usage from the Total Normal Water Usage

How much money could your family save by using the water conservation practices?

- 1 Cubic Metre = 1000 L
- 1 Cubic Metre of water costs $ in Chatham-Kent

Divide your Total Normal Water Usage by 1000 L to calculate the water usage in cubic metres. Multiply that number by the cost per cubic metre. Repeat the same process for the Total Water Conservation Usage. Subtract the cost of the Total Water Conservation Usage from the cost of the Total Normal Water Usage.

12. Refill!

Did you know?… Over the last 15 years, the consumption of bottled water has doubled in the UK. Of the 13 billion plastic bottles used each year – an estimated 7.7 billion (or nearly 60%) are plastic water bottles. Sadly, it's been estimated than almost half of these bottles are NOT recycled and around 15 million plastic bottles are littered, landfilled or incinerated every day – ending up in our natural environment and flowing into our oceans.

Refill is an award-winning national campaign set up by Bristol-based City to Sea. It aims to reduce plastic pollution by making it easier for people to reuse and refill their bottles with free tap water while they're out and about.

All you need to do is:

- Start using a reusable bottle
- Sign up to the free Refill app (available via the App Store and Google Play)
- Look out for the Refill stickers in shop windows while you're out and about
- Find out where you can refill, and track the impact you are making for the planet each time you do!

With over 20,000+ Refill Stations nationwide (with lots of well-known shops, cafes and restaurants signed up as well as local independents), refilling your water bottle for free has never been easier. Simply tap the app or look out for the stickers, find your local Refill Station and get fresh drinking water on the go!

Refill has local champions across the country, for example Refill Birmingham, Refill Manchester and Refill Newport & Shropshire, working to get as many businesses local to them signed up to the scheme and people signed up to the app.

ecobirmingham

In Birmingham, where The Bone Ensemble (who have brought you their performance today) are from, ecobirmingham are the local champion for Refill. They set up Refill Birmingham in October 2018. ecobirmingham exist to make the city more environmentally sustainable, working with individuals, communities and businesses to make positive changes to the city's environment. http://ecobirmingham.com/

Find out more about Refill and download the free app here: https://refill.org.uk

13. Water quiz

Download our water quiz, created by ecobirmingham, to test your water knowledge!