Water and the water cycle

SDG 6 Clean water and sanitation

How the water cycle is affected by pollution

What's the science?

There are many things that affect the water cycle and human access to clean water. One of these is pollution. Although water covers 70% of the Earth, only 3% of the world's water is fresh water and less than 1% of this is ready for human use. There are many pollutants that can affect water quality including agriculture run-off, storm run-off and vehicle emissions. Billions of people still lack access to clean water.

What are scientists doing about it?

Scientists are able to monitor the levels of organic materials in drinking and waste water to ensure the water in our taps is safe to drink. NASA engineers have developed a purification system that recycles air and water aboard the space station. This advanced technology has also been used in at-risk countries to improve access to clean water.

How could you explore this in the classroom?

- Learners could develop their secondary research skills by finding out about water pollution and filtration, as well as learning about access to water in different countries.
- Learners could leave containers outside in different areas to collect rainwater over a week or month. They could observe what collects in the different containers and compare these to clean water.
- Learners could then use this water or a mixture containing different materials such as sand and soil to investigate how they could separate the materials to 'clean' the water. Provide them with a range of equipment such as sieves, filter paper, funnels etc and set them the challenge of 'cleaning' the water.
- Literacy skills include writing about the process of separating the mixture. Learners could create a persuasive poster to educate others about those lacking access to clean drinking water. Cross-curricular links to PSHE include learning about the work of charities such as Water Aid.
- Useful books are *'The Drop in my Drink'* by Meredith Hooper and *'The Rhythm of the Rain'* by Grahame Baker-Smith. Learners could create comics to show the journey of water including where pollutants can be added.

Curriculum links

Research and observation; literacy; states of matter; water cycle; separating substances; habitats; Earth and space; PHSE

ROYAL SOCIETY OF CHEMISTRY

Sources Environmental Pollution Centers What Is Water Pollution? | National Geographic Water: Additional Resources | BBC

Age range: 7–9 years

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How we can save water

What's the science?

On average, each person uses approximately 140 litres of water per day in the UK. However, there are still billions of people across the world who lack access to clean water. Climate change is leading to more floods and droughts across the world. By 2025, two-thirds of the world's population could be facing shortages.

What are scientists doing about it?

There have been many innovations in recent years designed to help people understand and reduce their water usage. Fifty percent of homes in the UK now have Smart Meters which can reduce average water consumption. Scientists also test water to make sure it is safe for people to use.

How could you explore this in the classroom?

- Ask learners to think about different uses of water and which actions they think use the most water. They could group them into the three categories: domestic, agriculture and industry. They could develop their research skills by finding out how water is used in agriculture and industry.
- Ask learners to predict how much water the average person in the UK uses each day. You could demonstrate this with a two-litre bottle asking them how many of these they think it would fill. Compare this to a person in a country where water is more limited.
- Learners could develop their observation and measuring skills, as well as recording and interpreting data to investigate how much water they use throughout the day. They could create and use a tally chart to record how many times they wash their hands/fill up their water bottle/shower/use the toilet etc. Available data can be provided to help them to calculate how much water they used.
- They could then consider ways to save water in their own home and design a poster to persuade their families to reduce their water usage.

Curriculum links

Observing; measuring; recording and interpreting data; secondary research; literacy; water cycle

ROYAL SOCIETY OF CHEMISTRY

Sources How to conserve water | The Wildlife Trusts Water Scarcity | WWF Water and Sanitation | United Nations Regreen the Desert | Practical Action Water and Sanitation | Practical Action

Age range: 7–9 years