

Water

Eco Schools objectives

The Eco Schools objectives in this area are:

- to raise awareness that simple actions can cut down water use substantially
- to help pupils and the wider community understand that conserving water is vital to our future
- to raise awareness about the link between clean water and good health, especially in a world context.

Learning outcomes

Through work on water, pupils should be enabled to:

- understand and act upon the principles of sustainable management of water
- understand the water cycle
- carry out calculations using a variety of strategies and techniques
- collect, interpret and present information, using ICT, where appropriate
- present findings to others in a way that will persuade them to change their attitudes or behaviour
- work cooperatively with others.

NOTE

Less than 2% of the world's water supply is fresh water.

Taking showers rather than baths would save enough water every week to make 1,000 cups of tea.

A garden sprinkler uses as much water in half an hour as a family of four in a day.

Water pictures

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13	14	15	16

1. Clean beach
2. Fireman to the rescue
3. Water garden at Currie Community High School
4. Investigating pond life
5. Cleaning out the pond, Dunino Primary School
6. Biodiversity at the pond
7. Saving water
8. Calder Primary School's bridge
9. Biodiversity in the quadrangle
10. Planted boat, Elgol Primary School
11. Measuring
12. Waste not, want not!
13. Close examination
14. Flooding can cause misery
15. Portobello High School's greenhouse
16. One of the outcomes of global warming



The big picture

Water is a crucial aspect of our lives. We use it not just for drinking and washing but also for industry, agriculture and making almost any kind of product, from hamburgers and tin cans to newspapers and cars.

Our demand for water has grown to the point that the natural water cycle can no longer keep up. Pollution – mainly caused by sewage leaks, chemical discharges and agricultural runoff – has made clean water a rare and valuable commodity. Climate change may also contribute to making water more scarce.

This means that water organisations have an important role to play in managing, treating and distributing supplies to make sure that our demand for clean, fresh water is satisfied. But this process is expensive – and will become more so as our demand for water grows.

The water industry

Water itself doesn't cost money – but we do pay water companies for recycling water to supplement the natural recycling process of evaporation and rainfall. In Scotland, water and sewerage services are supplied by Scottish Water, which is a new organisation replacing East of Scotland Water, North of Scotland Water and West of Scotland Water. It provides water and wastewater services to household and business customers across one-third of the land area of Britain, providing 5 million customers in Scotland with clean, safe and high-quality drinking water and sewerage services. About 2.5 billion litres of water come to our homes, schools and other workplaces every day. There are 441 water treatment works and 1,127 service reservoirs linked by nearly 49,000 km of water mains. The 643 wastewater treatment works connect to over 30,000 km of sewers.

In general, the responsibilities of water companies are: maintaining water sources (such as reservoirs and underground supplies); treating and cleaning water; water distribution and supply; sewerage and sewage treatment; flood prevention and some aspects of coastal protection. The more we waste water and the more polluted natural supplies get, the harder these companies have to work, and the more chemicals they have to use, to make sure we have enough of the clean water we need – which means bigger water bills. Water, which we use at home, is paid for through the Council Tax. In the school context, water consumption is paid for through the central council budget.



A matter of life and death

Saving water is not just about saving money. A sufficient supply of clean water is essential to the health of people and the environment.

In many parts of the world, and even in some parts of the UK, lack of adequate rainfall can make water a scarce resource. In countries where water is difficult to come by and where existing supplies are often contaminated by bacteria or pollution, effective treatment and distribution is literally a matter of life and death. Within the context of global warming, this situation may become exacerbated with many more parts of the world being affected by extremes of weather.

Sustainability and water

Sustainability relates to our ability to balance the often conflicting concerns for the world in which we live (environment), the people who live in that environment (society) and their ability to provide for themselves and their dependants (economy). Water as a context for teaching and learning provides pupils with an opportunity to develop and broaden their understanding of sustainability issues across the curriculum.

	Environment	Economy	Society
Knowledge	water cycle	supply and demand	the potential for conflict
Issues	protecting and managing freshwater; managing hazardous wastes	combating poverty	changing consumption patterns
Skills	observing, recording, interpreting and presenting data	identifying some of the factors that contribute to the full cost of water supply, treatment and waste disposal	thinking critically about value issues
Perspectives	linking contemporary global environmental issues	seeing beyond local and national boundaries	universal attributes of being human
Values	ecological value of undisturbed land	value of a sustainable livelihood	balancing economic, societal and environmental values ⁹

See the website for more helpful background information about water and the environment, including: information about the water cycle, rainfall distribution figures, the effect of human water consumption on ecosystems, the role of water organisations and how to get in touch with them.

“ Saving water is not just about saving money. A sufficient supply of clean water is essential to the health of people and the environment. ”

What it means for schools

Water is an exciting topic that can develop pupils' skills in many curricular areas. Water has unique properties that have enabled life on this planet to develop. By encouraging pupils to explore them, you can show that water is not just a vital resource, but interesting, too.

Introducing water

One way to introduce the general topic of water would be to get pupils thinking about the number of times they use it every day. These could include indirect uses (in bottled drinks, food, manufacturing processes) as well as direct uses (washing, flushing toilets and so on). For more about water use in manufacturing, see the website.

Pupils could list every time they use water in one day. The amount they use may surprise them.

Older pupils can be challenged to think and write about life where water is a scarce resource, perhaps as part of a comparative study with another country.

The properties can be brought to life with basic scientific experiments looking at evaporation, condensation and freezing.

Checking water use in the school – what to look for

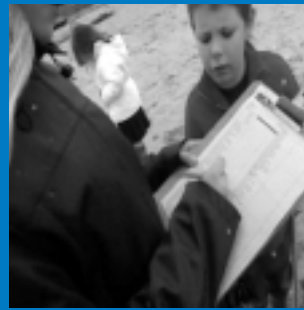
The activity in the following pages suggests an approach to a school water review that could involve pupils, staff and the wider community. There are a number of common causes of unnecessary water loss in any school.

Taps

The maximum flow rate of taps can usually be adapted. Check to make sure that the flow rate is adequate, not excessive. Taps left running can waste enormous amounts of water every day.

There are various types of self-closing, press operation taps that cut the supply shortly after use. These can waste water if they jam in the 'on' position and so need to be inspected and maintained regularly.

Taps with spray heads can reduce water consumption up to 50% but, like push taps, need regular maintenance.



Toilets

Most urinals are flushed by an automatic system that controls the flow of water at a minimum set rate per hour when in use. It may be possible to save water by reducing the flow.

Many older schools do not have control devices on their urinal cisterns to stop them flushing at night, weekends and during holidays. Various devices can be fitted to control water use during these periods, ranging from simple timing devices to 'people detectors'.

Such control equipment is not cheap, ranging from £100 to £200 per cistern. However, the savings made can pay for a unit within the first year of installation. A school of 480 pupils in England saved 68% of its overall water use by installing passive infrared urinal controls.

Advice and support

Many water companies have an educational role. As well as encouraging site visits, some produce high-quality educational material, much of it free to schools in their catchment areas. Janitors/caretakers, who are normally responsible for the maintenance of the water supply and heating systems in the school, are often useful sources of knowledge. Another underused source of hidden expertise are parents, who may include plumbers, architects, engineers or even water company employees. Calls for assistance at parents' evenings or in school newsletters often reveal hidden talents. The local authority may also be able to help, or at least provide advice about the water system in the school.

See page 134 for more information about how to get in touch with water authorities, companies and charities, or visit the website.



Curriculum links

The activities in this section offer plenty of opportunities for pupils to use maths in real-life situations (for example, when analysing and measuring water use or the cost of improvements). You could also link the topic to geography (when investigating the management of water resources and comparing water resources in different countries) and ICT (pupils could present their findings using spreadsheets and mapping software). Analysing the properties of water provides strong links with science.

Activity: the water review

This activity encourages pupils to think carefully about water – how we use it and where it comes from. It will give them a chance to review how effectively the school manages water and to suggest improvements.

1. How do we use water?

Ask pupils to list all the different ways they use water every day. The list would include taking showers, boiling kettles, brushing teeth, washing clothes and dishes, flushing loos and so on. Using water is crucial to our lives – but can your pupils think of ways they might be wasting water unnecessarily? For example, are they boiling more water than they need in kettles?

2. The financial side of water

To understand why water costs money, pupils need to understand the role of the water organisation that distributes and manages our water supply. Many water companies encourage site visits and provide educational materials, and it would be ideal if you could make contact with the relevant organisation to arrange a visit. To find out more about the role of water organisations and how to get in touch with them, see the Eco Schools website.

3. How much water do schools use?

Research by the National Audit Office suggests that most schools should be using an average of 4,000 litres of water per pupil per year. Work out how many litres of water a pupil would use in two years in nursery school, seven years at primary school and six years at secondary school. Work out how much water is used by all the pupils in your school in one year.

4. Identifying water wastage

Use the environmental review checklist on page 130 to help pupils identify problem areas. Are there any leaking or dripping pipes? Do taps drip when turned off? What kinds of taps are installed? (Self-closing taps such as press taps can save huge amounts of water over time.) What about toilets – how regularly do urinals flush? Do they continue to flush overnight, and throughout weekends and holidays? How long do hot water taps have to be left running before the water heats up? (Lagging the supply pipe could save both energy and water in the long term.) Remember that kitchens and the school garden can also be sources of unnecessary water loss.

NOTE

Where possible, it's a good idea to get pupils to measure water wastage. For example, if they do find any leaking or dripping pipes, they could use a cup to measure how much water is lost in one hour. They could then work out how much would be lost in a year (there are 8,760 hours in a year, so the volume of water lost in an hour should be multiplied by this number to get the year's wastage).

5. Proposing solutions

Now that problems have been identified, ask your class to get together to brainstorm ways of fixing them. Make sure that their ideas are practicable. Solutions will normally fall into two different categories. There will be those that require changing behaviour throughout the school, such as using rainwater to water the school gardens and reminding pupils and teachers to make sure taps are turned off properly. Other solutions will need some financial investment to put into place. They might include upgrading the washers in taps or installing press taps and controllers in urinals.

Where a solution costs money, ask pupils to work out how much money the measures would save in the long term compared to the cost of the initial outlay. The website contains a chart that shows the cost benefit of installing a urinal flush controller in a school, which you could use as a starting point.

6. The action plan

Ask pupils to draw up a list of realistic goals and set targets for when to achieve them. Some goals can be achieved fairly quickly, such as organising awareness raising campaigns. Others – such as installing new washers – will take more time and may need money and approval to put into place. Pupils could use any cost-benefit charts they have drawn up in presentations to headteachers and the Local Authority.

7. Monitoring progress

To make sure their action plan is effective, pupils will need to regularly and continually monitor the process. Pupils will need to make sure the momentum of the campaign is maintained.

Additional activities

As well as the water review, the Eco Schools website contains a number of additional activities encouraging pupils to think of other ways to save water, reduce water pollution from the school and consider water use from a national and a global perspective. These suggested activities include the following:

Home water audit

After carrying out a review of the school's water management and suggesting improvements, pupils do the same in their own homes.

Finding the source

Pupils investigate the different sources of water within a region and correlate this with the geography and geology of the region.

Future supply and demand

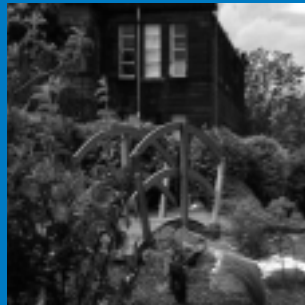
Pupils discuss the reasons for water shortages in the world and what steps might be taken to improve access.

School pollution

Extending the water review, pupils consider how the school might be contributing to pollution and consider ways to reduce it.

Water: case studies

It's hard not to take water for granted in a country like Scotland. But a number of water industry initiatives are helping to raise awareness of just how precious a resource it is. Water offers lots of scope for measurement with before and after meter readings, and pupils do like to tell the head how much they could save.

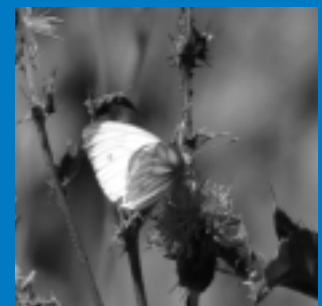


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An African band visited the school to inspire everyone to get involved in 'People and Water'. Pupils are much more globally aware and believe in playing their part as world citizens.

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Lunnasting Primary School, Shetland



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Water Action targets were agreed, following concern over water use being raised by the school's Pupil Council.

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Muiredge Primary School, South Lanarkshire



A world of water

Lunnasting Primary School, Shetland

Saaba, an African band from Burkino Faso, visited Lunnasting School to inspire everyone to get involved in the World Wide Fund for Nature's (WWF's) 'People and Water' project. Water as a subject is now included in the curriculum for all year groups, focusing on how water is essential for life. The pupils have a clear understanding of how lack of water or too much of it can have a devastating impact on the environment and the resulting effect it has on people's lives. They realise that having access to sufficient water at home and at school does not mean they should be unthinking in its use. As a result, they are particularly careful about saving water at school. Water butts are used to collect water for the indoor and outdoor plants. They check taps for drips and quickly attend to any faults. The pupils are much more globally aware and strongly believe in playing their part as world citizens.

Keeping track of water use

Muiredge Primary School, Uddingston, South Lanarkshire

Muiredge Primary School achieved their second Green Flag Award early in 2003. One of the environmental areas they targeted for their second flag was water. 'Water Action' targets were decided on, based on the current level of water usage, which had been an issue of concern raised by the Pupil Council. The idea of looking at water was to raise awareness about water usage, take readings, look into how to reduce water usage, then monitor and evaluate progress.

Daily and weekly units were recorded from readings of the water meter. The janitor helped pupils take the readings. An average usage rate was then calculated. The main aim was to try to reduce the average weekly units of water used.

The outcome is that water usage in the school has been greatly reduced by turning off taps, reporting dripping taps and leaks to the janitor and by installing a water butt to collect rainwater for watering plants.

Excellent monitoring takes place and graphs produced are displayed on the Eco Schools Board for the whole school to see.