KEMPTON STEAM MUSEUM

Clean Water for Life
Learning Resources

From Cloud to Tap: The Journey of London's Water

KS2

Educator's Notes

Keywords

Water cycle, rivers, source, reservoir, gravity

Topic Overview

Children will begin to think about where their water comes from and how they make use of a clean water supply in everyday life. The topic begins with the water cycle and discusses how London's water starts as rain in the hills, in Kemble, in the Cotswolds (the source of the River Thames).

Children will understand how we store water in reservoirs for later use. The presentation explains how the steam engines in Kempton Steam Museum were used to pump water to service reservoirs at Cricklewood.

Key Stage Two Curriculum Links

Science

- **States of matter** e.g. identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Geography

- **Human and physical geography** e.g. 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. And, physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes, and the water cycle.
- **Geographical skills and fieldwork** e.g. use the eight points of a compass, four and six-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world.

Prior Learning

- Pupils will benefit from being familiar with water cycle terminology e.g. evaporation, condensation and precipitation.
- Pupils should be familiar with the term gravity and that gravity is a force which pulls things down.
- Pupils should be familiar with maps, contours and grid lines.

Presentation slides

Look out for the speech symbol throughout the presentation — it marks moments for discussion, questions and shared ideas.

1. **Title slide:** From Cloud to Tap: The Journey of London's Water
2. **The water cycle** Discuss the terminology used in the water cycle: evaporation, condensation, precipitation and collection. Check understanding of each term.

From Cloud to Tap: The Journey of London's Water

Educator's Notes – Continued

3. **River Source:** Ask 'What do we mean by river source?'. Highlight that the source is in higher ground: water flows downhill – Link back to water cycle. Discuss what would happen if we drank water straight from a river. Even when water looks clean it can still contain bad bacteria and germs that could make us sick.
4. **Cleaning the River Thames Water:** Introduce systems thinking: parts working together. Emphasise that there are numerous steps in cleaning water; each step has a purpose and a process. The current process is first settlement, where dirt and debris sink to the bottom of the storage reservoir. Then the water goes through a slow slow sand filtration process and is then finally treated with chlorine or UV light to kill remaining bacteria.
5. **Kempton Park Pumping Station:** London's water starts as rain in the hills. It flows into the River Thames, which begins near a place called Kemble. Highlight that the source is in higher ground. Reinforce idea: water flows downhill. Link back to water cycle.
   Describe how the steam engines were once used for pumping water from the Thames to the reservoirs at Cricklewood such as the Bishops Wood Service Reservoir, but they have now been replaced with electric turbine technology.
6. **Water flows downhill:** Explain, or even demonstrate that water flows downhill because of gravity - just like solid objects are pulled down to earth, so are liquids.
7. **Reservoirs:** Explain that a reservoir is a large man-made place, a bit like a lake, where water is stored. They can be open, like a lake, or they can be covered/underground to protect the water from getting dirty. Explain that reservoirs are often built on higher ground so that gravity can help move water to next stage of the journey.
   In dry weather or when people are using a lot of water, the water level drops. In wet weather or when people are not turning on taps as much the water level rises.
   Water is stored in reservoirs because we don't get rain every day but people always need water and we need different amounts of water at different times. More people are living in cities. Ask: "What would happen if we didn't store water?". Think about short-term challenges like hot days and long-term challenges like climate change.
8. **Water's journey to London taps:** Follow the journey of the water:
   - Water is taken from the River Thames.
   - Water is pumped up to the storage reservoir, using engine power.
   - Dirt and sediment sink to the bottom of the reservoir. The water stays here until it's needed.
   - With the help of gravity, water is moved to the cleaning stage. Particles of dirt are trapped in filters.
   - The water is treated to kill germs and bacteria.
   - The clean water is pumped up to the service reservoir using engine power.
   - The clean water is stored in a covered service reservoir until needed.
   - With the help of gravity, the clean water is released to homes and businesses.
9. **Water in demand:** Discuss with the class that some activities use more water than others. Discuss which of the activities might use the most least water. Explain that is takes a lot of effort and energy to get the water to your taps so we need to use it sensibly and with respect.
10. **How much water?** Can children make rough estimate of their water use for one week? Demonstrate what a litre looks like.
11. **Water use prediction:** Use the table (printable pdf version available on the website) to estimate water usage over a week. This could be a whole class activity or an individual task.
12. **Plan your own water system:** Use the printable sheet with your children to plan locations for the 5 parts of their new water system. Talk about the contours on the map showing areas of higher ground. Remind children that reservoirs should be located on higher ground so that gravity can help with water delivery to taps.

From Cloud to Tap: The Journey of London's Water

Educator's Notes – Continued

13. **4 figure grid referencing:** Practice using 4-figure grid references by labeling the map.
14. **6 figure grid referencing:** For upper key stage 2 – practice using 6-figure grid references by labeling the map.
15. **Design a coat of arms:** Use the printable sheet to think about symbolism and link to Greek mythology. Children could colour in the Metropolitan Water Board Coat of Arms then have a go at creating their own design.

Extension ideas

Find the locations on Google maps:

- Littleton Pumping Station (TW17 0QQ), Queen Mary Storage Reservoir (TW15 1UA, Kempton Pumping Station (TW13 6XH), Bishops Wood Covered Reservoir (N2 0BS).
- Discover more about coats of arms or greek mythology