

Educational Water Boxes and IChemE Water Special Interest Group

For many years the Water SIG has promoted the teaching of water-related science in primary schools through the medium of the Water Box. This actually started off with the "Science Box", as offered by Northamptonshire County Council, which contained the equipment and instructions for a whole series of scientific experiments geared towards helping children improve their understanding of science. When this product ceased to be available, a search brought us to the Water Box, which is provided by Veolia Water. As the name suggests, this is far more water-specific than its predecessor and is available in English and French language versions.

Through a range of 15 interesting and fun experiments, schoolchildren typically in the age range of 7 to 14 years old (KS2/3 in UK) discover all about water, its properties and its importance in the environment to sustain life on our planet. **Further details are shown below.**

Since mid-2006 the WSIG has purchased over 40 Water Boxes, most of which have been donated to schools throughout the UK, with a couple also being sent to Australia and South Africa. Each box costs just under £200 and a significant proportion of group funds have been dedicated to this valuable resource.

If you, as a Water SIG member, would like to nominate a school to receive a free Water Box, please send your request to waterboxes@ichememember.org including the details listed below. Alternatively, send a preliminary enquiry to the same address. All we ask in return for the gift of a Water Box is a short article (after delivery of the box) about the school in question and their beneficial use of the experiments, which we can then publish in our newsletter, Wet News.

We look forward to receiving your school nominations.

Jim Keary, Water SIG Water Box coordinator, September 2015

Key Information required with the application –

- Requesting member's name and IChemE membership number.
- Name and full address of the recipient school.
- Name, position, phone number and email address of the nominated school contact who is to receive the box.
- Confirmation of year/Key Stage group that will use the box.

Important notes –

- Water Boxes are delivered directly to the nominated school. It is not our practice to deliver them to WSIG members or to other individuals for their own use.
- Water Boxes are given free of charge by the WSIG. We value feedback on their use, suitability and possible improvement.
- Water Boxes are offered subject to availability, as our budget is limited.



The Water Box

"Finding out about water"

Water, a major challenge for the future

More information at www.kidslovecities.com

This Water Box has been produced by Veolia Water for schools in the areas where the company is active.
(Age bracket: 8-11 years)



The Water Box contains:

- The equipment and products needed to carry out 15 experiments on water
- 3 classroom posters
 - "The natural water cycle"
 - "The water treatment cycle"
 - "Available freshwater per capita around the world"
- 1 teacher's handbook and worksheets to be photocopied.

HOW TO USE THE HANDBOOK, STUDENT WORKSHEETS AND POSTERS

The **teacher's handbook** outlines experiments and activities that can be carried out in class with the children. It explains and gives background information on the activities and suggests possible extension opportunities on the topics under discussion.

The time required to carry out each experiment is indicated using the symbols shown opposite.

These symbols indicate whether it is preferable for the experiment to be carried out by the teacher or by the teacher and the children.



At the back of the book, there are **worksheets that can be photocopied for the children** to enable them to easily carry out the experiments and activities in class.

After having completed the experiments or activities, you can use the **posters** to help the children consolidate their new knowledge and retain the information.

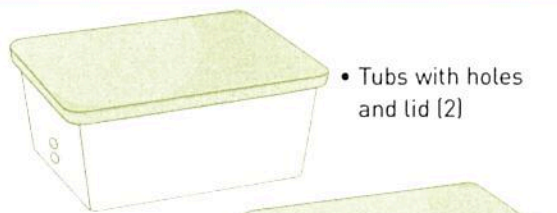
Activities chart and associated tools

Science and technology			
Topics	Experiments	Worksheets	
Large cycle	The states of water and the natural water cycle	1 : Variations in water volume	1
		2 : Evaporation	2
		3 : Condensation	3
		4 : Precipitation	4
Summary and extension opportunities: "The natural water cycle (large cycle)" poster			
Small cycle	Drinking water production	5 : Flocculation / Sedimentation	5
		6 : Filtration	6
		7 : Eliminating odors	7
		8 : Water hardness	8
		9 : pH - measuring acidity	9
	Drinking water distribution	10 : The relationship between water height and pressure	10
		11 : Communicating vessels and water towers	11
		12 : The siphon	12
	Summary and extension opportunities: - Water waste workshop - Magnetic jigsaw		
	Wastewater treatment	13 : Solubility	13
		14 : The relationship between density and buoyancy	14
		15 : Removing sand and oil	15
Summary and extension opportunities: - "The water treatment cycle (small cycle)" poster - "Animated map of the water cycle"			
Cross-curricular activities			
Craft, Design & Technology	Workshop – Magnetic jigsaw (eco-citizen actions)	Magnets	
	Workshop – Animated map of the water cycle	Animated map	
	Workshop – Tasting water	Water tasters	
History & Geography	Daily water use through the ages	•	
	Survey of a local watercourse	Survey	
	Available freshwater per capita around the world	•	
Citizenship	Respecting water: role-playing & discussion	Respecting water	
	Making a poster encouraging water conservation		
Summary and extension opportunities: "Available freshwater per capita around the world" poster			
Language skills	Studying expressions, proverbs and texts	•	
	The story of a water drop's journey through the natural water cycle	•	

The worksheets may be photocopied and given to the children.

Some have sections for cutting out; make sure you do not photocopy anything on the back of these pages.

Equipment in the Water Box



- Tubs with holes and lid (2)

- Tubs without holes but with lid (2)



- Test tubes (100 ml) (3)

- Measuring cylinders (120 ml) with screw tops (3)



- Pipettes (6)

- Funnels (3)

- Spatulas (5)

- Rubber bands (2)



- 60 cm rubber tube (1), tube clamp (1), tube connectors (2)



- Water hardness indicator (1) + strips (10)

- Universal indicator scale (1) + pH strips (10)



- Filter papers to be folded (8)

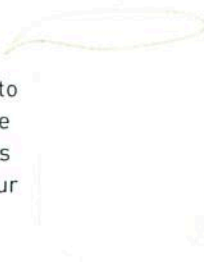


- Packets of modeling clay (2)

- 250 ml beaker (1)



- 500 ml beaker (1) to collect water at the end of experiments (use it to water your plants).



REAGENTS IN CONTAINERS

Liquids

Liquid soap, oil, vinegar, aluminum sulfate, calcium acetate, food coloring (dropper bottle), orange-flower water.

Solids

Salt, sand, gravel, clay, activated carbon.

SAFETY WARNINGS FOR ADULTS SUPERVISING THE CHILDREN

The Water Box must be handled only by an adult.

Read and follow the instructions and keep them for reference.

Handle the following products with care on account of their corrosive properties: vinegar, aluminum sulfate and calcium acetate.

Store the Water Box out of the reach of children.

Clean all equipment after use.

Wash your hands as soon as the experiment is finished.

Do not eat or drink in the area set aside for experiments.

Avoid all eye and mouth contact with the chemical products.

Do not drink the water used in the experiments. Even if it is clear, it is still not drinkable.

Do not touch the colored squares on the hardness and pH strips with your fingers.