

**The Green Classroom**

# Lesson Plans



# Where does water come from?

## Lesson Objective

To understand the water cycle.

## Resources

Reversible changes sheet, water cycle sheet.

## Introduction

Explain to the students that they will be taking part in a new unit or work/topic all about water conservation. Display these two words on the board. What do they mean to us? When do we hear them used? What do they mean together?

Hold a brief class discussion about any issues they may have heard about relating to water conservation. What water conservation activities can students think of and how do they think these might impact on people's lives?

Before we can begin to look at ways to conserve water and the implications of water wastage, we must first understand where this vital resource comes from. Explain that they are going to learn/revise work relating to both science and geography. Show the enlarged copy of the "Water: A reversible change" sheet (which can be photocopied from the pupil book or downloaded from the Yorkshire Water website to use on the interactive whiteboard. Ask for their help completing this. Reinforce the key vocabulary of: "reversible change, melt, freeze, condense and evaporate".

Now show an enlarged copy of the "Water cycle" sheet. This can be photocopied from the pupil book, downloaded from Yorkshire Water's website or you could use the supplied water cycle poster. How does it work? How does water 'move through' this system? Show a variety of different diagrams to highlight this from the Internet or books.

## Main Activity

(These activities are designed to help students consolidate/revise the vital learning which took place in the introduction.)

### Activity 1: Design a poster

Ask students to make their own version of the reversible changes sheet using their own pictures and notes. Explain that this will be a good revision tool to help them remember all about reversible changes in science.

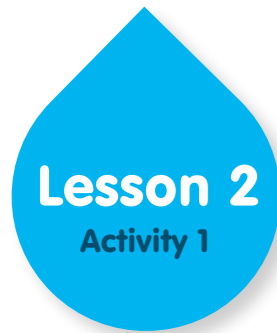
### Activity 2: Complete the diagram

Ask students to use books and/or the Internet to help complete their own copy of the water cycle sheet. Explain that they are to complete the labels and add notes to help them remember the key facts.

## Conclusion

Recap on the learning that has taken place in this lesson. Who can remember what the word 'freeze' means? What about 'evaporate'? Test their understanding of these key words. Ask students to discuss the water cycle. How do you think a reservoir might affect this system? Explain that in the next few sessions we will be looking at water consumption, what the costs are and how we can help to save water.





# How do we get drinking water?

## Lesson Objective

To understand the process of water capture and treatment.

## Resources

Pictures of water capture/treatment, topic cards in the work booklet, note taking sheet.

## Introduction

Recap on the learning which took place in lesson 1 – where does water come from? What can we remember about the water cycle?

Now that we know where water comes from, what about our drinking water? Draw up a class brainstorm on the whiteboard of different ways in which humans 'collect' water for mass consumption e.g. reservoirs, rivers and groundwater.

Show pictures from either the water treatment poster supplied or downloaded from Yorkshire Water's website of different methods of water collection and ask students to help identify these. What must we do before this water is safe to drink? Talk about treatment. Discuss that not only is water cleaned but also things are added e.g. chlorine.

This session is all about research and using different sources of information. What could we use? Draw up a list of different sources of information available to students to help them with their research.

## Main Activity

Break the class up into small research teams. Explain that each group is going to be responsible for one (or more, depending upon size of class) area of research. Their job is to use sources of information to find out as much as they can about a given area of water collection/treatment. Each member of the group must make brief notes and understand the area well enough to be able to explain this to another group.

Provide each group with one or more of the research cards and each member of the group with a copy of the note taking sheet with their work booklet. Allow the groups time to use fact books, encyclopaedias, dictionaries, the Internet, CD-ROMS, magazines, journal articles etc to help research their topic cards and complete their note taking cards.

You will need to create your topic/research cards in advance.

## Conclusion

Once each group has completed their research and the individual members completed their note taking sheets, number each person in a group e.g. 1 – 5. Repeat this for each group.

Ask all of the students numbered 1 to sit at one table, all of the 2s to sit at another and so on. The students will now be in new groups, each having researched a different area. Each member of each new group takes it in turn to feedback about their research using their note taking sheets. The students 'jigsaw' and share their collective knowledge.



# How much water do we use?

## Lesson Objective

To appreciate how much water is used every day.

## Resources

A container holding 1 litre of water, interactive whiteboard or projector to help share online water calculator, picture cards in the work booklet, blank cards in the work booklet.

## Introduction

Recap learning in previous session by showing some of the topic cards – who can remember what these mean?

Today's lesson is all about 'water consumption'. What does this mean? Explain that we are interested in how much water each person in a typical household uses. Link to maths by revising the units of measurement for liquids e.g. 1000ml = 1 litre. It would be beneficial to show the students how much water 1 litre is to help them appreciate the figures later.

Students can visit Yorkshire Water's website and use the online water calculator to find out how much their household water bill might be: [www.ywsonline.co.uk/internet/CCD.nsf/nwmc?openform](http://www.ywsonline.co.uk/internet/CCD.nsf/nwmc?openform)

Did they realise how much water things used? Were they shocked to realise the sheer volume of water a typical person in the UK uses each day?

## Main Activity

Explain that this lesson is in two parts. The students are to work in mixed-ability pairs and complete two activities. The first activity is to research how much water a variety of different everyday tasks use. Provide them with the picture cards and the blank cards from their work booklet. They must start by discussing the pictures – which do they think use the most water? Which use the least? They must then order the pictures from smallest to largest in terms of average litres per use. They must negotiate, justify and explain their reasons to ensure their choices are shared.

The second activity is for them to research either online or in books to find out roughly how much water each of these everyday tasks use. They then record this on the blank cards and match the blank cards up with the pictures. Once complete, they must now re-arrange the picture cards to ensure they are in the correct order.

If time allows, the picture cards and completed blank cards (with the average litres per use on) can be used to play either a simple matching pairs game or snap activity as an extension to the lesson.

## Conclusion

Discuss the findings from the lesson. Which everyday tasks were they surprised about? Which household jobs used more water than they realised? Which used less? Did it make you think about the things you do every day? Why? Will you change any of your behaviours because of this?

Show them the homework sheet and explain that every student is going to investigate their own water consumption for a week.





# Data handling

## Lesson Objective

To sort, organise and present data relating to water consumption.

## Resources

Calculators, data table sheet.

## Introduction

Discuss the homework activity. How did they find it? Were there any problems? What surprised them? Did they use more or less water than they thought? Did they think they were more conscious of water usage because of the diary?

We have collected a lot of data here. Model addition strategies to work out the total usage for a day and for the week. How could we check this? Revise how to work out an average water consumption figure for the week. Remind students that this is only looking at the behaviours/tasks outlined in the diary. There may have been other things happening in the week which use water which have not been counted.

How could we present this information? What skills have we covered in our maths lessons which would help with this? Discuss using data tables and various types of graph.

When drawing a graph, what must we include? Revise the key features of a graph including axes, labels, titles, appropriate scale.

## Main Activity

Pupils to work individually to work out their total consumption of water for the week using the data table sheet. They can revise their maths skills by doing this using pencil and paper methods of addition and then checking using a calculator.

Once the data table has been completed, students are to draw either a bar chart or pie diagram to represent their findings.

Once complete, ask students to share their data tables and graphs with one another ready to feed back in the conclusion session. Ask pupils to also look at the water saving facts throughout the pupil book.

## Conclusion

What did we find out? Which activity used the most water? Were there any patterns e.g. did they use more water on one day than another? Was water use less or more at the weekends? Why?

Talk about how this data and the graphs could be used to help teach other people about water consumption.

Reference the water saving statistics throughout the pupil book. Were they surprised at how much water could be saved from simple things like this? How could we present this data? Would this work in a graph? How could we make people aware of this information? Ask them to put this information into either a graph, data table or leaflet for their homework activity.



# The cost of water

## Lesson Objective

To look at the environmental and monetary costs of water usage. To solve mathematical problems.

## Resources

Maths problem sheets 1 and 2.

## Introduction

Ask students what they believe the 'costs' of water usage are. Establish that it costs companies and individuals money. What about the environmental impacts? Think about the building of dams and reservoirs. What about the energy used to clean and pump clean water to homes and businesses? Treating and pumping drinking water and waste water uses a lot of energy, with the UK water industry accounting for around 1% of UK CO<sub>2</sub> emissions. Amazingly domestic water heating is responsible for 5% of UK CO<sub>2</sub> emissions, and 25% of your household energy bill. Research released by Waterwise states that the average family's annual water consumption results in as much CO<sub>2</sub> as two transatlantic flights! How does this increased CO<sub>2</sub> impact on the environment?

Explain that this session will help us to look at these 'costs' in more detail and help us to practise our maths problem solving skills using all four mathematical operations. We will also be using some of our creative skills to make some of our own problems for other students to solve. Pick one of the maths problem cards and model how to solve it on the whiteboard, discussing possible solutions and strategies with the class.

Refer again to the water saving information throughout the pupil booklet. Which ways help us to save the most water? Why do you think this? Ask students to share their homework showing how they chose to display/promote this information to others.

## Main Activity

Hand out the problem solving sheets to the class. Activity 1 has been designed for average and less able students. Activity 2 has been written to cater for the needs of more able pupils within the class.

Ask students to either work individually or in pairs to solve the mathematical problems relating to water costs. As they work, encourage them to be thinking about the impact of these costs and what they could do to reduce these.

If students complete the maths problems, ask them to try and think of their own problems to pose to other students on their table.

## Conclusion

Ask students how they found the maths problems. Which mathematical operation did they find easiest to use? Do they feel they need to revise any of the operations or strategies they came across today?

Did they manage to come up with any of their own problems? Ask students to share these with the class and work together to solve them.

Were students surprised about the costs of water treatment and delivery?





# School audit

## Lesson Objective

To investigate water usage in school and generate ideas on how to reduce this.

## Resources

Brainstorm sheets, blank water usage sheets.

## Introduction

Ask students to think back to the work done using their home water usage diaries. Which activities used the most water? Which used the least? What ways could we reduce the amount of water we use at home?

Where else do we use a lot of water as individuals? Establish that students spend a large portion of their time within school and therefore use water here. How much water do you think the school uses every week? Every year? How much money do you think school must spend on its water bill each month? Each year? (Have school admin team provide this data from school water bills).

Explain that this lesson is about conducting an audit of water usage within school and looking at ways we can reduce this.

Students can visit the the Water School website to learn about how your school can save water, save money and help save the the planet!  
[www.thewaterschool.co.uk](http://www.thewaterschool.co.uk)

## Main Activity

Students to work in mixed ability groups. Provide them with a blown up copy of the blank water usage diary. Ask each group to discuss the different ways water is used in school e.g. washing paint pots, watering the plants outside, washing pots in breakfast bar. As a group, fill in these activities on the diary.

They must then use the information they already have (e.g. from their own home water usage diaries) and from research (books, Internet etc) to complete the table to show how much water each of these activities uses.

Once the table is ready, through discussion with each other and through interviewing key people around school (e.g. caretaker, breakfast bar staff, kitchen staff) they can complete a reflective diary estimating how much water is used within school. How much do these tasks cost? Find out the approximate cost per litre and ask students to calculate how much activities, such as washing paint pots, costs the school.

Once this is complete, groups to use the brainstorm sheet to think of ways in which the school could reduce the amount of water it uses.

## Conclusion

Students to share their school water usage diaries as a class and compare these. Each group can then take it in turns to present their ideas for reducing the amount of water used in school.

Are there any other ways we could save water? Could we collect our own water e.g. harvest rainwater? What could this be used for? How much water would this save? Talk about some of the new 'eco-schools' which have special roofs designed to collect rain water.



# How do we change?

## Lesson Objective

To research different ways to help conserve water and reduce waste and turn these ideas into a leaflet designed for younger children.

## Resources

Planning sheet (enlarged to A3), leaflets about water conservation, visit: [www.yorkshirewater.com/watersaving](http://www.yorkshirewater.com/watersaving) for lots of water saving information.

## Introduction

Establish that throughout this unit of work, as individuals we all use a great deal of water. Ask students to call out different amounts of water that different everyday tasks use e.g. flushing the toilet, taking a shower.

Why do we need to worry about water conservation? What are the implications for wasting water? Ask students to think back to the costs (monetary, environmental etc) of water production and delivery.

What can we do to help? What changes could we implement to help reduce the water we use and make sure we don't waste any? Draw up a list of ideas with the class.

Explain that we are going to research, plan and write a short leaflet to help educate a younger audience how to save water. Where could we research? Show examples of leaflets. How is a leaflet set out? What tone and style does it use? Would these be suitable for a child of 6? Why not? How could we adapt this information to make it more accessible to younger children to help get the message across? Recap on the features of a leaflet.

## Main Activity

Students to work either individually or in pairs to read through a selection of water conservation leaflets/websites. They are to record/jot down any ideas that they think would be useful when trying to get the message of water conservation across to children of 6 and 7 years of age.

Remind students that pictures are important – especially when engaging a younger audience. They must also remember that key facts and tips relevant to this audience must be included to help these younger children save water.

When ready, they can use the planning sheet to help piece together their ideas. Less able pupils could use key word cards and be assisted by adults with their writing.

## Conclusion

What have we learnt in this session about saving water? What about our literacy skills – did this activity help us to adapt our writing for a different audience? How did we have to change our style and tone? Did we have to alter the sorts of words we use? Why?

Ask students to share their leaflets with each other and, if possible, with the target audience. This would be an ideal opportunity to pair up with a younger class and ask students to share read their leaflets with these younger children.





# Preparing for a school assembly

## Lesson Objective

To prepare and present information about water conservation in a whole school assembly.

## Resources

Assembly group planning sheet.

## Introduction

In this unit of work, we have educated ourselves about water conservation. Who else have we educated? (Parents/Family with water usage diary, younger class with leaflets). How else can we get this vital message across? What forum can be used within the school? Establish that the class is going to plan and present a whole school assembly.

Draw up a list on the board – what do they feel are the features of interesting and boring assemblies? If we want to get the message across, we need to ensure that the assembly is interesting, informative and exciting. How can we do that? Allow the class time to discuss their ideas. Teacher to work as facilitator and pitching in when ideas become unrealistic. How can we ensure that our assembly is suitable for all year groups? All types of learner? Can we make it hands on and fun?

Outline that the key areas to be covered in the assembly are:

- How water is made ready for us to use (collection, processing and delivery)
- The costs of using water
- Why we need to conserve water
- Ways we can save water.

Are there any other areas students would like to cover?

## Main Activity

Divide the class into groups and assign one area of the assembly to each group. Allow them time to research, plan out and prepare for their segment of the assembly. Students may wish to use the planning sheet to help sort out their ideas.

Depending upon the style and props they decide to use, this session may take more than one lesson. Teachers could utilise time in creative sessions such as art and design for students to create props or pictures to use.

Once prepared, each group to spend time rehearsing their segment of the assembly.

## Conclusion

Each group to perform their segment of the assembly. Other groups to act as audience. Ask groups to comment on each other e.g. What did they like? What could be better? What would they change?

How can we link the segments together? Do we need a narrator or spokesperson to help move from one segment to another?

Allow the class time to rehearse presenting the whole assembly together.



# Writing a letter

## Lesson Objective

To organise ideas and information into a letter.

## Resources

Examples of letters.

## Introduction

Discuss all of the work covered in this unit of work. What have we found out? What lessons have been learnt? What were we most surprised by? How will this work change our behaviour? What facts have we come across? Hold a class discussion to unpick all of the key learning that has taken place. Draw up class lists or brainstorm on a whiteboard to help organise collective thoughts.

Explain that water companies such as Yorkshire Water are keen to promote water conservation and seek to educate people to make better use of water. As they have set up this unit of work, it would be good to feedback to them about its impact and how we have benefitted from it. How could we do this? How could we send them this information? What could we write?

Establish that a letter or email would be an effective means of communicating the learning which has taken place.

What are the features of a letter? Revise the key parts and layout of a letter including:

- Where to write addresses
- Appropriate opening e.g. Dear Sir or Madam or named person
- Date
- Use of paragraphs to group ideas
- Opening sentence
- Closing sentiments
- Signing off e.g. yours sincerely or yours faithfully.

## Main Activity

Students to plan out their own ideas about water conservation and the learning they have undertaken in this unit of work using the planning sheet.

Encourage them to write their own reflections and how the unit of work will change their behaviour and hopefully the behaviours of others.

Once they have jotted down their ideas, they can move to the computer to use the interactive letter writing tool to help piece together their letter.

If finished, they can print off the letters and help one another by evaluating each other's completed work.

## Conclusion

Ask students to share their completed letters by reading them out to the class. Review all of the learning that has taken place by asking key questions such as "Why do we need to conserve water?" Ask students to evaluate the topic e.g. which parts did they enjoy, which would they change? Explain how the letters will be submitted to Yorkshire Water to help them learn about how their message of water conservation is getting across and will help them to develop further resources to help people.



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