



# Water and your school

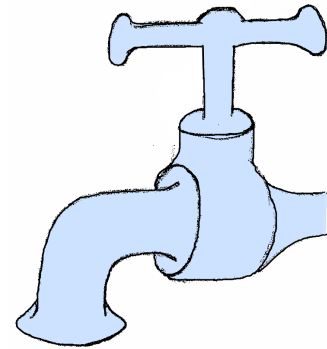
[www.go4set.org.uk](http://www.go4set.org.uk)



# Water and your school

All over the world, supplying people with water is a serious issue. With a growing population, we all need to think about how we use water and where we get the water from. Whilst water can be limitless, making it safe to drink can be a complicated task, one which uses energy and costs money. As such, it is really important that we all find ways of reducing waste.

We can all reduce our usage of water, by simply turning off the tap when we are cleaning our teeth for example. We can even find alternative courses of water for non-drinking needs that make a big difference, both at home and at school.



How does your school use water? What are the different uses for water within your school, for example, drinking water or water for feeding plants? Consider the following:

## Possible water sources within your school are:



- Taps linked to water pipes below ground
- Rain water
- Imported sources such as bottled water for drinking
- Wells or natural water sources such as streams or rivers

## Water leaves your school site:



- As waste water, through the drain pipes from plug holes in sinks, drains or flushing the toilet.
- As evaporated water in the form of condensation.
- Consumption, such as consumption from human beings or nutrition for plants and vegetables.
- Energy, used to heat elements in radiators for central heating, or in Hydraulic machinery.



# Water and your school

**Your challenge is to identify a suitable building or part of your school and look at ways of reducing how much tap water is used through reducing waste and / or by finding water from other sources.**



Start by thinking about some of the following questions:

- What is water used for at your school? Think about more than just for washing and for drinking.
- How is water stored at your school?
- How much water is wasted at your school from leaks or old systems?
- Does every use need very clean water?
- What happens to all the rain water that your schools collect each year and how could this be used?
- How can water be 'captured' from natural resources and stored and filtered for other uses?

You will have plenty of questions of your own and the answers will help you to create a detailed list to include in your project proposal. This list is called the '*specification*'.

## What to do first?

**Firstly, you will need to work out how much water is currently used for your chosen building or area.**

The best way to start is to try and get your hands on some water bills for the school; your teacher will know who you need to ask. Your school will probably only have one bill so you will need to estimate how much your chosen building or area uses.



Think about how much money your ideas could save the school. Maybe you could use a combination of measures, some cheap, others expensive?

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## Then...

Your team will need to come up with a way of **either** using less water **or** using the same amount of water for less money, so perhaps by recycling water from natural resources or identifying different sources for different uses.



You will have lots of ideas but for your final presentation it is best to focus on one specific idea or set of related ideas: you will not have time to do more! Your team can present a couple of different ideas, for example, one that costs more money but saves more water and another that is cheaper but does not save on the water use, but remember, you only have a limited amount of time to work on this project so try and keep your ideas focussed.

## Plan of action!

- Make sure you understand the project brief and find answers to your starting questions.
- Create your specification (the list of features to be included in your proposal). You should try to do this as early as possible, the first week is ideal!
- Create as many ideas as you can which might follow your specification. Decide which main idea/set of ideas, to focus on and develop into a practical proposal.
- Always keep good notes about what you are doing; a team diary of progress is a good idea.



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- **Plan** your work over the few weeks using a Gantt Chart (at the end of this booklet):
  - Make lists of the things that need to be done.
  - Try to organise these things into a suitable order.
  - Try to decide which team member/s will do what things.

Good planning at the beginning of a project means you will be more organised and will make your project more structured. This will give you the ability and confidence to finish on time!

- Evaluate the outcome of your project; how well does it satisfy your specification? How effective is your model?
- Costs—You will need to show how your design can save money. To do this you need to think about how much your design will cost to begin with and how much it could save over a period of time.
- Give yourself a team name and allocate roles depending on what each member of the team is good at, for example Managing Director—The boss!, Design Engineer—good at ideas and drawing, Finance director—in charge of how much money is being spent / saved etc.

The following may be helpful:

- Calculating rainfall near your school:
  - Check if your school has a weather station or if someone has recorded rainfall in another class.
  - Look at websites such as <http://weather.msn.com/> and <http://www.metoffice.gov.uk/> You need to think about how much rainfall will be collected in the wettest and driest months and also how you can store this? For example, does your school storage tank have enough capacity to hold the maximum amount of water in the wettest month?
- Calculating how much rain you can collect over a surface / roof:
  - Rainfall figures will be in mm per month. This is the same as one litre of water over an area of one metre squared each month. **So...** if you have a roof measuring 10m x 10m and a monthly rainfall of 130mm then your roof can collect:

$$130 \times 10 \times 10 = 13,000 \text{ litres per month}$$



- Think of other calculations and experiments you could do like working out how much water is used in toilets.

# What you need to produce

The end of your project is your Celebration and Assessment Day (CAD) where you will present what you have done to professional engineers. The assessment has **four stages** that must be ready by the day:

## 1. A model of your project

Your model can be built with any materials available and should visually demonstrate how your project would work and look.

## 2. A display

This is a written and visual method of communicating your project to the assessors, who will visit and question you at the stand. Try not to clutter your board; think of what looks good and best demonstrates your project to a passer by. Maybe you could take photos of you all at work throughout your project, or could draw a logo for your team? You will need to ask your teacher to get anything you will need to stick your project to your board, eg. Velcro pads, scissors, etc. Your teacher will also have the dimensions of the board.



## 3. A five minute presentation and questions

You may want to use PowerPoint or could just use your model and display but you need to talk about how your model works and how it saves water. Also, you should talk about how you went about coming up with your ideas and how you overcame any problems. Make sure every member of the team speaks during the presentation and that you know enough about your project to be able to answer questions about it from the engineers.

Remember, practice makes perfect!



# What you need to produce

## 4. A written report

You need to hand in a professional report **one week** before the CAD so the assessors can read through this before your presentation: you will also need to bring copies on the day that are printed on A4 paper and bound as a professional report. Your report should include the following information:

- Say something about yourselves; the team members, your teacher and your mentor and their company.
- Explain what thoughts you all had when you were first presented with the challenge.
- Describe any research you had to do to understand the challenge
- Explain how you planned your project, how you decided when to do things and who would do them.
- Describe how you developed your first ideas into a main proposal.
- Describe any problems your team had and say how you dealt with them.
- Describe how you presented your proposal and how you built your model
- Say how successful your proposal is and why.
- Try to say how your proposal might be useful in other situations, such as in the developing world.
- Personal Appendix: half a page on each individual student and your contribution, tasks and what skills you have learned during the project.

Try to think of suitable titles for each section. Consider putting some of your diagrams and graphs into a special section at the end, called 'Appendix', so not to clutter the main report.



**Make a front cover for your report. You will need to state the names of your team, school, teacher(s), company mentor(s) and company.**

**Get your mentor to check your report a few days before the submission deadline;** the quality of the report (spelling, grammar etc.) will be considered during the marking process so you may need time to edit the report. There is more guidance in the scheme Handbook; your teacher has a copy.

# Timetable

<b>Launch</b>	Meet with your mentor and arrange when you are going to do the project and when you are going to go on your company visit.
<b>Week 1</b>	Choose a building to make more water efficient. Get some water bills for your school and have a look at where water is used, and where it could be collected. Research some websites for ideas.
<b>Week 2</b>	Decide what you are going to do to save water and draw up some possible ideas.
<b>Week 3</b>	Choose from your ideas and decide how you are going to build your chosen design. Explain why you chose your solution and think about what materials you will need.
<b>Week 4</b>	Begin work on your model. How can you best represent your idea? What materials will you need for your model? Ask your teacher how to get them.
<b>Week 5</b>	Work on your model and start writing your report.
<b>Week 6</b>	Work on your model and your report. Your design may alter as you build your model. Keep a note of this and explain it in your presentation.
<b>Week 7</b>	Carry on with the report and the model.
<b>Week 8</b>	Get your report checked by your Mentor and send it to Go4SET to be passed to the Assessors.
<b>Week 9</b>	Carry on with your model, and start to prepare your project display and presentation.
<b>Week 10</b>	Put the finishing touches to your model, your project display and your presentation.
<b>CAD</b>	Present your work to the Assessors.

# Timetable

The table below is what engineers call a **Gantt chart**. You should use this to plan how long you need to spend on different tasks throughout the project. Fill out the weeks, as in the example, to decide when you plan to do a task. Remember to allow for holidays!

		Week Number																		
		1	2	3	4	5	6	7	8	9	10									
Tasks	Example																			
	Specification of problem																			
	Company visit																			
	Research																			
	Generation and evaluation of ideas																			
	Design ideas and evaluation																			
	Prototyping and testing																			
	Manufacture and production																			
	Final evaluation & modification																			
	Writing report																			
	Producing presentation																			

## Go4SET

## EDT



### Go4SET Regional Contact:

### Company Mentor Contact:

### Project Report Submission Date:

### Date and location of CAD