

# Managing water resources

Having a reliable and safe supply of fresh water is very important for us to stay alive. The way that many of us live our lives means that we use a lot more fresh water than we need just to stay alive. If the number of people in the world increases and they all use more fresh water, we will not be able to supply all the fresh water that is wanted. One way of helping to solve this problem is for each of us to use fresh water more carefully.

## Activity 1: Making an estimate

Here's how to estimate how much water you use each day:

Fill in the first column of the table below for the volume of water that you use, on average, each day. Then calculate how much water you use in a year.

In some cases you will need to work out your **share** of the water used in your home. These cases are marked with a \* in the table. For example, if your family uses a washing machine to wash clothes 3 times a week this uses  $3 \times 120 = 360$  litres per week. On average, this is  $360 \div 7 = 51$  litres per day. If there are 5 members of your family this is just over 10 litres per day for each member of the family.

You will probably find the following average values helpful:

- Brushing teeth: 0.01 - 1 litre
- Shower: 1 - 40 litres
- Cooking a meal: 1 - 5 litres
- Cleaning car: 5 - 200 litres
- Flushing toilet: 5 - 10 litres
- Drinking: 1 - 2 litres
- Washing hands: 1 - 3 litres
- Watering garden: 1 - 17 litres per m<sup>2</sup>
- Dish washer: 30 - 50 litres
- Bath: 50 - 150 litres
- Washing machine: 30 - 100 litres

(Washing clothes or dishes by hand only uses a quarter as much water.)

use of water	how much you use each day	how much you use in a year
keeping your body clean		
drinking		
flushing the toilet		
preparing food*		
washing dishes*		
washing clothes*		
washing a car*		
watering a garden*		
<b>TOTAL</b>		

## How much water could you save?

### Activity 1: Making an estimate

Discuss ways that you could reduce the amount of water you use without affecting your life too badly.

- How much water could you save each day?
- How much water could 1000 people save each day?
- In towns and cities, a lot of water is lost through burst pipes. Estimate the loss of water through a burst pipe by measuring how fast water flows out of a tap. (For example, you could measure how long it takes to fill a 1 litre bottle.)

How much water would be lost from a burst pipe in a day?

How does this compare with the water that 1000 people could easily save each day?

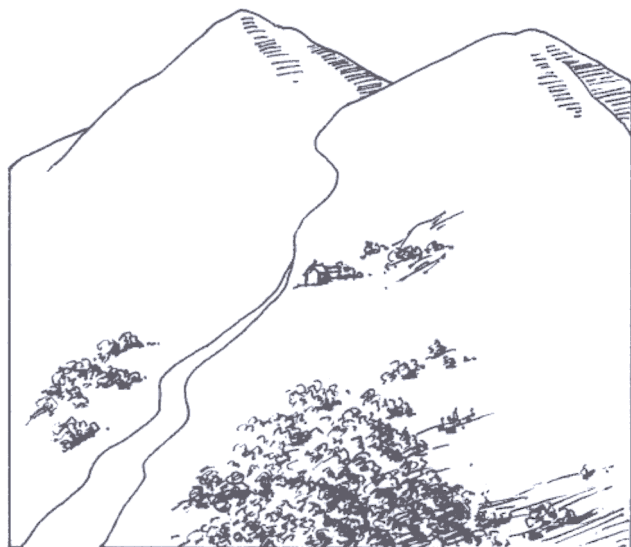
Which is more important, saving water at home or repairing burst pipes quickly?

- Design a poster to inform the public about the importance of saving water.

## Sharing water between different users

Different groups of people with different interests often live in the same area and have to share the same fresh water resources. This can often lead to conflict.

There is a plan to dam the main river in your area, upstream of where you live, to store water and only release it at certain times.



### Activity 3: Role play

Each group of people who would be affected has to present a report to the committee that will decide whether or not to build the dam. Your teacher will put you into one of the following groups:

- Farmers (who need water mainly for irrigating their crops).
- Water authority (who need to supply water to people in towns and villages in the area).
- Leisure-time users of water (e.g. for yachting, fishing, etc.).
- Hill farmers who would lose land and in some cases houses as the reservoir forms behind the dam.
- Industrialists who could use the cheap hydro-electricity that could be generated.

#### **Preparing the reports of the various interest groups**

You should prepare your group's report to the committee under the following headings:

- A description of the group.
- A statement of the *quantity* of water that your group needs for its activities.
- A statement of the *quality* of water that your group needs for its activities.
- A statement of how the needs of your group would be helped by the dam.
- A statement of how the needs of your group would be harmed by the dam.

#### **Making a decision about the dam**

The whole class should now regard itself as the committee that makes the decision. Each group presents its report and is questioned by members of the committee. The committee then discusses the whole matter and reaches a decision, unanimously if possible, otherwise by voting.

## Meeting the demand for water

The water that is consumed in homes in different parts of the world depends mainly on two factors:

- How much water is readily available.
- How much water people have got into the habit of using.

The table shows the average amount of water used in homes per person per day in different parts of the world.

part of world	water used (per person per day)
North America	200 - 300 litres
Europe	100 - 150 litres
Developing Countries	5 - 50 litres

In 1990 there were 5.3 billion people on Earth. By the year 2025 it is expected that there will be 8.3 billion. It is also expected that the average

amount of water used by each person will also have increased.

The table shows how much water was available per person in 1995 in different regions of the world and how much is likely to be available in 2025.

region of world	water available in 1995 (per person per year in millions of litres)	water likely to be available in 2025 (per person per year in millions of litres)
Africa	5.53	2.46
North & Central America	16.60	12.50
South America	37.00	24.10
Asia	3.60	2.35
Europe	3.96	3.92
Oceania	80.80	61.40

- 1 How many times as much water do people in North America use in their homes compared to people in Europe? and people in Europe, compared to people in developing countries?
- 2 In which two regions of the world is water most likely to be seriously scarce in 2025? Give two reasons why this is likely to happen?

Water is officially defined as being scarce when less than 1 million litres are available per person per year. The following countries suffer most from water scarcity (in order, starting with the one where water is scarcest): Kuwait, Bahrain, Malta, Singapore, Libya, Jordan and Cyprus.

### Activity 4: Questions

- 3 On a world map colour in blue the three regions where there is the greatest amount of water per person per year. Colour in red the countries where water is scarcest.

# Managing water resources – Teacher's Notes

## Introduction

In this module, students are asked to:

- estimate how much water they use each day;
- suggest ways that they could reduce the amount they use;
- compare the savings they could make with the estimated losses from leaking pipes;
- consider competing claims on water resources, present the case for a particular point of view and participate in reaching a balanced judgement;
- compare the amounts of water used by people in different parts of the world;
- consider likely problems in meeting the demand for water during the next quarter century.

## Scientific & technological concepts

- estimation;
- projection.

## Teaching approaches

This module is designed to help students appreciate just how much water they personally use and the problems there might be in meeting this demand in different parts of the world or in the future. The first activity involves two different exercises in estimation and the second activity involves adopting the roles firstly of a particular user of water resources and secondly of an impartial decision maker. Presented data is then used both to make comparisons and to anticipate possible future problems.

## Notes on the activities

**Pages 1, 2:** It might be worthwhile collecting together the individual results across a whole class in order both to ascertain the range of values and to obtain some average values.

**Pages 2, 3:** Depending on what teachers know concerning the likely prior knowledge of their students, it might be helpful to provide each group with further background information on a briefing sheet. This should, where possible, relate to local circumstances but should **not** comprise a script for what the group presents in its report. It should, rather, provide the information from which students can infer what the group they belong to would need to say. The information provided to different groups might, of course, partly overlap.

In the final decision-making stage, it might be helpful for the teacher to chair the meeting.

**Page 4:** For the final part of Activity 4, students need an unmarked outline world map and an atlas for reference.