

# Water the world's most essential commodity Numeracy

Only 3% of all the water on earth is fresh water and 77% of this is locked up in ice caps and glaciers. It is a renewable but limited resource.

Clean water is therefore one of the most precious resources on earth. It is life's most important basic necessity. Dirty water on the other hand is one of the deadliest killers.

In the UK we usually have lots of water and have direct access to it via taps which very rarely stop running. What's more, the water coming out of taps in the UK is guaranteed clean and safe.

For many in the world however turning on a tap and watching it pour clear clean water is simply a pipe dream. Millions of people are often many miles away from a source of water. Often this water is dirty and unsafe to drink.

This series of leaflets highlights the effects of poor access to water and the unjust and unequal distribution of the world's most valuable resource.

## **A world thirsty for water justice**

The world's water supply is unfairly divided. In the UK we bathe, water our gardens, use water-guzzling washing machines and dishwashers while millions go without.

## **Clean water - the key to health**

It is inconceivable to us living in the UK that the water we drink and in which we wash would be anything but clean and safe. Yet an estimated 10 people die every minute from contaminated water. The World Health Organisation estimates that 80% of all sickness and disease in developing countries is due to unsafe water. In many countries surface water and water found in streams and lakes is deadly. It is home to all sorts of parasites and illnesses which kill millions of children world wide and cause lives of misery to many more. In the UK and other western countries we are fortunate that we have had the money to build sewers and water treatment plants to ensure safe water and high levels of hygiene.

## **Water access - millions go without**

In the year 2000 189 nations agreed the Millennium Development Goals, a set of goals and targets for tackling extreme poverty. One of the targets was to reduce by half the proportion of people without access to safe drinking water and basic sanitation. This is one of the few targets that have been met. Between 1990 and 2010, over two billion people gained access to improved drinking water sources, such as piped supplies and protected wells. However, still one in ten of the world's population does not have access to clean water. This, and lack of safe sanitation, result in over two million people dying from water-related diseases every year. Also, many millions of people, usually women and children, spend many hours every day fetching and carrying water, because there is no water supply where they live.

## **Water in short supply - who gets it?**

It is estimated that a third of all the world's countries will soon be permanently short of water. Yet in many of the countries with a shortage of water the rich have their swimming pools filled and their golf courses watered while the poor struggle to get any water at all. And to make it worse in many cities the rich get their water cheaply while the poor have to pay a much higher price for their miserably small allowance. Also big industrial or agricultural businesses often ruin people's water supply in the pursuit of profit by using water which could otherwise be used for local people's needs or by polluting their water supply.

<b>Water: how much will you use?</b>	<b>Numeracy Water</b>	
A numeracy activity practically exploring how some people survive on so little of the world's most important basic need	<b>45 mins</b>	<b>Year 3 and 4</b>

## Suggested lesson structure

### Preparation

This activity assumes some previous work on capacity. Resources needed for the successful completion of the activity: a litre measuring jug with 100 ml intervals, a litre drinks bottle and four buckets capable of holding 2½ litres each.

The lesson could begin by asking children to consider pairs of multiples of 100ml which add up to 1lt. This could be practically tested and demonstrated by measuring the two suggested combinations in the jug and pouring them into the bottle to see if it fills it.

Children could be quizzed on how many ml in ½/¼ of a bottle.

### The main activity

Ask children to estimate how many litres (bottles) are used for common or essential daily activities. Suggested figures could include ½ lt. or mls.

The average daily figures for a variety of activities are given below and these figures should be revealed to children following their estimates.

### Suggested whole class teaching activity

In the poorest countries the average person uses 10 litres of water a day. Ask children to imagine a child in Africa collecting and carrying 4 buckets of water containing 10 litres in total (see also Rachel's story, Water leaflet, Year 4 literacy). If the water is evenly shared between the four buckets, how much water would each bucket contain?

Practically measure out the water into buckets. Ask one or two children to try and lift the four buckets and imagine walking for a long distance with them as many children in Africa have to.

### Suggested group activity

Children should consider the list of daily uses of water discussed earlier and decide how they would divide up 10 litres of water.

Once they have decided on the amount allocated to each activity, and have checked the total adds up to 10 litres, children can colour code the water tub below with different colours indicating different activities (in effect an 'add-on' bar chart).

### Plenary session

Examine some of the results, questioning and checking calculations and presentation of information. Measure a few suggestions to demonstrate how little some people have to survive on and use for various tasks. Some suggestions may need questioning/challenging, e.g. it is difficult to reduce the amount you drink, particularly if you live in a hot climate. Consider what problems there might be living on 10 litres a day, e.g. no toilet, having to hand wash clothes in a tiny amount of water and possibly using the same water to clean dishes, the need to wash instead of shower.

### The key global citizenship messages of this activity:

- to highlight the discrepancy between our unrestricted access to water and the very limited amount of water available to many millions of people in poorer countries
- to show how many people have to plan and prioritise their use of water
- to understand that drinking and cooking water must always be prioritised first for human survival
- to demonstrate the risk to health and hygiene of restricted access to water: it makes personal washing, clothes washing and sanitation difficult
- to show restricted access and usage of water and the need to collect and carry water is a daily reality for millions of people in poorer countries

## How will you use your 10 litres of water?

In many poor countries in the world people are only able to use 10 litres of water a day. Imagine that today you only have 10 litres of water. You have already discussed with your teacher and the rest of the class how much water you normally use for different activities each day. In your group try to think about how you would use 10 litres of water. Use the table below to help you.

Discuss the following questions:

How much water would you use for each task?

Which are the most important uses of water?

Which activities could you still do but with less water?

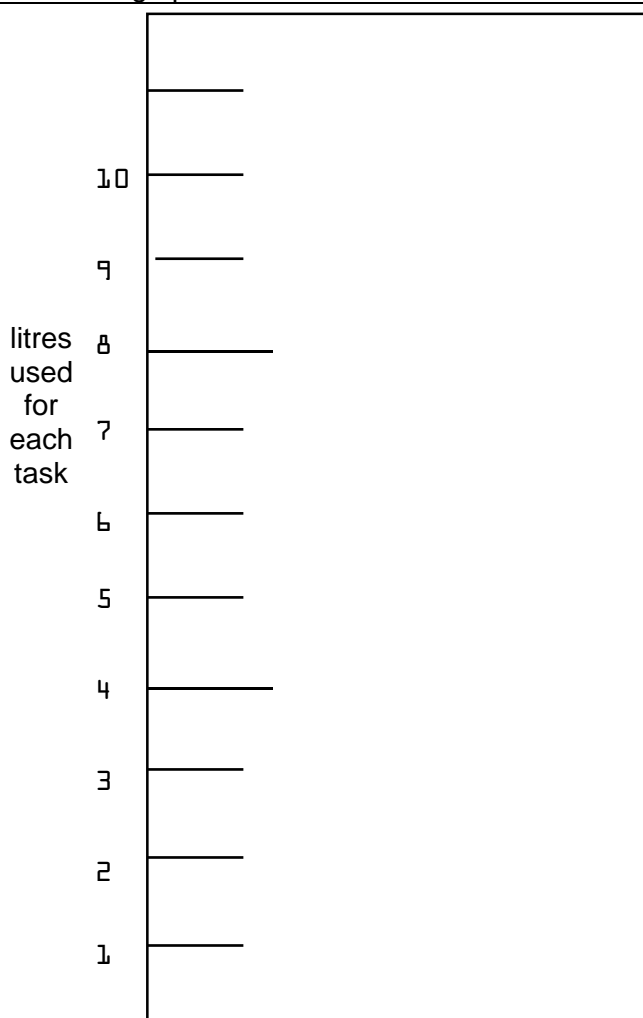
Could you use some water for more than one activity?

Which activities could you not do at all?

When your group has carefully decided how you would use 10 litres of water, colour in the water tub opposite using a colour code to show how much water you will use for each activity.

### Amounts of water used for different daily activities

A shower	18 litres
Filling a sink/bowl to wash dishes	5 litres
Filling a bath	50 litres
The washing machine uses	95 litres
Filling the kettle	1 litre
Daily drinking per person	1 litre
Water for cooking	1½ litres
Flushing the toilet	9½ litres
The average person in the UK uses 80 litres of water a day	



Put your colour code here:

## Water numbers: a water quiz

The following quiz would be suitable for some Year 3 children and for the majority of Year 4 children

- How much of the earth's surface is covered by water?
  - Half of the earth
  - Three quarters of the earth
  - One quarter of the earth
- How many people in the world do not have clean safe water?
  - One in every ten people
  - One in every four people
  - Everyone has clean safe water
- How many children die every day in the world because of diseases caused by unsafe water?
  - 10
  - 100
  - 2000
- Women in Africa and Asia often have to collect the water for the whole family carrying it for several miles. What is the weight of water that they often carry?
  - The weight of 4 bags of sugar (4kg)
  - The weight of your airport luggage allowance (20kg)
  - The weight of an elephant (5,220kg)
- How much money is needed to provide someone in Africa with clean safe water for life?
  - The cost of a bag of crisps (70p)
  - The cost of a pair of brand name trainers (£50)
  - The cost of a match quality football (£15)

### Answers:

Question 1: b

Question 2: b

Question 3: c Around 700,000 children die every year from diarrhoea caused by unsafe water and poor sanitation - that's almost 2,000 children a day

Question 4: b Carrying such weight often leads to back strain and injuries. It also takes so much time that girls are often not able to attend school

Question 5: c Just £15 can enable one person to access a lasting supply of safe water, improved hygiene and sanitation

### Suggested further activities and challenges based on the quiz.

How far and for how long can children walk around the playground carrying a weight of 20kg?

If every child in the class donated one week's pocket money to an organisation helping to provide people in developing countries with clean safe water, how much money could be collected?

For further statistics and information about water see:

[http://www.wateraid.org/international/what\\_we\\_do/statistics/default.asp](http://www.wateraid.org/international/what_we_do/statistics/default.asp)

	Knowledge and Understanding		Skills		Values and Attitudes
<input checked="" type="checkbox"/>	Social justice and equity	<input type="checkbox"/>	Critical thinking	<input type="checkbox"/>	Sense of identity and self-esteem
<input type="checkbox"/>	Diversity	<input type="checkbox"/>	Ability to argue effectively	<input checked="" type="checkbox"/>	Empathy and sense of common humanity
<input type="checkbox"/>	Globalisation and Interdependence	<input type="checkbox"/>	Ability to challenge injustice & inequalities	<input checked="" type="checkbox"/>	Commitment to social justice and equity
<input checked="" type="checkbox"/>	Sustainable development	<input type="checkbox"/>	Respect for people and things	<input type="checkbox"/>	Valuing and respecting diversity
<input type="checkbox"/>	Peace and conflict	<input type="checkbox"/>	Co-operation and conflict resolution	<input checked="" type="checkbox"/>	Concern for the environment and commitment to sustainable development
				<input type="checkbox"/>	Belief that people can make a difference

<b>Suffer the children</b>	<b>Numeracy Waste</b>	
<b>A numeracy activity comparing infant mortality rates for different countries and exploring the significance of water in these differences</b>	<b>45 mins</b>	<b>Year 5 and 6</b>

## **Suggested lesson structure**

### **Preparation**

The lesson could begin with looking at mental strategies involving multiplying and dividing numbers by 10 and 100 to understand the effect of doing so.

### **The main teaching activity**

This activity involves the application of calculation strategies for multiplication and division by 10 and 100 to real world statistics on infant mortality. The activity alerts children to the scandal of infant mortality and reveals the huge differences in rates between different parts of the globe. This provides a good starting point to explore reasons for high infant mortality rates in certain countries, the major reason being illness and disease which results from the lack of access to clean water and sanitation.

The mental or oral work focusing on the effect of multiplying and dividing a number by 10 and 100 should be a sufficient introduction to the main activity, though this could be recapped at this stage. The main purposes of the teaching session should be to introduce the concept of infant mortality and explain rounding up, particularly with regards to decimal places. One of the countries could be worked through as a whole group; a full list of infant mortality figures for each country in the world can be found at [http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_infant\\_mortality\\_rate](http://en.wikipedia.org/wiki/List_of_countries_by_infant_mortality_rate)

Whilst the activity can be completed using only multiplication and division by 10, children should be made aware that to get to an out of 10 000 figure from an out of 100 figure involves multiplying by 100 and visa versa involves dividing by 100.

**Less able children** could be given the figures for infant mortality rates out of 100 for each country and produce either a bar chart showing each country or a 10 x 10 cm square for each country where infant mortality figures are coloured in.

### **Plenary session**

Selected children should share their figures and explain how they obtained them. Less able children can show the class their bar charts or coloured squares.

Children should also be encouraged to express feelings about the infant mortality rates and discuss why they think certain countries have high or low rates. Whilst the significance of access to clean and safe water should be highlighted, there are other significant reasons that determine infant mortality rates and children should be encouraged to think about these too. For example famine or poor diet, the level of medical facilities, access to immunisation against killer diseases, climate specific diseases, e.g. malaria, HIV/Aids, war and conflict. Ultimately children should understand that it is poverty and global inequality that is the root cause of such differences in infant mortality rates around the world.

### **Infant mortality rates for different countries**

Infant mortality is a measure of the number of children who die before they reach the age of 5

Complete the table below showing infant mortality rates for different countries in the world. The figures given are the number of child deaths out of every 1000 children. Calculate each country's infant mortality figure out of every 100 children and every 10 000 children: **Some figures will need rounding up to the nearest whole number.**

How many continents are represented in this table of countries?	Country	Infant mortality per 100 children	Infant mortality per 1000 children	Infant mortality per 10 000 children
	<b>Brazil</b>		<b>21</b>	
	<b>Bangladesh</b>		<b>59</b>	
	<b>United States</b>		<b>6</b>	
	<b>Ethiopia</b>		<b>75</b>	
	<b>Afghanistan</b>		<b>122</b>	
	<b>UK</b>		<b>5</b>	
	<b>France</b>		<b>3</b>	
	<b>Jamaica</b>		<b>14</b>	

Using the information in the table consider the following questions:

Which country has the highest infant mortality rates?  
Which country has the lowest infant mortality rates?

Divide the countries into three groups: countries with high infant mortality, countries with medium infant mortality and countries with low infant mortality.

What factors do you think cause a country to have high or low infant mortality rates?

### **Of all the water in all the world**

#### **Aim of the activity**

This activity is designed to demonstrate the importance and worldwide scarcity of water as a resource. It can provide a good starting point for encouraging children to think of practical ways to take action at home or school to save water as well as providing application for numeracy knowledge and skills to a real life and global investigation. The activity could be used as a whole class demonstration/discussion lesson or delivered by a mixture of whole class teaching and group problem solving and investigation work.

#### **The activity**

Using a large measuring container or bucket pour 10 litres of water into the container. Explain to children that this represents all the water in the world.

Brainstorm with the children all the places on earth where water is found or stored (e.g. oceans, lakes, rivers, aquifers, wells, reservoirs, water tanks, ice caps etc.). Discuss which of these sources are available for human use such as drinking, cooking, washing etc.

Through discussion reach the conclusion with children that much of the world's water is largely unusable salt/sea water.

Ask children to estimate how much of the total water in the world they think is available for use by humans, i.e. how much of it is fresh water. They could express this as a percentage or fraction of the total. Ask them to translate this to the proportion of the 10 litres in the container, e.g. half equals five litres, 25% equals 2.5 litres etc. Reveal the true figure (just 3% fresh water). Ask children how much of the 10 litre total this is (300ml). Remove this amount from the 10 litre total using a measuring jug. Explain that of this 3% fresh water, 2% is frozen in the ice caps leaving just 1% (100ml). Pour 200 ml back into the larger container, asking the children first to calculate how much should be poured back.

Ask children to calculate from the representative total the volume of water available/unavailable for human use (100ml/ 9900ml or 9.9L), and also as a fraction (1/100th/ 99/100ths) and a percentage (1%/ 99%).

The comparison of the amount of available water with the amount of unavailable water can provide a good starting point for discussion:

- Consider the importance of using water sensibly, conserving it wherever possible
- The injustice of the unequal distribution of such a valuable and vital commodity where some have private swimming pools while others have to live on as little as 10 litres of water a day

Try to make practical use of the water at the end of the activity, e.g. for washing up or for watering plants etc!

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