

A3 ACTIVITY 2: VISUALISING: WHY SUSTAINABILITY? HOW MUCH FRESHWATER IS THERE?

Background

This activity complements **A3 ACTIVITY 1: VISUALISING: WHY SUSTAINABILITY? IS THERE ENOUGH LAND FOR EVERYONE?** The measures used are approximate ones but still within the same ratio frame and should illustrate how scarce freshwater is and why we need to be careful using it. The difficulty is in understanding, and appreciating, that the quantity of water on Earth is actually finite – there is no agency outside Earth waiting to replenish it – all our water is continually being recycled in various forms.

Equipment required:

- Empty container with a four-litre capacity, or
Four containers with a one-litre capacity each if a single container with a four-litre capacity is not available
- Two beakers, each with at least a 100 ml capacity
- Pipette and filler, or a large volume syringe
- Blue food dye
- A small amount of table salt
- Map of the world (marking the topographical features if possible)

What to do:

1. Print out copies of the map above and give one to each student, or use a large map for the whole class.
2. Fill the container with approximately four litres of water. Explain that this represents the total amount of water on Earth.
3. Using a pipette or a syringe, remove 90 ml of water, transfer it to one of the 100 ml beakers and set it aside.
4. Add a few pinches of salt to the water left in the large container. Explain that this water now represents the oceans, i.e. water not suitable for immediate human usage. (You can explain that some countries are investigating desalination processes but it is very expensive both financially, and in terms of energy consumption.)
5. Return to the 90 ml set aside (in step 3). Add a few drops of the blue food colouring to this water. Explain that this water represents freshwater...
6. **BUT** that not all this water is accessible. Using the pipette remove about 80 ml of the water and put it out of reach. This represents water trapped in glaciers or too deep underground to be accessible.
7. Explain that what remains in the 100 ml beaker represents the amount of water available for daily use by the entire planet, e.g. agriculture, potable water, industry, freshwater ecosystems.
8. Explain that forecasts indicate that the world population will reach 9.6 billion by 2050 but the quantity of water available for daily use will still be represented by the quantity left in the 100 ml beaker. Ask the question, Why is this?

Additional discussion:

1. Start a discussion on the issues of water pollution and how this will affect how much water is available for use.
2. Discuss water conservation. What can we all do to save water. Visit the [Irish Water](#) and [EPA](#) websites for more information.
3. Examine how much energy is used in the treatment of water.
4. Come up with a list of actions everyone can take to reduce pollution and save water.