

This activity is adapted with permission from Activity 3.4 in *Science DIY Kit: Water*, published by Scitech and supported by Water Corporation.
<http://www.scitech.org.au/education/at-your-school/diy-science/1602-diy-science-kits>

Outcomes

Students:

- identify the amount of water on Earth available for consumption, and
- visualise and understand the percentage of drinkable water on Earth.

Duration

- 20 minutes

Safety and disposal

- Do not drink water used in this demonstration. Dispose of water wisely.

Materials

- bucket
- water
- 5 beakers, various sizes
- measuring cylinder
- Pasteur pipette

Method

This is a teacher-led demonstration to showcase the availability of Earth's water supplies.

You may like to start this activity as a guessing game to see if students can predict how much water is available to drink, proportionally, when given an amount of water. Encourage students to discuss what water is used for, where we might find it and in how many different forms (states).

Introduce students to the concept of 'proportions'. What does this mean and why do we use them?

1. Fill a 10 L bucket with water. This represents all water on Earth.
2. Ask a student to remove the amount of water they think is fresh.
3. To demonstrate what the actual percentage looks like (3% of total water on Earth), use a container to take 300 mL of water from the refilled 10 L bucket. This represents the proportion of fresh water on Earth. Compare it with the student's estimate and what's left in the bucket.
4. Colour the 300 mL water sample to make it easier to see. Then divide it amongst 4 labelled containers to represent the amount of fresh water in each of the following: polar ice caps and glaciers, underground, permafrost, and finally surface water. Ask different students each time to guess the amount (you may need a second container containing 300 mL of water for the guesses).
5. The table below summarises how 300 mL of water should be divided up. A very small (<0.1%) proportion of fresh water is also present in the atmosphere.

Where does all the water go?

10 L	all of the water on Earth	100% of the total water on Earth
9.7 L	seawater	97% of the total water on Earth
300 mL	fresh water	3% of the total water on Earth



Divide up the 300 mL that represents fresh water:

300 mL	fresh water	100% of fresh water on Earth
204 mL	ice caps, glaciers	68% of fresh water on Earth
90 mL	groundwater	30% of fresh water on Earth
4.5 mL	permafrost (underground ice)	1.5% of fresh water on Earth
1.5 mL	fresh, liquid, surface water	0.5% of fresh water on Earth

Now we've discovered there isn't much surface water, ask students to:

- brainstorm how we use this water; and
- tell you what type of water is represented in the bucket we used earlier (salty water).

This has been a visual representation of the water that we have to use on Earth. Ask students to:

- explain why it is so important to save water;
- discuss what happens to fresh water once it disappears down the drain (It travels to oceans and rivers and becomes salty water.); and
- discuss whether there are ways to make use of other sources of water.

Explanation

Most of the water on Earth is salty. Humans can't use this water for drinking. Instead, we use fresh water. Unfortunately, only a small percentage of the total water on Earth is fresh. Of this, an even smaller amount is readily accessible surface water. Therefore, it's very important both to save the fresh water we have and experiment with ways to use salty water. Scientists have now developed desalination plants that remove salt from ocean water, making it appropriate to drink. Advances in technology have made this process much faster and more cost effective.

Real world relevance

Almost half of Perth's water needs in 2015 are supplied by two desalination plants (in Kwinana and Binningup). The balance comes from groundwater and surface water.