

Exploring reverse osmosis



Tap into water education

Lesson plan

Year levels: 7 & 8

Time: 2 x 90 minutes

Lesson overview

In this hands-on lesson, students will learn about reverse osmosis as a water treatment method and gain insight into its role in delivering clean, safe drinking water. They will create a 1-2 minute video explaining how reverse osmosis works and how it can help communities facing water scarcity.

Objectives:

- Understand and explain the process of reverse osmosis and its role in water treatment.
- Understand the importance of accessible clean water, and how it is a challenge
- Use technology (e.g., iPads, movie and editing apps) to produce and edit a television advertisement.
- Collaborate effectively in groups, practising teamwork and communication skills.

Materials (per group):

- iPads/computers (1 per group)
- Movie editing apps (iMovie etc)

Opening

Give students the following provocation:

Imagine you're stranded on a deserted island surrounded by the ocean. You're thirsty, but there's no fresh water source available. How could you possibly turn the salty ocean water into something safe to drink?

Explain to students that the process which removes salt from water and turns it into fresh water is called desalination.

Have a discussion with students about possible ways to achieve it. Examples might include:

- **Distillation:** boiling seawater then cooling the steam and collecting it as purified water.
- **Solar still method:** using sunlight to evaporate water, leaving salt behind and condensing the clean water into a container.

Write **REVERSE OSMOSIS** up on the board and ask students if they understand what it might mean.

Give students 10 minutes to research and make notes about how reverse osmosis works and how it could be of use to communities experiencing water scarcity.

Bring the class back to discuss their understandings.

You may also like to screen a video of the process:

Reverse osmosis – Adelaide Desalination Plant:
https://www.youtube.com/watch?v=iY_f_9NWiYA

Conclude by summarising how reverse osmosis is used in desalination:

Seawater is pushed through a semi-permeable membrane – a thin wall with lots of microscopic holes in it – under high pressure. The pressure forces the water through the tiny holes, but salt molecules and water molecules are different sizes. While salt molecules are too big to squeeze through the holes, the water molecules are small enough to pass through. This leaves the salt on one side of the membrane and fresh water on the other side.

Activity

Divide the students into groups of three or four. Explain that each group will create a 1–2 minute video that explains the process of reverse osmosis. The goal is to make the process easy to understand and visually engaging. Encourage students to get creative by using diagrams, animation or stop-motion techniques to explain the process visually.

Video requirements:

- **Engaging opening:** Begin with an attention-grabbing introduction that captures the viewer's interest.
- **Clear explanation of reverse osmosis:** Use visuals to show how reverse osmosis works. Consider using animated diagrams, labelled drawings or stop-motion models to illustrate the process step by step ("Water is pushed through a special membrane, filtering out salt and impurities to produce clean, drinkable water").
- **Well organised content:** Make sure the explanation flows logically from one point to the next. Start by explaining the problem of salt water or contaminated water, then introduce reverse osmosis, and finally, describe how the process works in simple terms.
- **Use of visuals and sound effects for emphasis:** Add elements such as water sounds (splashing, bubbling), background music, or visual effects like arrows pointing to key parts of the process to enhance the video's impact. Include diagrams, animations, or short clips showing real-world applications.

Recording and editing

- **Draft and rehearse:** Allow time for groups to plan their scripts, storyboard their visuals, and rehearse.
- **Record and create visuals:** Use iPads to film their ad and bring the visuals to life. They can:
 - Draw diagrams on paper or whiteboards and film step-by-step explanations.
 - Create stop-motion animations using clay models or drawings to show the water moving through the filter.
 - Use simple animation apps to add digital effects, such as arrows or labels, to their footage.

- **Edit the video:** Groups should edit their recordings to ensure their video is clear, engaging, and within the timeframe. Encourage them to add sound effects, background music and titles or captions for extra impact.

Reflection

Watch each group's video:

- Have each group present their video to the class.

Class discussion

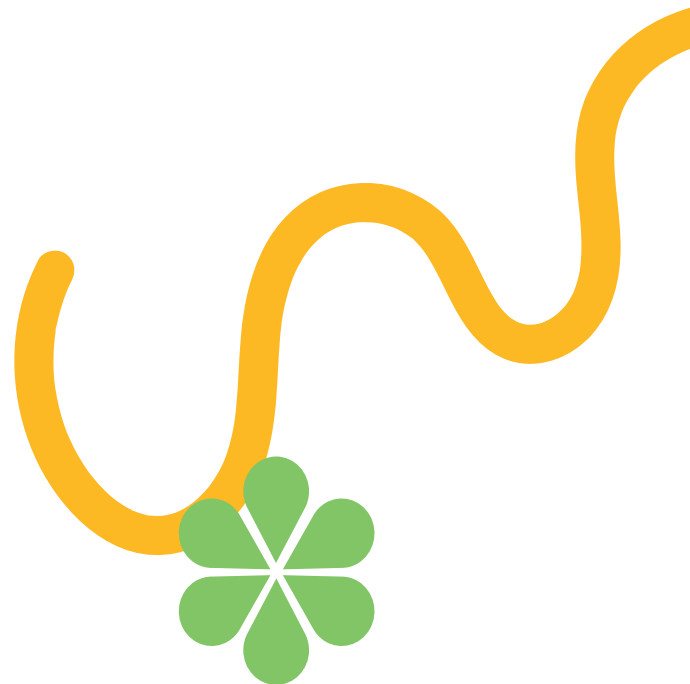
Guide the discussion with the following prompts to encourage students to consider the viability of reverse osmosis for solving real-world water challenges in communities experiencing water scarcity.

- **In what ways could reverse osmosis make a difference during times of drought or water restrictions in water scarce areas?**

Consider impacts to households as well as business, industry and agriculture.

- **What positive impacts could reverse osmosis have on the environment, especially in areas where fresh water sources are overused or polluted?**

Students to reflect on how reverse osmosis could help reduce the pressure on natural fresh water resources and allow them to replenish.



Curriculum connections

Science	
Year 7	<p>Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116)</p> <p>Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120)</p> <p>People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121)</p>
Year 8	<p>Chemical change involves substances reacting to form new substances (ACSSU225)</p> <p>Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE135)</p>
HASS (Geography)	
Year 7	<p>Classification of environmental resources and the forms that water takes as a resource (ACHASSK182)</p> <p>The way that flows of water connect places as they move through the environment and the way these affect places (ACHASSK183)</p> <p>The nature of water scarcity and ways of overcoming it, including studies drawn from Australia and West Asia and/or North Africa (ACHASSK185)</p>
English	
Year 7 & 8	<p>Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)</p> <p>Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable (ACTDEK032)</p>