



Practical investigation - Distillation

Learn how to get clean water with evaporation and condensation - distilling water from a solution. See how distillation can be used to provide us with alternative sources of water.

Need some lesson ideas? Our [High school](#) webpage has syllabus linked lesson plans to support this experiment.

Why do we distil water?

Water is an excellent solvent. It picks up particles, salts and minerals (solutes) as it flows through the water cycle. If there's too many solutes in water, we may not be able to use or drink it. Distillation is one separation technique that can give us clean water. Distillation involves:

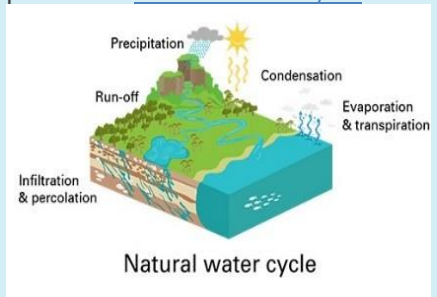
1. Evaporation, turning liquid into a gas (vapour).
2. Condensation, cooling vapour so it turns back into a liquid again.
3. Collecting the liquid that we evaporated and condensed, called the distillate.

If the distillate is water, it's called pure or distilled water. What remains are the solid particles and solutes like salts and minerals. This is because they need extremely high temperatures to evaporate or boil.

Distillation gives us the opportunity to make small amounts of clean water out of multiple water sources. This includes sources of water that aren't from rain, including seawater and wastewater. These are water sources which we couldn't clean using conventional methods like filtration.

Did you know?

Evaporation and condensation are part of the [Natural water cycle](#).



Did you know?

Distillation works great for small volumes but would take too long to produce millions of litres of clean water! We use membrane technology called reverse osmosis instead to remove solutes like salt. Find out more at [St Marys Advanced Water Recycling Plant](#).

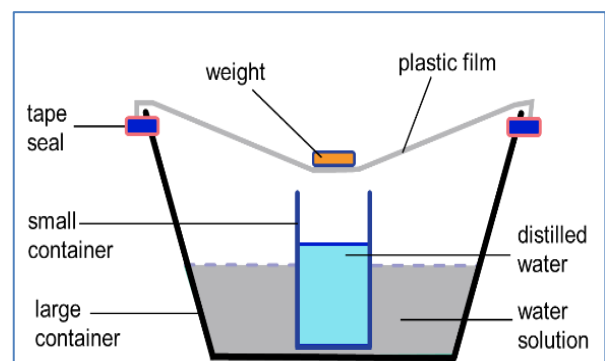
What you'll need?

Safety first! Adult supervision is needed. Follow all safety precautions as directed on product packaging.

- 1 large container - beaker, bucket, plastic pot, bin or food storage container
- 1 small container - smaller beaker, jar or cup
- 1 large sheet of clear plastic film - cling film, plastic bag, shower cap
- Tape or large elastic
- 1 weight - coin, stone, nuts and bolts
- Water solution of your choice

Did you know?

We have mock water sample recipes you can use for experiments like this one. You can find them on our [High school](#) webpage.



Example of experiment setup



Step 1



Step 5



Step 7

Activity

1. Gather your equipment together.
2. Place the small container in the middle of the large container.
3. Fill up the large container with some mock water sample. Be careful not to get any mock water sample in the small container.
4. Wrap the top of the large container with clear plastic film and seal with tape or elastic.
5. Place weight on the plastic film. Make sure the film is over, but not touching the small container.
6. Place the container in a sunny spot out of the way.
7. Be patient and record your observations.
8. Observe or examine the water collected in the small container.
9. Repeat the activity using other types of mock water samples (optional).

Extension Activities

- What happens if we use other types of mock water sample?
- How can you make your distillation device work faster?

Results

Write your observations in the table below:

| Time | Mock water samples and observations | | |
|-----------|-------------------------------------|--|--|
| | e.g. raw water | | |
| one hour | | | |
| six hours | | | |
| one day | | | |
| one week | | | |

Discussion

- What happens to the mock water sample when it is placed under the sun?
- What did you collect in the small container and how does it look?
- What is the purpose of the clear plastic film and the weight?

Want to know more?

Come behind the scenes with your school on a free excursion. See our [Excursion requests](#) webpage for more information. Proud of your results? We'd love to hear from you. Share with us using #sydneywatereducation.



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