Distillation

Specification reference:

- C1.1.2 Mixtures

Aims

This worksheet aims to improve students' literacy skills. After completing it, students should be able to explain why fresh water is a precious resource, describe the difference in composition between seawater and fresh water, and explain why drinking seawater can be fatal.
They should also be able to outline how desalination is carried out using distillation, and explain why limitations of the process mean that it is not widely used to obtain freshwater.

Learning outcomes

After completing this worksheet, students should be able to:

- understand that seawater is a mixture
- describe how freshwater can be obtained from seawater by distillation.

Teacher notes

In this reading comprehension activity students will learn more about distillation by exploring how drinking water can be obtained from seawater. The questions feature some of the key command words that students will encounter in their exams. The questions become more demanding and students could choose, or be asked to complete, only certain questions.

Answers

1 parts per million
2 removing salt from seawater
3 Aristotle
4 35:1, i.e. there is 35 times as much salt in seawater
5 100 – 96 – 2 = 2%
6 The water is heated until it boils. Then the water vapour is cooled and condenses to form pure water.
7 The water boils at a lower temperature than the usual 100 °C due to the lower pressure.
8 Distillation is expensive so the country must be very wealthy and have a seacoast. Also, only countries experiencing a water shortage need to use distillation.
9 Distillation requires a lot of energy. This can be obtained from burning fossil fuels, but when these fuels are burnt carbon dioxide, which is a greenhouse gas, is produced. Alternatively, the energy for distillation can be obtained from nuclear fuels. This would not produce carbon dioxide but public opinion is often against nuclear power stations.