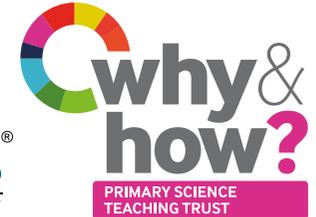




Clean me!

LINKED CHALLENGE

To create a filtration system to clean water



ACTIVITY OVERVIEW

Make a bucket full of 'dirty' water before the session. (Ideas provided in the resources list.)

Review the basics of a solution versus a mixture. In two clear beakers of water, add sugar to one and stir, and add paperclips to another. Ask children to talk to their partner about whether/how they could separate the materials that are in each beaker. Draw out key facts then add the contents of both beakers to the bucket.

Set the children a challenge: Each pair will have their own beaker half-filled with 'dirty' water from the bucket. On each table are tools/materials that they could use to 'clean' the water. Their challenge is to use some/all of these tools in a set time, to make their beaker of water as clean as possible. They need to decide the order of use, whether they want to use all the materials, and whether there are other tools they could try. Ensure you have discussed why the water will NOT be clean enough to drink at the end of the process.

After the set time, bring the group together to explain what they have 'cleaned' from their water and how they did this. Ask pairs to describe one of their processes in detail and why they used it, e.g. "Magnets were used to remove the paperclips because they are magnetic." Hand lenses should be used to decide which pair has 'cleaned' their water the most.

KEY FACTS/SCIENCE

Mixtures and solutions of solids and liquids can be separated in many ways, including filtering and sieving. Larger items can be picked out by hands and magnetic materials can be removed using a magnet. A *mixture* is a substance made by combining two or more different materials physically together without causing a chemical reaction. As such, the components are unchanged and the components can usually be separated again. Passing a mixture through a sieve will catch the largest particles. For those that are smaller, funnels and filter paper can be used. In both cases, the water passes through and the solid particles are left behind.

A *solution* is made by combining a *solute* and a *solvent*. A simple example is sugar dissolved in water: water is the solvent and sugar is the solute. Solutions cannot be separated using sieves and filters. If the water is heated until it *evaporates*, in this case the sugar is then left behind. The water could also be collected by distilling it - cooling it down from vapour back to liquid.

Bacteria and other microbes are microscopic and we will not have removed these. Some may be dangerous to health. Without proper water treatment our 'cleaned' water MUST NOT be consumed.

RESOURCES

One bucket of 'dirty water' (water, sugar, sand, soil, gravel, leaves, salt, paperclips)	Filter paper
Spoon/stirrer	Sieve
Beakers	Paper towels
Funnels	Magnets
	Hand lenses

Health and Safety:

Ensure no one drinks water that has been 'cleaned'.

QUESTIONS/FURTHER LEARNING

- What is a mixture and what is a solution?
- How can we separate each?
- What dangers are there in drinking water that has only been filtered?
- Why can't we see these hidden dangers and filter them out?
- Do you know how our drinking water is made safe?
- How can we save water?

Online supporting video:

<https://www.youtube.com/watch?v=RqWV7ozfFNQ>

