

Year 7 science

What is the difference between mixtures

Australian Curriculum links: Year 7 Science

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques (ACSSU113)

In this activity, students use simple hands-on tasks to explore their initial ideas about mixtures, solutions and suspensions. Many towns in Queensland depend on surface water sources for their drinking water and this 'raw' water must be treated to make it safe to drink. This activity simulates the types of mixtures that may occur.

The **Story of a river** demonstration is an effective way to 'set the scene' for this activity.

This activity can be run as a class demonstration, a group or a workstation activity.

Equipment

For the class

- map of a catchment for a town or city that uses surface water as its water source (preferably local)
- an enlarged copy of Resource 1

For each group

- cups, teaspoons, torches and substances (resource 1)

For each student

- a copy of predict–observe–explain (resource 1)

Preparation

Decide how you will organise this activity. It can be run as a class demonstration or as a group activity with workstations.


Activity steps

1. Ask students where their drinking water comes from. Using a map, explain that many towns and cities in Queensland (probably your town) drink water that is sourced from surface water sources e.g. dams, weirs and rivers. This source water comes from run-off after rain events and the water picks up all kinds of contaminants that need to be removed from the water to make it safe to drink.
2. Using the resource 1 worksheet, explain the three tasks in this activity. Ask students to predict what they think they will observe in each task and why they think that will happen. Students complete the 'predict' row on the worksheet.
3. Complete the tasks and finish the 'observe' and 'explain' rows on the worksheet.

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4. Discuss the observations and explanations as a class. The dirty water usually contains a mixture of broken leaves, sticks or detritus which float on the surface and heavier sand or small gravel that sink to the bottom. It may also contain fine particles of loam or clay that stay in solution for a while. The salt dissolves in the water, forming a solution, and the light from the torch shines straight through. The clay, however, takes a long time to settle and when the torch light shines through the mixture, the light tends to scatter; the clay mixture is an example of a suspension. Salt is soluble in water while clay is insoluble in water.
 5. Explain the scientific terms that a chemist uses to describe these different types of mixtures – solutions and suspensions. Ask the students to explain the differences between solutions and suspensions and devise class definitions. When talking about solutions, introduce the terms 'solute' and 'solvent'.
 6. Water sourced from rainwater run-off is a 'mixture of mixtures'. Discuss why understanding the different types of mixtures might be important if you wanted to treat 'raw' water from a catchment for drinking purposes.

Optional: Students work in groups to design a fair test to decide which of four common substances (e.g. sand, sugar and flour) are soluble and which are insoluble.

Resource 1 Predict (reason)–observe–explain

	Dirty water Add a teaspoon of dirt to half a cup of water.	Salty water Add a teaspoon of cooking salt to half a cup of water. Shine the torch through the cup of salty water.	Clay water Add a pea-sized piece of modelling clay to half a cup of water. Shine the torch through the clay-water mixture in the cup.
Predict What do you think will happen? Why do you think this will happen? Explain the reasons for your prediction.			
Observe What happened? Use words and pictures			
Explain Why do you think this happened?			