

# BREAKING IT DOWN

with Dr. Michelle Dickinson



## MIXTURES

Welcome to **Breaking It Down with Dr Michelle Dickinson**.

This worksheet is to help you to support your teaching (ako) after your students (taura) have watched the Mixtures episode. It contains a summary of the science knowledge (pūtaiao), experiment instructions, topics for further inquiry, and links to the NZ curriculum at levels 3-4.

Use this sheet alongside the video for the Mixtures episode of "Breaking It Down with Dr Michelle Dickinson" to help with your teaching around the science of molecules and mixtures. During the episode, Dr Michelle Dickinson will cover the basics of elements, compounds, mixtures and molecules, talk to chemistry researcher Dr Jadranka Travas-Sejdic, and conduct an experiment which students can follow along with.

For this session, your students will each need:

- Paper towel
- Water
- A few dark-coloured water-soluble felt tips, NOT permanent markers
- Notebook to draw in and write down their observations

### Achievement Aims

#### NZ Curriculum Strand: Material World

**Structure of matter (L3-4):** Begin to develop an understanding of the particle nature of matter and use this to explain observed changes

**Properties and changes of matter (L5):**  
Distinguish between pure substances and mixtures, and between elements and compounds

### Learning Outcomes

- Understand the differences between elements, compounds and mixtures
- Understand how molecules come together to form elements and compounds
- Conduct an experiment to separate out molecules in a mixture using chromatography

### BREAKING IT DOWN: Science of Mixtures

Stuff is made up of matter which is made up of atoms. A substance which is made from only one type of atom is called an element. Two or more elements joined together can form a molecule, which has properties that are different to the pure elements it is made from. For example hydrogen and oxygen join together to form water.

Mixtures are formed when two or more different substances combine without a chemical reaction occurring. We can usually separate a mixture back into its original components, for example a bowl of mixed candies can be separated out into their original types.

Solutions are a type of mixture where one substance is dissolved into another, for example salt dissolving in water (wai) to make salt water.

A compound is different from a mixture because in a compound a chemical bond is formed between the two substances, and the original materials cannot be separated out. An example of a compound is baking a cake - heat from an oven creates a chemical reaction which turns raw cake batter into cake, and the raw ingredients cannot be separated out.

## EXPERIMENT INSTRUCTIONS

### Experiment: Chromatography

- Using a felt-tip pen, draw a large spot (about the size of a large coin) at one end of a strip of paper towel. Black (pango) ink works best for this experiment, but brown and purple can also be used.
- Dip the end of the paper towel with the ink-spot lightly in water for a few seconds, then remove it.

- Wait 10 minutes. You should see that the ink travels up the paper towel with the water, and that as it does so, the black ink separates out into different colours.

### EXPLORE FURTHER

(Use these prompts to start a discussion or further inquiry on the topic of mixtures)

- Is a cup of tea a mixture?
- Why are rocks mixtures?
- What pure metals do we find in nature?
- How does dishwashing liquid clean oil off plates if it doesn't mix with water?
- Is slime a mixture?
- If a baked cake is a compound, does that mean that raw cake batter is a mixture?
- How do people come up with new paint colours?
- Is there a limit to how much salt will dissolve into water?
- Why do we make alloys?
- Are there metals which can't be combined together?

### FURTHER EXPERIMENTS & INFORMATION

Make your own slime!

Try different ways of separating out mixtures and solutions, such as by boiling, filtering or freezing them.



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