

EVERYDAY SCIENTISTS

— IN SESSION ACTIVITY

INTRODUCTION

Australian physiologist Professor Derek Denton was recognised as the world's leading authority on salt and water metabolism. He studied the way our bodies detect and balance salt concentration and water levels. His groundbreaking work revealed complex interactions between the organs of our body and our brains.

In this experiment you'll use a potato to discover how water moves in and out the cells of your body.

WHAT YOU'LL NEED

- 2 plastic tubs
- Salt
- Spoon
- Labels
- A few potatoes
- Knife

WHAT TO DO

Before the session...

- 1) Fill both tubs with tap water
- 2) Add salt to one of the tubs, stirring until it dissolves
 - *Use about 10g (or 1.5 teaspoons) of salt per 100ml of water*
- 3) Label the two tubs
 - *FRESH WATER*
 - *SALTY WATER*
- 4) Cut the potatoes into thick slices (as evenly as possible)
- 5) Wait for the EVERYDAY SCIENTISTS session to begin!

During the session...

- 1) Towards the beginning of the session, David will ask you to place half the potato slices in the FRESH WATER, and half the slices in SALTY WATER — follow his instructions at the appropriate time!
- 2) Place the tubs to one side...
- 3) Towards the end of the session, David will tell you that something has happened to your potato slices — that water has been moving around. He'll also ask you to make a prediction about what you think has happened to your potatoes.
 - *What do you think has happened to the slices of potato in the FRESH WATER?*
 - *What do you think has happened to the slices of potato in the SALTY WATER?*

After the session...

- 1) Pass the potato slices around the class. What has happened to them? How are they now different?
- 2) If you leave the potato slices to soak for another hour (or even two) the changes will be even more noticeable.

WHAT'S GOING ON

To understand what's going on in this experiment, the first thing you need to know is that living things are made up of cells. These are tiny little bags that contain a huge variety of different chemicals and molecules, including proteins, sugars, and — most importantly for this experiment — salt.

All cells have an outer layer called a cell membrane (plant cells have an additional outer layer called a cell wall — but that is science for another day!). Cell membranes are *semi-permeable* — that is, they allow some things to pass across them, but not all things. For example, water can easily slip through, but salt can't.

The next thing you need to know is that water will always move in a direction that dilutes a salty solution.

In the tub of FRESH WATER, the water inside the potato cells is a little saltier than the fresh water in the tub. As a result, water moves across the semi-permeable membranes *into* the potato cells. They cells swell up, and the potato slice gets a little stiffer!

In the tub of SALTY WATER, the water inside the tub is a lot saltier than the water inside the potato cells. As a result, water moves across the semi-permeable membranes *out* of the potato cells. They cells shrivel up, and the potato slices gets floppy!