

# Water movement in potatoes

Try this

*What happens when water moves into and out of potato cells?*

## You will need

1 medium sized potato  
knife and chopping board  
2 glasses or beakers  
sugar  
spoon  
kitchen paper  
water

**Note:** Ideally you should use distilled water for this experiment. If you don't have any, tap water will work.

## What you do

Cut at least 4 'chips' from the potato and remove any skin.

Put water into the glasses. Stir sugar into one of the glasses until you have a fairly concentrated solution. Put two or three of your chips into each of the glasses. You may need to hold the potato into the sugar water with the spoon.

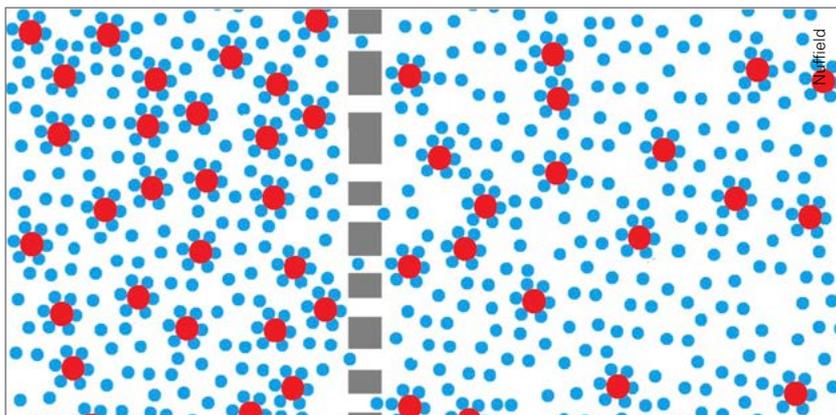
Leave the chips for about 40 minutes then remove from the solution and dry carefully with kitchen paper.

What do you notice about the potato chips from each solution?



## What's going on?

This is a special case of diffusion called osmosis. Water moves by diffusion across the cell membrane. The pores in the cell membrane are big enough to allow the water molecules to cross but are too small for the sugar molecules so the membrane acts like a sieve.



The blue circles are water molecules, the red circles are sugar molecules. The dashed line is the cell membrane with the pores.

You can see the water molecules have clustered round the sugar. This is due to weak bonds which form between the sugar molecules and water molecules. These bonds make it harder for water to cross the membrane. Water molecules pass through the cell membrane in both directions, but water can pass more freely from a dilute solution to a concentrated solution. In this diagram, in which direction will water move? Which way will it move for your potato chips? What effect will that have on the potato?

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*The potato at the end. One has swelled up with water, one has lost so much that it is really flaccid. Which was in the sugar solution? Answer opposite.*

Answer: The flaccid potato chip was in the sugar solution, the one which has swelled was in distilled water.