

Microbe Magic Experiments

<http://microbemagic.ucc.ie>

Healthy living – Is there a solution for everything?

Experiment 1:

What you will need

A clean glass jar or bottle with a tightly-fitting lid

200mls water

20mls cooking oil (any kind)

What to do:

- Make sure the jar or bottle and its lid are dry and totally clean (you can run them through the dishwasher or wash them well in hot soapy water and rinse very well in cold, clean water).
- Add the 200mls of water to the jar or bottle.
- Add the 20mls of cooking oil to the jar or bottle.
- Put the lid on tightly and shake the jar or bottle as hard as you can!
- What do you see?

What's happening?

Oil is hydrophobic which means it is 'afraid' of water. *Hydro-* is the Greek word for water and *-phobic* comes from the Greek word phobos which means fear. No matter how hard you shake, the oil won't mix or stay mixed with the water. Oil will always end up lying in a layer on top of the water.

So, the answer to the question "*Is there is a solution for everything?*" is No, as oil and water will not mix!

A lot of other substances do move into solution – try the following experiment (Experiment 2) to see how this happens.

Experiment 2:

What you will need

A clean glass jar or bottle

200mls water

Food colouring (any colour)

What to do:

- Make sure the jar or bottle is dry and totally clean (you can run them through the dishwasher or wash them well in hot soapy water and rinse very well in cold, clean water).
- Place the jar on a level, solid surface.
- Add the 200mls of water to the jar or bottle.
- Add two drops of food colouring to the water.
- Let it stand, do not touch the jar or bottle.
- What do you see?

What's happening?

When you add the food colouring to the water, it begins to diffuse, that is, it spontaneously spreads out and fills the entire space that the water occupies. You don't have to mix it or shake the water for this to happen, it just does it by itself. The food colouring will continue to diffuse until it has spread itself evenly around the water. The intense colour the drops of food colouring have when you first add them to the water end up a much lighter colour as they are diluted in the water.

Water molecules and the food colouring molecules (like all molecules) are moving all of the time. These movements are so tiny you can't see them even if you squint really hard! This movement is also responsible for the diffusion across membranes when your cells receive oxygen from your blood and carbon dioxide is removed. In biology, this process of diffusion is better known as 'passive transport' because it doesn't require any energy from the cells to occur!