



CONVECTION CURRENT IN A BOTTLE

Find out about convection in this cool experiment using coloured water in bottles!

YOU WILL NEED

- 4 identical empty glass or plastic bottles (wide mouth, about 1 ½ inches / 4 cm)
- Warm water and cold water
- 2 different colours of food colouring (yellow and blue work best)
- A playing card



WHAT YOU DO

Step 1

Add some yellow food colouring to two of the bottles and fill with warm water.

Step 2

Add some blue food colouring to the other two bottles and fill with cold water.

Step 3

Using a playing card to seal the mouth of one of the yellow bottles containing hot water, carefully place it upside-down on top of a blue bottle containing cold water. Remove the playing card slowly so the bottles are mouth-to-mouth.



This experiment must be done under the **supervision of an adult** to ensure safety when working with hot water.



Step 4

Using the playing card to seal the mouth of the remaining blue bottle, do the same as before and place it upside-down on top of the remaining yellow bottle and remove the playing card. Watch and see what happens!

THE SCIENCE BEHIND IT

When a bottle of the warm yellow water is rested on top of a bottle containing blue cold water, the water will not mix. However, when you place a bottle of the cold blue water on top of a bottle of yellow warm water, the cold water will sink and the warm water will rise, mixing to make green water!

This is a great way to show how convection works. Convection is the movement of liquid or gas caused by temperature, with hotter molecules rising and colder molecules sinking under the influence of gravity. When a liquid or gas is heated up, the molecules making up the liquid or gas get energy and start moving around faster. This leads to the molecules being further apart from each other than when it is cold, meaning density has decreased. Helium is a gas that is less dense than air, which is why balloons float upwards, and the same this is happening here; when water is heated up it expands, decreasing in density.

Because the warm yellow water is less dense than the cold blue water, it rises upwards. And so, when the hot water is on top the liquids will not mix, but when the cold water is on top the dense cold water will sink and the less dense warm water will rise, mixing to make green water! Therefore, convection allows heat to be transferred from a hot, less dense liquid or gas to a colder, denser liquid or gas.

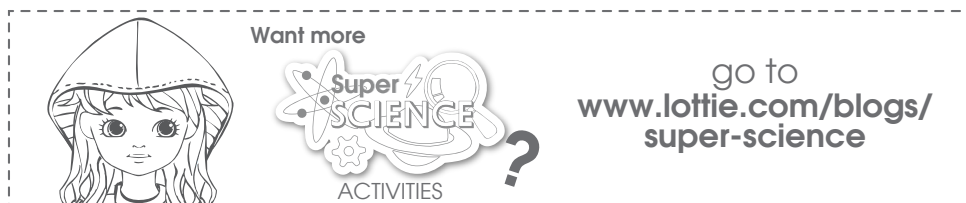


Photo Credits

- Convection current in a bottle : missmelissaprek-4.blogspot.com

