Water

What is it made up of?

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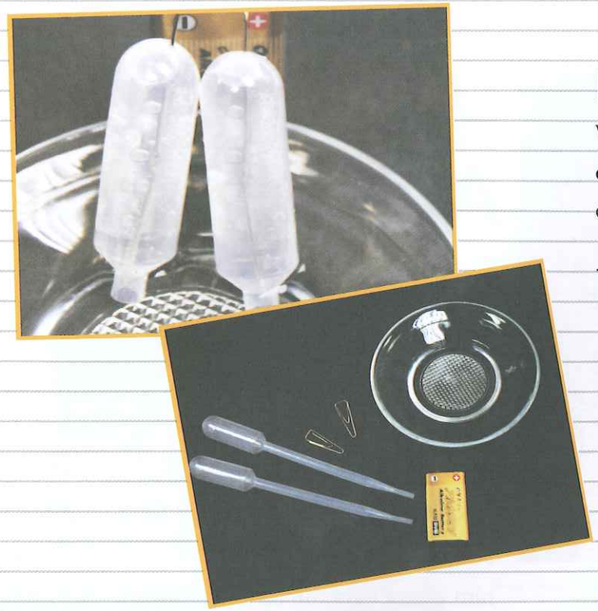
Water is an essential component of life. You can survive up to several weeks without food, but you will surely die within a few days without water. Why is water so important to us? Water is the medium for chemical reactions to take place in our body. It acts as a solvent (溶劑) and transports useful substances around the body.

In nature, water appears in three common states, namely gas (water vapour in clouds), solid (ice in glaciers or icebergs) and liquid (water in seas and rivers).

The Chemical Composition of Water

The chemical composition of water is relatively simple. It composes of two hydrogen atoms (原子) and one oxygen atom. Thus the chemical formula for water is H_2O.



Breaking Down Water

We can break water down into hydrogen and oxygen with electricity. This process is known as electrolysis (電解作用).

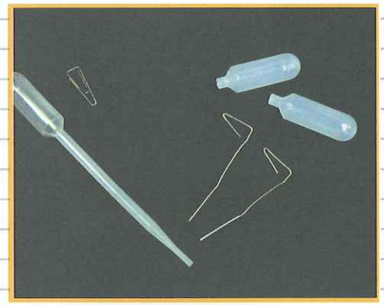
To do this experiment, you will need

- some water
- two metallic paper clips
- a 9V battery
- some vinegar (ethanoic acid) or table salt
- two plastic pipettes (移液管), available in most model shops
- a small dish

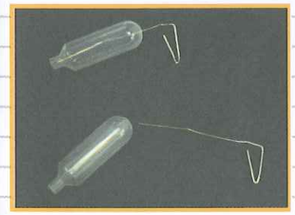
Steps

1. Put a small amount of water in the dish.

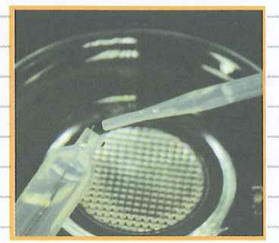
2-3. Add a generous amount of vinegar (or table salt) to the water to increase its conductivity (導電率).



4. Cut the two pipettes and straighten the ends of the paper clips, as shown in Picture 4.



5. Pierce (刺穿) the bulbs of the pipettes with the paper clips.



6. Fill the bulbs with some water from the dish.

7. Quickly invert the bulbs and put them in the dish, as shown in Picture 7.

8. Connect the other ends of the paper clips to the two poles of the battery. The process of electrolysis starts.

As electric current passes through the water, gases are generated. While hydrogen gas is generated in the bulb connected to the negative pole of the battery, oxygen gas is generated in the other bulb. The volumes of hydrogen gas and oxygen gas are in the ratio of 2 :1.