

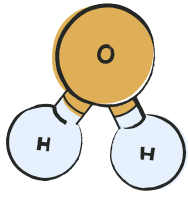
Activity Description

This is a group activity aimed at aged 8–11 pupils, but could also be useful for older students.

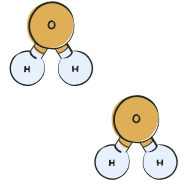
It consists of:

- A practical group activity where pupils simulate how both a fuel cell and electrolysis work
- A clear explanation of how a fuel cell works for teachers

Simulating Fuel Cells & Electrolysis

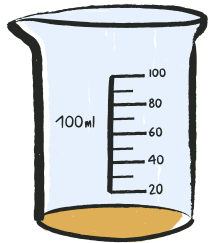


Fuel cells and electrolysis are often difficult processes to understand. This activity can be done in small groups or with a whole class to physically demonstrate what occurs during these processes, by assigning students to be different parts of a fuel cell/electrolyser.



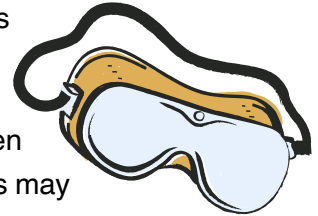
What are Fuel Cells and Electrolysers?

- Fuel cells can be difficult to understand because they involve a set of chemical reactions which change depending on the type of fuel cell used
- However, the processes that occur are the same across all fuel cell types
- Electrolysers are much easier to understand because only one chemical reaction occurs
- As the overall reaction in electrolysers is the reverse of in fuel cells, it is best to understand how an electrolyser works to help learn how a fuel cell works



How do Fuel Cells and Electrolysers Work?

- Electrolysers use electricity to split water (H_2O) into hydrogen and oxygen
- Electricity is a flow of electrons which causes the chemical reaction. This may be easier to explain as 'pockets' of energy for younger students
- Instead of electricity, fuel cells use a constant supply of oxygen and a fuel (usually hydrogen), which are each fed into different parts of the fuel cell (each known as an electrode)
- Depending on the type of fuel cell, hydrogen or oxygen releases an electron ('pocket' of energy) forming an ion
- The ion travels from one electrode to another through the electrolyte, whilst the electron travels through an external circuit, producing electricity
- The electrons recombine with the ions at an electrode and produce water!



What Roles Should I Assign?

- Electrons
- Electrolyte (acts as a barrier so ideally 2 students acting like a level crossing)
- Hydrogen
- Oxygen

What to do?

1. When hydrogen enters the fuel cell, it starts by holding onto 2 electrons
2. When the hydrogen meets the electrolyte (barrier) the electrons are released and they run around an external circuit (around the classroom)
3. The hydrogen is then let through the barrier into the electrolyte and across to the other electrode
4. The hydrogen ions, oxygen atom and electrons which ran around the classroom meet at the electrode to form water (H_2O)!

