

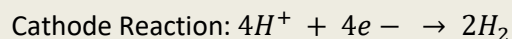
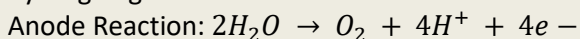
# Chapter 5: macroscopic aspects

## ACTIVITY 3 : Water electrolysis

### DOCUMENT 1: the electrolyser

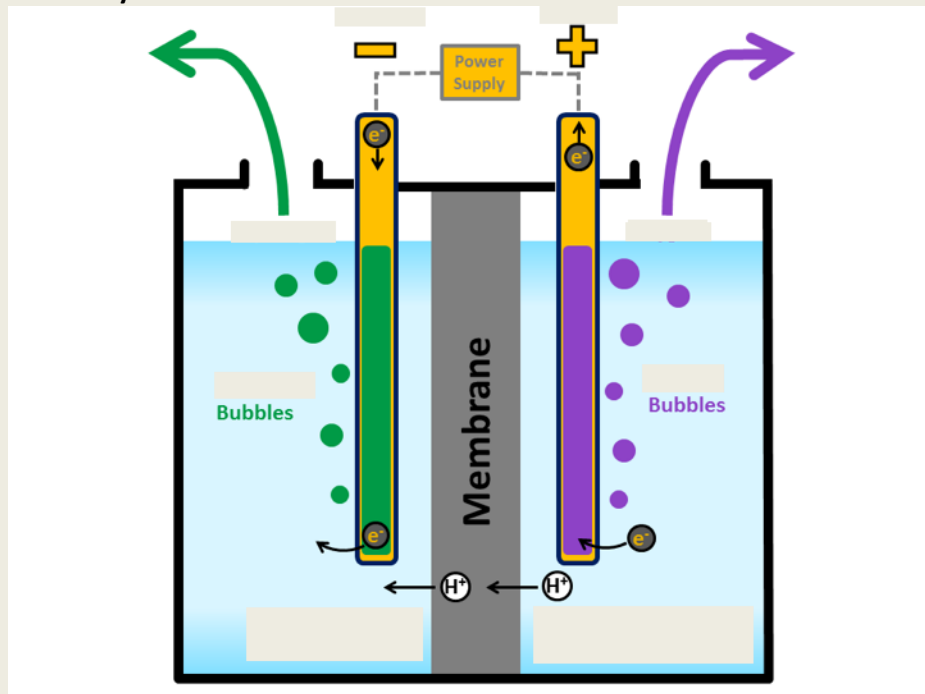
Electrolysis is a promising option for hydrogen production from renewable resources. Electrolysis is the process of using electricity to split water into hydrogen and oxygen. This reaction takes place in a unit called an electrolyzer. Electrolyzers can range in size from small, appliance-size equipment that is well-suited for small-scale distributed hydrogen production to large-scale, central production facilities that could be tied directly to renewable or other non-greenhouse-gas-emitting forms of electricity production. Like fuel cells, electrolyzers consist of an anode and a cathode separated by an electrolyte. Different electrolyzers function in slightly different ways, mainly due to the different type of electrolyte material involved.

Water reacts at the anode to form oxygen and positively charged hydrogen ions (protons). The electrons flow through an external circuit and the hydrogen ions selectively move across the membrane to the cathode. At the cathode, hydrogen ions combine with electrons from the external circuit to form hydrogen gas.



Source: <https://energy.gov/eere/fuelcells/hydrogen-production-electrolysis>

### DOCUMENT 2: Electrolyser scheme



Source: <https://energy.gov/eere/fuelcells/hydrogen-production-electrolysis>

**■ Acquiring vocabulary:**

English	French
renewable resources	
to split	
small-scale/large-scale	
fuel cell	
to combine with	

**■ Understanding the process**

Using document 1, label document 2 and write the reactions that take place at each electrode as well as the overall reaction:

## Activity summary

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What you must remember:

- Réaction spontanée
- Réaction forcée

Skills linked to the curriculum:

Compétences	Capacités à maîtriser
- APP	Identifier et/ou caractériser expérimentalement les espèces chimiques formées aux électrodes.
- ANA	Donner le principe d'une électrolyse. Représenter un électrolyseur en précisant la polarité, le nom de chaque électrode, le sens de déplacement des électrons, du courant.
- REA	Prévoir les réactions se déroulant aux électrodes et écrire les équations correspondantes, les couples redox impliqués étant connus
- COM	Formuler et argumenter des réponses structurées Formuler et présenter une conclusion