Student experiment (5th - 10th grade)	**Electrolysis of NaCl**	**Time:** max. 15 min.

Safety:

safety glasses

extraction hood

Do not breathe in the gas which is produced!

Instruments:

- glass ampules
- corks
- a knife
- a long nail (or a small hand drill)
- pencil lead
- copper wire
- flat 9 Volt battery
- tape

Chemicals:

- red cabbage indicator solution
- distilled water
- table salt

Experiment:

- Make sure that the cork will tightly close the glass ampule, so that no gases can escape.
- Shorten the cork by cutting it halfway between its two round ends, so that it is easier to drill through. Use a long nail (or a small hand drill) to drill two small holes through the cork - one for the piece of pencil lead, one for the copper wire.
- Mix concentrated salt solution and some red cabbage indicator solution in the glass ampule, so that a red color is visible.
- Cork the ampule tightly shut. Make sure that the pencil lead and copper wire are dipped in the liquid.
- Connect the graphite and copper electrodes to the 9V battery using additional pieces of copper wire. Connect the pencil lead to the positive battery pole and the copper electrode to the negative pole. Tape the connections if necessary.
- Observe carefully what happens in the glass ampule.

Observations:

The solution turns green, then after a short time it turns yellow. Gas is clearly emitted at both electrodes.

Results: The color change of the indicator reveals that the solution becomes basic upon application of an outside electrical current.
The following reactions occur at the electrodes:

$$2\ Cl^- \rightarrow Cl_2 + 2\ e^-$$ (oxidation at the anode)

$$2\ H^+ + 2\ e^- \rightarrow H_2$$ (reduction at the cathode)

Disposal: The liquid can be diluted and poured down the drain.
