

# CARBON DIOXIDE (CO<sub>2</sub>) AND OCEAN ACIDIFICATION

(Level: middle school to high school)

SUBJECT: CLIMATE CHANGE  
EXPERIMENTS TO DO IN CLASS

## 1. THE QUESTION

**Sébastien:** “Does the rise of atmospheric CO<sub>2</sub> have consequences for the oceans?”

To answer this question, the association Planète Sciences proposes the following experiment.

## 2. MATERIALS

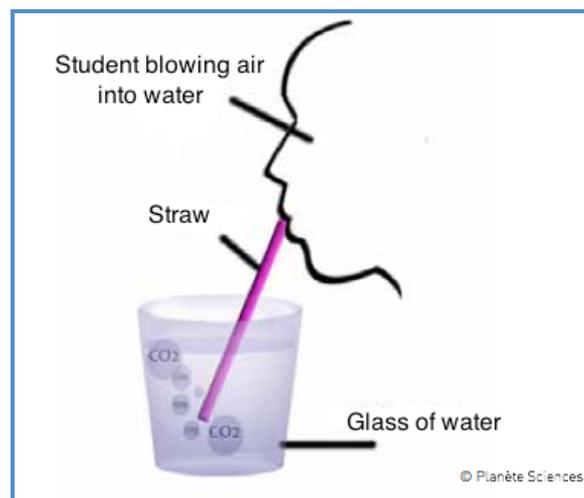
- Electronic pH-meter
- Water glasses
- Straws

## 3. EXPERIMENT

1. Pour some water into a glass and measure its pH (wait until the meter reading has stabilized).
2. Add carbon dioxide to the water by blowing through the straw into the water for at least 20 seconds.
3. Remeasure the pH of the water.
4. Follow a part of the Arctic food chain on paper:

Phytoplankton → krill → Arctic cod → Greenland seal  
↳ Polar bear

Water acidification clearly affects plankton and krill. What are the consequences for the rest of the food chain?



## 4. GOING FURTHER

Climate change is closely linked to the increasing “greenhouse effect.” This phenomenon (see Greenhouse Experiment) is in turn linked to the increase in certain atmospheric gasses. Carbon dioxide is a greenhouse gas that accumulates in the atmosphere and is also trapped by ocean waves – a chemical reaction between CO<sub>2</sub> and water leading to water acidification. In this experiment, we observed a decrease in pH, i.e. an acidification of water due to the introduction of carbon dioxide.

Water acidification can cause the reduction or disappearance of certain species in the food chain (like plankton and krill which are at the base of this chain) and may disrupt the total aquatic ecosystem. If plankton disappear, many fish species can perish through lack of food, which then affects larger predators (carnivorous fish, seals, polar bears). The goal of the *Tara Oceans* expedition is to study ocean biodiversity and to anticipate the effects of climate change.

*This experiment was designed by the association Planète Sciences.*

