



Experiment: Oceans acidification

Objective:

Understand the effect of increasing CO₂ levels in the oceans on marine life.

Background:

Carbon dioxide (CO₂) in sea water induces a chain of chemical reactions, indicated with the term “ocean acidification”, which have the effect of reducing calcium carbonate concentrations in the water. This molecule is used by many marine organisms use to build their shell or their exoskeleton.

Before starting, write down your hypothesis: what do you think will happen when we put an object made of calcium carbonate (e.g., shell) in an acid liquid? Write your idea below.

1) Procedure and observations - PART 1:

Pour some water into two glasses. Insert acidity indicators for few seconds in both glasses and write down the indicated values:

Glass 1: Glass 2:

Now, use the straw to blow air into glass 2 for 2 min (make bubbles!). How has the acidity changed there?

Glass 1: Glass 2:

What do you think has happened, and why?

3) Synthesis:

Initially, we blew into the water to introduce in it.

This made the acidity of the water change, in particular it

In contact with an acid, both the shell and the chalk

4) Interpretation

1. Why do we use an acid as strong as vinegar in our experiment? Are the oceans getting as acid?
2. If you have some time left, you could search on the web other effects of climate change on marine life. For instance: what is the cause of what we call “coral bleaching”? What is the effect of climate change on fishes respiration?

Materials:

- 4 glasses;
- Water and vinegar;
- Acidity indicators;
- 2 small shells;
- White chalks;
- 1 straw.

Group structure

Not more than 4 persons

- | | |
|------|---------------|
| 1-2p | experiment |
| 1p | documentation |
| 1p | presentation |

2) Procedure and observations - PART 2:

We saw that blowing into one of the glasses introduces CO₂, increasing water acidity.

Now, add some vinegar to glass 2 (more than the water). How does its acidity change?

Glass 1: Glass 2:

We are using now vinegar, which is a stronger acid, to simulate what happens to marine life over the course of some years.

Insert a shell in each glass and wait one minute. What do you observe (you can also draw)?

In order to see what happens to the shell over a longer period of time, we use now two pieces of chalk. Pour water and vinegar respectively in other two glasses and put a piece of chalk in each one of them.

Finally, ask your teacher to show you what happened to a shell immersed in vinegar for 2 days!