



Somewhere beyond the sea? The oceanic – carbon dioxide – reactions

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In correlation to climate change and CO₂ emission different campaigns highlight the importance of forests and trees to regulate the concentration of carbon dioxide in the earth's atmosphere. Seeing millions of square miles of rainforest cut down every day, this is truly a valid point.

Nevertheless, we often tend to forget what scientists like Spokes try to raise awareness for: The oceans – and foremost deep sea sections - resemble the second biggest deposit of carbon dioxide. Here carbon is mainly found in form of carbonate and hydrogen carbonate. The carbonates are needed by corals and other sea organisms to maintain their skeletal structure and thereby to remain vital.

To raise awareness for the protection of this fragile ecosystem in schools is part of our approach. Awareness is achieved best through understanding. Therefore, our approach is a hands-on activity that aims at showing students how the carbon dioxide absorption changes in relation to the water temperature – in times of global warming a truly sensitive topic.

The students use standard syringes filled with water (25 ml) at different temperatures (i.e. 10°C, 20°C, 40°C). Through a connector students inject carbon dioxide (25ml) into the different samples. After a fixed period of time, students can read of the remaining amount of carbon dioxide in relation to the given water temperature. Just as with every scientific project, students need to closely monitor their experiments and alter their setups (e.g. water temperature or acidity) according to their initial planning. A digital template (Excel-based) supports the analysis of students' experiments.

Overview:

What: hands-on, minds –on activity using standard syringes to exemplify carbon dioxide absorption in relation to the water temperature (Le Chatelier's principle)

For whom: adjustable from German form 11-13 (age: 16-19 years)

Time: depending on the prior knowledge 45-60 min.

Sources (extract):

Spokes, L.: Wie Ozeane CO₂ aufnehmen. Environmental Sciences. University of East Anglia, Norwich 2007.

Von Borstel, G. und Böhm, A.: Le Chatelier einmal anders, Gleichgewichtsverschiebungen am Kontext Sprudelwasser. Naturwissenschaft im Unterricht Chemie 6 (2006) H. 96, S. 34–37