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Ocean Acidification, Imminent Mass Extinction?

Guide for Curriculum Unit 18.02.02

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“Ocean Acidification, Imminent Mass Extinction?” is a unit for an Earth, Physical, or Environmental Science classroom. This unit is easily included in larger curricula focusing on climate change, the carbon cycle, human impact on Earth, or ocean chemistry. A backdrop for the unit is that ocean acidification may be jeopardizing global primary production because phytoplankton are being forced to adapt to a lower and lower pH. Loss of this piece of the food web has the potential to collapse massive, if not the most massive, ecosystems, hence mass extinction. Past mass extinction events are briefly discussed.

The unit begins by presenting the phenomenon of an ocean pH that is changing and then delves into the chemistry behind the change. The unit also considers the biological consequences of an ocean that is more acidic than it had been in millennia. Furthermore, implications to global carbon cycling are considered as the planet relies on microscopic ocean creatures to sequester carbon and transport it into long term storage. Lastly, the unit presents some recent research into the effects of the increased ocean acidity on an array of different organisms. Student activities are focused on hands on demonstrations that help students gain an understanding of pH; how pH is affected by carbon dioxide; and how shells are vulnerable to acidic conditons.

(Developed for Phy-Chem, grade 9; recommended for Earth Science, Physical Science, and Environmental Science, grades 9-12)

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