PUBLIC ENGAGEMENT OF EARTH SCIENCES: CLIMATE CHANGE AND OCEAN ACIDIFICATION

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ABSTRACT: Communicating scientific themes to society has been one of the major challenges faced by the academic community. In the field of Earth Sciences, educating people about the impact of human actions on climate is particularly important to make society aware and gain its support to build grassroots pressure for public policy changes. We thus adapted and successfully applied an interactive demonstration on the causes and effects of ocean acidification during the Science Night in Worcester (United Kingdom), on the 15th of March 2018, jointly organized by The Hive and the University of Worcester as part of the British Science Week. This presentation involved two main activities: 1) How atmospheric CO_2 affects ocean acidity, and 2) The Effects of Ocean Acidification on Marine Organisms. The first activity showed the effect of CO_2 emissions to the atmosphere on the pH of the oceans. We asked the visitors to blow for a few seconds through a straw into a partially covered test tube containing a mixture of deionized water and pH indicator and swirl it gently, inducing a color change in the solution. The participants were then asked to observe that change, compare with a pH scale and figure out what would it represent chemically, i.e., the more acidic conditions. Afterwards, a few milligrams of calcium carbonate powder were added to the test tube and the tube was swirled once more, inducing a further color change. The entire experience represented how atmospheric CO_2 increase either by natural (e.g. volcanoes) and/or artificial (human pollution) processes causes ocean acidification. The addition and subsequent dissolution of calcium carbonate represented the natural mechanism by which the dissolution of deep sea carbonate-bearing sediments buffers against ocean pH change on geological timescales. The second activity demonstrated why acidic ocean conditions may be deleterious for organisms which make calcium carbonate skeletons. The visitors were asked to place mollusc shells in beakers containing water (neutral pH) or white vinegar (low, acidic pH) and observe the effects that each liquid had on the shells: the shells under water, remaining intact, reflected an ideal oceanic condition, whereas the ones under vinegar started to dissolve, representing a highly exaggerated version of our future oceans. These techniques proved to be especially effective among adults and older children, but younger children nonetheless were also engaged and eager to learn what they can do to reduce CO_2 emissions.

KEYWORDS: PUBLIC ENGAGEMENT, SCIENCE COMMUNICATION, CLIMATE CHANGE.