

# Climate Change – Ocean Acidification



## Subjects

Earth Science

## Topics

 Environmental Studies   Natural Science  
 Health Education   Agriculture

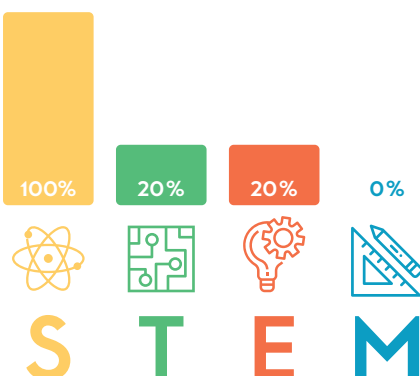
## Key Words

 Water   Acid   Ocean   pH  
 Climate Change   Ecosystem

## Connection to SDG



## STEM Chart



## Time for Activity

## 30 minutes

## Introduction

Since the Industrial Revolution, human activity such as the burning of fossil fuels, coal power plants has affected the climate. For instance, the emission of greenhouse gases has increased the Earth's temperature. The emissions from burning fossil fuels not only increases the greenhouse effect, but it also leads to acidification of our oceans. Carbon dioxide released into the air, dissolves in oceans and lakes, where it forms an acid. There is also a small contribution to this acidification from other compounds released from fossil fuels such as sulfur dioxide and nitrogen oxides. The acid changes the pH of the oceans affecting the health of the ocean ecosystem. In this activity, you will investigate how acidic water affects the eggshells, representing ocean organisms and limestone.

## Key Objectives

- 1 To test the pH of water and mixtures of water-acid
- 2 Observe the effects of acid on the ecosystem
- 3 Understand the scientific process e.g. observation and deduction
- 4 Understand the effects of climate change on water quality and on the ocean ecosystem both organic (plants and animals) and inorganic (rocks)

## Guiding Questions

- 1 How is acid rain formed?
- 2 What happens to the limestone and shells in the strongest acid?
- 3 What happens to the limestone and shells in water? What is a control?
- 4 How was the pH of the acidic solutions at the end?

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## Materials

- 1 Water
- 2 8 x Glass jars
- 3 Vinegar
- 4 Egg shells
- 5 3 x Small limestone
- 6 Litmus paper, or homemade pH indicators (turmeric, or red cabbage dye)
- 7 Tissues

## Tasks

- 1 Prepare a control, two jars with only water.
- 2 Fill the other 6 jars with water, half full.
- 3 Pour varying amounts of vinegar in the 6 jars, increasing the amount of acid for instance jar 1 (1/4 cup of vinegar), jar 2 (1/2 cup of vinegar) and jar 3 (3/4 cup of vinegar).
- 4 Measure the pH of the solutions.
- 5 Place the egg shells and limestones in 3 jars with the acidic solutions. Do you see anything happening in the jars, is it happening in all jars, and for all materials?
- 6 Observe the size and measure the mass of the rocks and shells over 3-4 days.
- 7 Measure the pH for the second time and compare with the last readings.
- 8 Record your findings.

## Safety

- 1 Follow laboratory protocol and COVID-19 protocol

