

Name: _____ Period: _____ Date _____

Ms. Randall Marine Science

Lab activity: Ocean Acidification

Background

pH is a measure of the acidity or alkalinity of a solution. Pure water is said to be neutral. The pH of seawater is about 8 but this varies slightly throughout the world. There is scientific evidence that suggests that the pH in our oceans is decreasing and therefore the oceans are becoming more acidic. The world's oceans currently absorb as much as one-third of all CO₂ emissions in our atmosphere. This causes the pH to decrease, resulting in the ocean becoming more acidic. This could have significant impacts on life in the sea.

For example, many marine species rely on calcium carbonate (CaCO₃) to build a shell or skeleton. One of the effects of increasing acidity is a reduction in the availability of carbonate. This means that any animal that produces a calcium carbonate shell or skeleton will find it much more difficult to do so. Organisms could grow more slowly, their shells could become thinner or they might dispense with shells altogether. It is difficult to predict the overall impact on the marine ecosystem, but many scientists fear that ocean acidification has the potential to decrease marine biodiversity on a very large scale.

A typical chicken eggshell consists of about 94–97% calcium carbonate, so this experiment uses chicken eggs to simulate the potential effects of acidity on marine animals. As with shelled marine animals, eggshells vary between different species and vulnerability to acidity will vary with shape, thickness, structure and so on.

Objective:

By the end of this activity, you should be able to:

- Understand about ocean acidification and the possible impacts on shelled marine animals
- Conduct an experiment that tests the effects of an acidic solution on eggshells.

Materials:

- 1 eggs
- 300ml beakers
- 250ml tap water
- 50ml vinegar

Procedure

1. With your lab group, watch the video clip [Ocean acidification](#).
2. Make a list of all the marine animals you can think of that have shells or skeletons made of calcium carbonate.
3. Set up and label your beaker: Create an acidic solution by mixing 100ml tap water and 50ml vinegar.
4. Record the pH
5. Take the mass of your egg and record in the data table.
6. Carefully place your egg into the beaker. Record any observations.
7. Leave the beaker in a cool area for 24 hours.

Day two:

8. Record the pH
9. Lift the egg carefully out of the solution.
10. Take the mass of your egg and record it in the data table.
11. Carefully touch the egg. Record any observations.

Data:

Observations Day 1

Observations Day 2

Initial mass	_____
Initial pH	_____
Final mass	_____
Final pH	_____
Change in mass (final-initial)	_____

Analysis questions:

1. What did the acidic solution represent?
2. How do you think ocean acidification might affect marine animals with shells?
3. What about those with skeletons?
4. How do you think ocean acidification might affect the marine food web?
5. Is there anything we can do to reduce ocean acidification?