**Swimming In Acid??**

**Question**

How will the changes in ocean chemistry affect the animals that live there?

**Background info**

Many scientists around the world are concerned with global warming and climate change. Global warming is defined as the increase in the average measured temperature of the air and ocean layers closest to Earth's surface. Climate change is defined as any long-term significant change to the average weather that a given region experiences. The causes of warming remain an active area of research. However, one theory is that present global warming is due, in part, to an increase in greenhouse gases, such as carbon dioxide (CO2), since the start of the industrial revolution.

Earth is protected and kept warm by our atmosphere, which is made up of several layers. Adding more carbon dioxide to a layer allows that layer to absorb more radiation or heat energy so the layers from which most of the heat energy used to leave Earth is becoming warmer, sending more of the heat energy back to Earth. This means that the energy can't leave Earth. Therefore, the planet then takes in more energy than it emits, meaning it gets warmer.

One resource that has prevented some of the CO2 from entering the atmosphere is our oceans. Oceans absorb about one-third of the CO2 emitted. However, this comes at an environmental toll - a process called ocean acidification. As CO2 dissolves in seawater, the pH of the water decreases. As the pH decreases, the water becomes more acidic.

This is bad news for marine animals such as corals, calcareous phytoplankton, mussels, snails, sea urchins and other marine life. When the oceans became more acidic it starts to dissolve the shells of these creatures and that is what I am testing in my experiment.

**Hypothesis**

If I increase the level of pH of the ocean water (make it more acidic), then it will increase the rate at which the shells and other marine species will dissolve and reduce their weight.

Abstract

The oceans are a precious natural resource, part of Earth's carbon cycle. But what happens if the oceans absorb too much carbon dioxide? Many scientists are concerned that the increased absorption of carbon dioxide is causing them to become more acidic. What impact does that have on the marine life? In this ocean science fair project, you will demonstrate ocean acidification and investigate the effect on the shells of marine life.

**Variables**

* Level of pH (independent variable)
* Weight of the shells (dependent variable)

**Experiment procedure**

**Materials**

1. **Sea water**
2. **pH testing kit**
3. **pH up and down kit**
4. **Plastic gallon bags**
5. **Shells different shapes, sizes and species**
6. **Digital scale**
7. **Eye dropper**

**Preparing/collecting the sea water**

1. **I collected 6 gallons of sea water from Mackworth Island, Maine.**
2. **I began testing the pH of my water. The pH level in the unmodified ocean water was 7.9. This will be my control.**
3. **I decided I wanted to have 6 different pH levels. The levels are 7.9 (control), 7.0, 6.5, 6.0, 5.5 and 5.0.**
4. **Then I labeled gallon freezer bags with the 6 different levels.**
5. **Using the pH kits I changed the ocean water pH to one of the 6 levels then poured it into the corresponding bag.**
6. **I did this with all 6 levels then set the bags of water aside.**

**Preparing the shells**

1. **I collected 7 different kinds of sea dwelling organism’s sand dollars, coral, mussels, sea urchins, oysters and lobsters from different beaches in Maine.**
2. **I broke all the oysters and mussels shells into fragments about the size of a silver dollar.**
3. **Then I labeled the fragments with a letter.**
4. **Then I weighted them with my scale and recorded the results in my notebook.**

**Final steps**

1. **I placed the weighed and labeled shells into the bags of sea water and placed them into a safe and undisturbed place.**
2. **Now I will weigh the shells every 1 week and record the difference from their original weights.**