Name:_____Period:____Date:_____
**Virtual Ocean Acidification**

Link: <u>Acid Ocean</u>

 **Purpose:** Acid Ocean is an inquiry-based virtual lab designed to investigate how ocean acidification could impact marine organisms.

**Objectives**:

1) Students will be able to explain how increasing levels of carbon dioxide in the air is resulting in the acidification of our oceans.

2) Students will analyze authentic research data and measure changes larva to see possible effects of climate change.

**Vocabulary:** hypothesis, pH, acid, base, reactant, product, scenario, replicate, standard deviation

**Procedure:** Use the virtual lab to answer these questions

<u>Part 1</u>

1. What does the graph of data from the Moana Loa lab indicate about the level of CO2 in the atmosphere in 1960 compared to the present?

2. The more concentrated the carbon dioxide in the atmosphere, the more CO2 will dissolve in the oceans, and the more acidic the oceans will become. That means that the pH will be:

    a) lower     b) higher     c) remain the same

3. On the pH scale: _____ is neutral. The most acidic is _____. The most basic/alkaline is _____.

4. The chemical equation $CO_2 + H_2O \longrightarrow H_2CO_3$ shows the reaction that influences ocean acidification. Here is the equation in words: Carbon dioxide + water produces carbonic acid.

What is/are the reactant(s)? _____

What is/are the products? _____

5. Please use the page "Exploring carbon levels and effects" to answer these questions.

- How old will you be in 2050? _____
- The most pessimistic scenario predicts an ocean pH of _____ in 2050.
- The most optimistic scenario predicts an ocean pH of _____ in 2050.
- What things will determine which scenario will be correct?


6. Use the drawing of the ocean chemistry "Carbon in water" to predict the effect of increasing acidification on calcifying organisms.

## Part 2

Procedure: List your data and the complete data set in the charts below.

**Your data**

|  | pH 7.7 | pH 8.1 |
|---|---|---|
| **Replicate A** |  |  |
| **Replicate B** |  |  |
| **Replicate C** |  |  |
| **Average** |  |  |
| **Standard deviation** |  |  |

|  | Your data | | Complete data set | |
|---|---|---|---|---|
| **Treatment** | pH 7.7 | pH 8.1 | pH 7.7 | pH 8.1 |
| **Average** |  |  |  |  |
| **Standard deviation** |  |  |  |  |

1. Please explain the importance of the data in this experiment.
   How do the arms of the larva in pH 7.7 compare to the larva in 8.1? Why might it be significant that larva in one group have shorter arms than those in the other group?

2. What can we do to decrease the trend of acidification in the world's oceans?