WebQuest **Name:** _____

Ocean Acidification: Is There a Problem?

This WebQuest will guide you as you review information and gain a better understanding of Ocean Acidification. Begin your quest by using the resources listed below to answer the following questions:

1. Watch the MBARI video on Ocean Acidification (5½ minutes)
   Life on the edge: Is ocean acidification a threat to deep-sea life?
   http://www.youtube.com/watch?v=Wyvc_r_0HgA&feature=plcp&context=C4e44f6aVDvjVQa1PpcFMfS8mKF4LUq6wN2VUN_NgndMvWShLfpLM%3D
   a. *Sum up what you have learned.*

2. Keeling's Curve:
   Go to http://earthobservatory.nasa.gov/IOTD/view.php?id=5620
   a. *What is Keeling's Curve?*
   b. *Interpret the data from Keeling's Curve.*

3. Acid Rain in Terrestrial Environments:
   Go to the following websites before answering questions.
   * http://www.epa.gov/acidrain/effects/surface_water.html
   * http://www.jstor.org/pss/2269380 (just an abstract)
   * http://www.physics.ohio-state.edu/~kagan/phy367/P367_articles/AcidRain/effects-on-lakes.html
   a. *What is acid rain?*
   b. *How does acid rain affect terrestrial environments?*
   c. *How does acid rain affect aquatic organisms?*

4. Fabry's Surprising Discovery on Pteropods
   Go to either of the two following websites before answering questions 6-7.
   * http://www.es.ucsc.edu/~silab/biocomplex/Henderson_Ocean%20Acidificat.pdf
   * http://staff.washington.edu/hodin/pdf/DarkeningSea.pdf
   a. *What was Victoria Fabry's surprising discovery about pteropods?*
   b. *What hypothesis did Fabry develop as a result of her discovery?*

5. Oysters in Washington State
   Go to: http://seattletimes.nwsource.com/html/localnews/2009336458_oysters14m.html
   a. *What happened to the oysters in Washington?*
   b. *Why should we be concerned about this oyster incident?*

6. Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean:
   http://www.mbari.org/wp-content/uploads/2016/01/OceanAcidification_1-14.pdf
   a. *Who/What may be affected by the change in seawater pH and how?*
   b. *What are the four general effects on organisms through the changes in pH?*
   c. *Are all four of these effects "negative"?*

Education and Research: Testing Hypotheses

7. MBARI: Listen to the audio podcast from the researchers and answer the following questions:
   * http://www.kqed.org/a/quest/R808110833 (6 minutes)
   Dr. Jim Barry:
   a. *What is a question that Dr. Barry is concerned with exploring?*
   Dr. Peter Brewer:
   b. *What experiment is going on deep in the ocean?*
   c. *How are MBARI scientists keeping some variables in check?*

8. Pteropods are a favorite food of which species? (Find a picture of a food chain with salmon and pteropods and include it with your webquest).
9.
10. Read the Emerging Science of a High CO2/Low pH Ocean Project Overview: http://www.mbari.org/science/seafloor-processes/emerging-science-of-a-high-co2low-ph-ocean/ for information on the Monterey Bay Aquarium Research Institute's High CO_2 Low pH science project.
    a. *What is the purpose of this project?*

11. Watch the following MBARI YouTube video (about 1:30) http://www.youtube.com/watch?v=ApEt6Ouq_4M&lr=1 (there is no audio so make sure you read the info below the video).
    a. *What surprised you from the experiment set-up?*

12. Go to http://oceanacidification.nas.edu/?page_id=36 and read either interview with the scientists (Dr. Jim Barry from MBARI or Dr. Joanie Kleypas from the Institute for the Study of Science and the Environment).
    a. *Identify which scientists you picked and why.*
    b. *What did you learn about ocean acidification from the interview?*
    c. *What are you still curious about after reading the interview?*

13. Ocean Acidification may be a new topic in the mainstream media, however, there has been interest in the scientific community for some years. The international community held a symposium on the topic in Monterey in September of 2012 (others were held in 2004 and 2008). Go to http://www.highco2-iii.org/main.cfm?cid=2259 .
    a. *Look over the ten topics that will be presented. Which one(s) most interests you and why?*

14. Go to http://coastal.er.usgs.gov/ocean-acidification/
    a. *Why is it important to study ocean acidification?*

15. Go to http://pubs.usgs.gov/gip/122/pdf/gip122.pdf
    a. *Look over the three postcards and then explain the possible impacts of higher CO_2 in:*
       - *Temperate marine ecosystems?*
       - *Tropical marine ecosystems?*
       - *Arctic marine ecosystems?*