

## **The Impact Of Carbon Dioxide On Our Shell Fish**

### **Lesson Rational and Context:**

Through student's discussion, students have learned about the effect of global warming. Students will participate in science experiment to analyze how the effects of greenhouse gases ocean and the food sources (shell fish). The data is captured from the Carbon Observatory Satellite, The Pace Satellite.

### **Grade 5-6<sup>th</sup>**

**Science** ESS3.C: Human Impacts on Earth Systems

**Interconnected** NJSL - English Language Arts. W.2.8

**Goal Statement. What is the effect of global warming on the ocean and the shell fish that live there**

### **Lab Materials:**

Oyster shells

Magnifying glasses

Beach sand

Play Sand

Clear plastic cups

pH test strips and instructions

Doppler

Vinegar

Carbonated water (club soda and seltzer water)

Distilled water (control group)

Water Samples (Hackensack River, Sandy Hook, Tap Water, Local Pond)

Ipads

Pencils

Pens

Poster paper

Extra paper for writing notes

Clear tape

### **In the beginning of Class Starts:**

Prepare videos, and labs material. Power Point - **What is Plankton** to take a look at what sea life is found in the ocean. The Ocean's Green Machine video will be used to show students what lives and grows in the ocean.

**Discussion Questions:**

Explain: What is the effect of increase CO<sub>2</sub> from atmosphere on the ocean? How does it affect the temperature of the ocean? What is the effects on the plankton that grows in the ocean?

**Explore:**

Start with a KWL Chart to collect information about student's knowledge of what is the effects of the Global warming on the earth and the ocean. To peak student's curiosity the students will participate in filling in the detail under knowledge of the topic and What they want to know. Next the students will pre-test their knowledge and understanding the NASA Global Climate Change Quizzes on Atmosphere and Hydrosphere. The students will then discuss the results of the questionnaire. Next, the students will view video. **The Ocean's Green Machines** and Power Points **What is Plankton**. After the video quizzes. The students will be asked to write a summary on the video and questionnaires to and answer what is our role in the impact of the Increase the CO<sub>2</sub> gases on earth.

*Discussion Questions for student to considers:*

**Students will be asked to develop a hypothesis on how to the** research and answer these questions to understand how greenhouse gases plays an important role on the temperature changes in the atmospheres. What is the human role in the impact of the increase of the CO<sub>2</sub> Gases on the ocean, plankton, and the food chain in the ocean?

**Evaluate:**

The students will participate in a science project to determine what is the human roll in effect and impact of CO<sub>2</sub> on the environment, how the data is collected and what must be done to change the increasing heating up of the earth.

Provide students with written instruction on how to set up lab manual and collecting data

Divide students in to small groups.

Give students oyster shells and magnifying glasses to make notes on their observation of the shells to identify characteristics and functions of the shells.

### **Engage:**

Students will investigate what the increase CO<sub>2</sub> will have on the ocean pH and the shells.

The students will start to develop an understanding of how the effects of the greenhouse gases has a direct impact as a result of human behavior. Through a prequestionnaire and KWL, the students' knowledge of the topic will be gathered. The students will take some quizzes on NASA the website (NASA Quizzes: The Ocean, Carbon, Sea Salt, Sea Change)

Students will take notes on the discussions and the results of the quizzes. The results of the quizzes and the science experiment will answer the learning in the KWL

Students will work on the lab experiment to test the pH in all of the samples (waters, vinegar, carbon water, saltwater, ocean water, sand and water, distill water)

Student will compare the results their lab result of the pH testing on water samples

Explain to the students what is the different between the acid, base and chemical reactions.

### **Explain:**

What is the effect of CO<sub>2</sub> on the earth atmosphere? How does it affect the temperature of the ocean? What is the effects on the food we get from the ocean?

### **Formal and Informal Assessment:**

Review the data, document the results, complete diagrams on the color changes and results, list all additional questions that might come up as a result of the testing and compare notes with the other groups. Explain and report results to peers and present the chemical changes which occurs using a scatter plot graph to highlights the variation of pH across the samples.

The students will be graded on sharing their information using a graph organizer to share their thoughts with the class on the process and procedure of the experiment.

**Elaborate:** Each group will review their peers research and provide comments. The students will have a chance to design diagrams and pictures to refer to the color changes and to explain the results they received from the pH test and observations of the shells.

**Modification/ Accommodation:**

Allow extra time if needed, provide translation if needed. Review instructions, and provide and post instructions.

**Resources**

Patrick Lynch Article NASA releases eye popping view of carbon dioxide (Orbiting Carbon Observatory Satellite)

NASA Earth Science Week: The Ocean's Green Machine

[https://www.youtube.com/watch?v=H7sACT0Dx0Q&feature=emb\\_logo](https://www.youtube.com/watch?v=H7sACT0Dx0Q&feature=emb_logo)

My NASA Data Plankton Power Point

<https://mynasadata.larc.nasa.gov/lesson-plans/introduction-plankton>

NASA Global Climate Change Quizzes: The Ocean, Carbon, Sea Salt, Sea Change

[https://climate.nasa.gov/climate\\_resource\\_center/interactives/quizzes](https://climate.nasa.gov/climate_resource_center/interactives/quizzes)

Science Daily- Ocean Acidification puts deep-sea coral reefs at risk of collapse. [www.sciencedaily.com/releases/2020/09/200917105321.htm](http://www.sciencedaily.com/releases/2020/09/200917105321.htm)

NASA Earth Science Week: The Ocean's Green Machines.

<https://youtu.be/H7sACT0Dx0Q>

Ocean Acidification <https://youtu.be/kxPwbhFeZSw> North Carolina Aquarium

Universal Indicator pH Color chart

<https://www.middleschoolchemistry.com/lessonplans/chapter6/lesson10>

