

Ánimo Leadership Charter High School 2011 QuikScience Team

Lesson Plan:

Hydrostatic Pressure: JOIDES Resolution Drilling

Written and taught by the ALCHS QuikScience team for Ánimo 11th Grade Physics

Grade Level: 11th

Subject: Hydrostatic Pressure

Duration: One class period 50 min.

Group Size: 25-30 students

Number of Classes: 6

Introduction:

*We will inform the students about the process of acquiring the microbes from under the sea floor using drills from the JOIDES Resolution while simultaneously giving instruction on Physics components.

Setting the Scene:

*As students listen to our presentation on the JOIDES Resolution and the drilling operation they will acquire knowledge and be encouraged to draw connections between their current studies in Physics with real world research of microbes. We will inquire their prior knowledge of pressure and fluids and understanding of the current issues that directly relate to microbe activity, such as the Oil Spill.

Brainteaser:

*Students will partake in a group discussion (four students per group) to brainstorm ideas on what they believe microbes' roles in our lives are. Students will discuss and hypothesize on how microbes may have a positive impact on our daily lives or a negative one. Students will then compare their hypothesis with actual facts we present to see if they are similar.

Hook:

*We will set up a wall space where we will have the Physics professor stand against and have two student volunteers outline his body with "microbes". This will demonstrate the idea that microbes are the basis of human existence and set the platform for our presentation.

Learning Objective:

*Students will learn about the JOIDES Resolution as well as the microbe *Alcanivorax Borkumensis*. They will learn how these microbes convert hydrocarbons into usable energy and will be encouraged to view microbes as helpful substances that are necessary for our survival.

Technology:

LCD Projector for QS conducted PowerPoint.

Student Presentation:

Hydrostatic Pressure: JOIDES Resolution Drilling

1. We will present the PowerPoint that contains information and diagrams about the JOIDES Resolution and *Alcanivorax Borkumensis*. It will include a description of how the Drilling Derrick functions. At the end of our presentation we will distribute brochures and hold a Q & A.

Activity Before Concept:

Students will be given one practice problem per group consisting of hydrostatic pressure scenario involving the JOIDES. Groups with correct answers will be rewarded with their very own “microbe”.

Materials:

- paper
- computer
- projector
- pens
- index cards
- “Microbes”

Phase One: Introduction to the Presentation:

- ✓ Both Crystal Juarez and Christine Munoz will introduce the activity and begin by presenting the PowerPoint about the JOIDES Resolution Drilling operation and featured statistics.
- ✓ Following the statistics they will be given a practice problem involving the JOIDES and a hydrostatic or fluid scenario.
- ✓ After the groups have solved their practice problems we will then ask for student volunteers to share out the answer and the solution to their scenario.

The PowerPoint includes a brief description about what the JOIDES Resolution drilling operation contributes to our knowledge of the ocean, the drilling process and a short introduction to our featured microbe, *Alcanivorax Borkumensis*.

Student Practice

The entire class will be split into two teams according to where they sit. We will then conduct a Jeopardy like questionnaire consisting of a variety of questions relating to PowerPoint presentation and the Physics components covered. The teams will respond with an answer in the form of a question. Points will be rewarded for correct answers; Team to win will be given extra credit in their Physics course.

Closure:

We will then open discussion and/or Q & A at the end of lesson and conclude class for the day.

Continuation:

*Now that we have taught the students, we will ask for any comments, especially in the areas of improvements. After our presentation, we will encourage the junior class to take part of the Marine Biology Club during their senior year. We will then distribute brochures containing further information about the JOIDES Resolution, the C-DEBI Program, ALCHS Marine Bio Club, as well as the microbe they were introduced to.