Grade Level: 6-8
Time Estimate: 3-5 days

PHYSICS PART 1 / LESSON OVERVIEW

Objectives

The students will:
• describe and understand how forces affect an object's motion;
• learn the following concepts: forces and Newton's laws of motion;
• be able to demonstrate Archimedes' Principle;
• be able to calculate different variables using Pascal's Law;
• use calculations to demonstrate a ship floating and sinking.

Lesson Summary

Part 1. Contact Force (30 – 45 minutes)
Define the types of contact force and learn how forces affect an object's motion.

Part 2. Newton's Laws of Motion (30 – 45 minutes)
- Become familiar with Newton's First, Second, and Third Laws.
- Practice solving for missing variables.

Part 3. Work and Energy (20 – 25 minutes)
Define work and energy. Then discover how they are related and how they

Part 4. Pascal's Law (30 minutes)
Explain Pascal's Law and how OCEARCH team uses this law every day by use of a hydraulic lift.

Part 5. Archimedes' Principle and the Law of Buoyancy (30 minutes)
Define buoyancy, density, volume, and mass.

Activity 1. Prove Archimedes' Principle (45 – 60 minutes)
Students will prove Archimedes' Principle by conducting an experiment. By immersing an object in a Eureka beaker, students will be able to observe that the displaced water equals the weight of the immersed object. Worksheets provided. Materials: rock, string, Eureka beaker, beaker, spring scale, physical balance, and water.

Activity 2. A Sinking Ship (45 – 60 minutes)
This activity uses calculations to demonstrate how density affects a ship's buoyancy. Worksheets and answer key provided.