CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
J1913

Project Title
Sink or Float: Effect of Salinity on Fluid Density and Buoyancy

Abstract

Objectives/Goals
The objective of this project is to determine the required salt concentration to make an object of varying weights float in three different fluids: tap water, distilled white vinegar, and 7 Up. The goal is to demonstrate Archimedes's principle by showing the effect of salt concentration on fluid density and buoyancy.

Methods/Materials
The materials involved consists of a test container, a plastic container with variable weights, a scale, a floating thermometer, stirring sticks, salt, tap water, distilled white vinegar, and 7 Up. I conducted tests to determine how much salt is needed for an object to float in each test fluid as the mass of the object is increased. For each fluid, I started with an object that floats in fresh fluid (no salt) and increased the mass of the object five times, each time by ten grams.

Results
The results clearly show that, as the object mass is increased, more salt is needed to keep the object afloat. Furthermore, vinegar and 7 Up, which are denser fluids, require less salt than water to float an object of the same weight.

Conclusions/Discussion
The experiments demonstrate that the higher the density of any fluid, the greater the mass of the object that can float in it. In the water experiment, as the object mass is increased, more salt has to be added to the water to increase its density. The same observations can be made with two other fluids with higher densities than water, vinegar and 7 Up. As more salt is added to these two fluids, their densities increase, and an object with a greater mass can float in them. The experiments with vinegar and 7 Up also show that these two fluids can float object with greater mass than tap water, since they have higher densities than water.

Summary Statement
This project demonstrates the effect of salt concentration on the density of a fluid and the buoyancy of an object floating in the fluid.

Help Received
Mother helped format my poster board; Father helped set up and run experiments.