HU GK-12 Program

1-17-07

Activity:

The fellow will help demonstrate principles of density and buoyant force.

Title

"Sinking Submarine"

Prepared by:

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DCPS Standards:

(ChaLC Goal):

8.4.4.

Determine and explain that the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced; this principal can be used to predict whether an object will float or sink in a given fluid.

8.4.2.

Know density is mass per unit volume

Goals

1) The students will demonstrate knowledge of density and buoyancy thorough a lab demonstration.

2) The students will understand the concepts of density and the effect it was on objects at different mass.

Objectives

The students will form hypotheses and analyze results from the lab demonstration on buoyancy.

Background

Density is a measure of the amount of matter packed into a unit volume. The density of an object is equal to its mass divided by its volume, which is measured in grams per cubic centimeter. Buoyant force is the upward force pushing on an object in a fluid. If an object is

floating in any liquid, the buoyant force is balancing the weight. Density and buoyancy work interchangeably, because whether or not a boat floats depends on both the density of the boat and the density of the water. A good story to tell the students is about the Greek scientist Archimedes. Archimedes was the first scientist to discover how to measure volume of an object that had irregular shape. He had a task of measuring the density of King Hiero's crown, which had an irregular shape. King Hiero was under the impression that the goldsmith that was hired to make his crown did not use all the gold that was given to him to make the crown. He could not be sure because there was no way to measure the volume of an object with irregular shape. If you can measure volume you can measure density. Therefore, the King put Archimedes to the task of finding a way to measure the crown. Archimedes could not melt down the crown to measure the density. He was struggling to figure out a way to accomplish his task until he was taking a bath and realized that the water level would rise as soon as he gets into the bath. Archimedes applied this notion to the King's crown and found that when you put the crown in water, it displaces the water in an amount. With this information Archimedes knew that the density of the crown would be less if a cheaper metal was used. When this information was given back to the king, the goldsmith was later put to death.

Materials:

- Empty bottle
- Bottle full water and corked
- basin of water

Procedure/Evaluation and Assessment

1) Drop empty bottle into basin and observe descent of bottle.
2) Hypothesize the reason for the descent of the bottle in the basin.
3) Drop full corked bottle into basin and observe its descent.

4) Give an explanation for the results of each demonstration.

Note to teacher:

This is a quick lab demonstration and can be modified accordingly