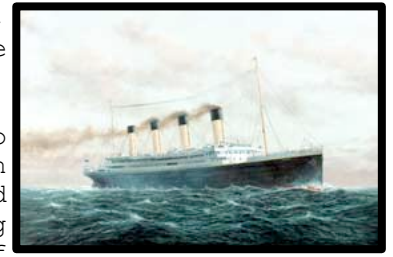




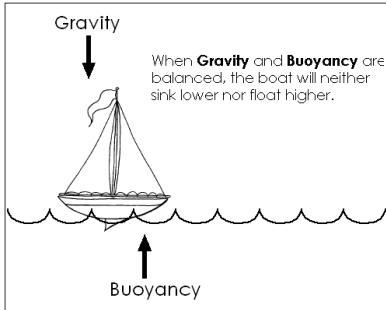
Name: \_\_\_\_\_

# Buoy - It's Sinking

The Titanic sunk. But then it was 46,000 Tons of very dense matter, the largest moving object created by humans up to that point. The surprising thing should be that the Titanic floated at all!

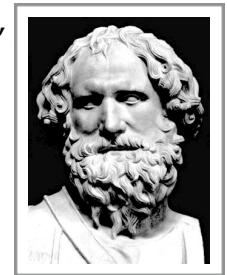


But it did float because humans were able to figure out a way to balance **FORCES** that would allow all of this dense material to stay on top of the water. In this case the two forces that were balanced



were the force of **GRAVITY**, which was trying to **PULL** the Titanic towards the center of the Earth, and the water's force of **BUOYANCY**, which was trying to **PUSH** the ship upward.

Legend has it that the Greek mathematician **Archimedes** (287-212 BCE), charged by King Hiero II with determining the purity of his new crown, made important discoveries the principle of buoyancy when he got into his bathtub and noticed how the water was displaced. From **Archimedes'** 'Eureka' moment came **Archimedes' Principle**.



## ARCHIMEDES' PRINCIPLE

An object immersed in a fluid experiences a buoyant force equal to the weight of the fluid it displaces.

In today's exercise we will use some familiar equipment to see if we can demonstrate **Archimedes' Principle** and gain a little more understanding about **BUOYANCY**.

### MATERIALS

- Spring Scale
- Various Size Weights
- Plasticene/Modeling Clay
- 250ml Beaker or Can
- Water
- String
- Scissors
- Lab Stand
- Graduated cylinders
- Overflow can

### PROCEDURE Part 1

1. Roll a piece of plasticene into a ball about the size of a Ping-Pong ball.
2. Hang the spring scale from the lab stand and hook the plasticene ball onto the spring scale.
3. Measure and record the MASS and FORCE (WEIGHT) of the plasticene ball.

MASS (g) : \_\_\_\_\_ FORCE (WEIGHT) (N) : \_\_\_\_\_

4. Fill can or beaker with water from a tap.
5. With the plasticene ball still attached to the Spring Scale, submerge the plasticene ball into the water so that it does not touch the sides of the can or the bottom.

6. Measure and record the MASS and FORCE (WEIGHT) of the plasticene ball.

MASS (g) : \_\_\_\_\_ FORCE (WEIGHT) (N) : \_\_\_\_\_

7. Is there a difference between your measurements in #3 above and in #6?

8. If there is a difference, what do you think is causing it?

#### PROCEDURE Part 2

**Archimedes' Principle** tells us that the amount of fluid displaced by an object will have the same weight as the buoyant force that is on the object.

Use the equipment provided to test **Archimedes' Principle**. Test to see if the amount of water displaced by a plasticene ball is equal to the upward force of buoyancy exerted by the water on the plasticene ball.

1. In the space below describe the steps you would use to carry out this procedure.

2. In the space below show your results in an easily understandable fashion.

3. Were you able to demonstrate **ARCHIMEDES' PRINCIPLE**? Explain.