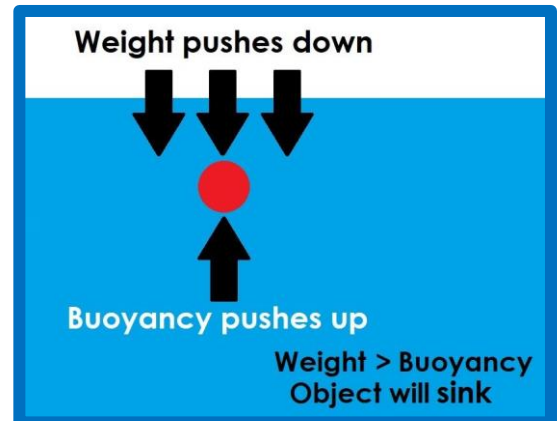


## Buoyant Boats

### Materials

- › Modelling clay, one-half stick (50-60 grams) per person
- › One piece of Lego
- › One coin
- › One small stone
- › One piece of paper
- › 1-2 sponges and/or dishrags for wiping up drips and spills
- › Several paper towels
- › One box to contain water
- › One water bottle



### Activity Overview

- › This task is focused on buoyancy and material science. The principles of floatation are used heavily by Babcock when designing and building boats and submarines. We are involved in the design and manufacture of some of the largest submarines in the world so need a very clear understanding of buoyancy and how it is affected by the materials we use when building the submarines. The students will experiment with different types of materials to discover which float and which sink. Upon learning the basic principles of buoyancy, students will design boats out of plasticine and see which can hold the most weight. It is important to study the effects of displacement during this process.
- › Try the steps below to find out how displacement works and test the knowledge gained using the final task.

### Activity Plan (see diagram for help)

- › Using the box filled with water test the buoyancy of the Lego, coin, and stone. Guess if the item will float or sink before testing it.
- › Using the Lego brick test different orientations, try the studs facing down, try them facing up, try the brick pushed underwater first, and finally try the brick on its side.
- › Test an empty water bottle and show that pushing down on the bottle to displace more water makes the bottle push upwards harder due to more water being displaced.
- › Test a ball of plasticine without any modifications to show that it does in fact sink.
- › The student will now design a boat on paper first and attempt to build it using the plasticine. It will be tested using the Lego, coin, and stone or other weights and the design can be updated if at any point the boat sinks. The student should use all the knowledge they have gained from the previous activities to make the best boat they can.

### Learning Objective

- › Ability to design a boat that floats and outline why using the principle of buoyancy.
- › Ability to explain why a specific design of boat is better than another.
- › Ability to describe the best material properties for building a boat and why.