Dynamics and Statics

Surface tension demonstration

(Ukraine)

Background

Buoyancy or upthrust, is an upward force exerted by a liquid that opposes the weight of an immersed object. If the weight is greater than the upthrust the object will sink and if the weight is less than the upthrust the object will float.

Surface tension is the property of the surface of a liquid that allows it to resist an external force, due to the cohesive nature of its molecules.

You will need:

- ✓ a cork
- ✓ thin plastic tube
- ✓ plastic dish
- ✓ nut/weight
- ✓ hot glue gun

Follow these steps:

1. Cut out a circle from a plastic dish.
2. Push the plastic tube through the cork.
3. Attach the nut/weight to the end of the plastic tube as in Figure 1.
4. Attach the plastic circle securely to the tube on the other side of the cork using hot glue or any other suitable means.
5. Place the device in a large beaker of water, as in Figure 2, and observe what happens.
6. Push it under the water and observe what happens.
7. Push gently so the plastic circle just meets the surface of the water and observe what happens.

So what happened?

The cork will float in the water when placed in the beaker as the upthrust is greater than the weight of the object. When pushed under the water it will bounce back up for the same reason.

However, if you gently let the plastic circle meet the water in the beaker the surface tension will be just enough to allow it to stick to the plastic, holding it in place, as in figure 3.

What next?

Investigate different areas of disks and find the minimum area needed.

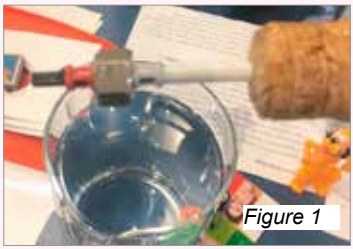

Figure 1

Figure 2

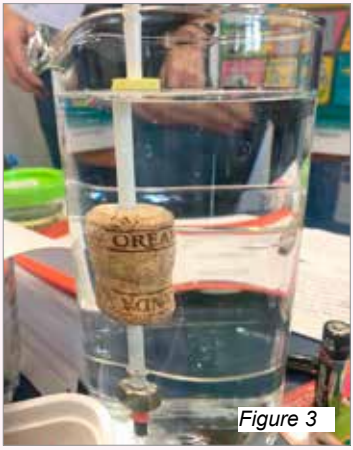

Figure 3