

Make a Submarine

A submarine is able to sink below the sea's surface or float on it through the principle of "buoyancy". An object is buoyant in water due to the amount of water it displaces or 'pushes aside'. If the weight of water that is displaced by an object in water exceeds the weight of the object then the object will float. A submarine controls its buoyancy – and its ability to sink or float – by controlling how much air it stores in its ballast tanks. Use this activity to make your own "submarine" and see the principle of buoyancy at work.

You will need:

- A straw
- An elastic band
- Approximately 10 paper clips
- An empty, rinsed out, soft drink bottle with its cap

Instructions:

1. Fold straw in half and fasten tightly towards where the ends meet with the elastic band. This is your "submarine".
2. Fill the bottle all the way to the top with water.
3. Hook paper clips into the elastic band of the 'submarine' to act as weights. You will need between 5 and 10. Keep trying until the submarine is almost all the way submerged, but not quite. It should bob just at the surface.
4. Close the bottle cap tightly.
5. Squeeze the bottle and watch what happens!

Why It Works

This experiment demonstrates the principle of buoyancy. As you apply pressure to the bottle, you apply pressure to the air bubble in the straw, reducing its size. As the bubble's size decreases, the straw becomes less buoyant and begins to sink. Releasing the pressure on the bottle decreases the pressure applied to the air bubble in the straw and allows it to expand. As the bubble becomes bigger, the straw begins to rise back to the top.