



## Curiosity Guide #206

### Liquid Forces

Accompanies Curious Crew, Season 2, Episode 6 (#206)

#### Soap Boat

Investigation #8

#### Description

Make a soap boat that uses liquid forces to move through the water.

#### Materials

- Paper soap-boat template, at end of this document
- Marker
- Cardboard, foam board, or thin plastic
- Scissors
- Bowl of water, or try it in the bathtub!
- Toothpick
- Liquid soap

#### Procedure

- 1) Cut out the soap-boat template.
- 2) Place the template onto a small piece of cardboard, thin foam, or plastic, like a butter lid. Trace around the template with a marker.
- 3) Cut out the boat with scissors.
- 4) Fill the basin or tub with water.
- 5) Place the boat on the surface of the water.
- 6) Wet the end of a toothpick with liquid soap. Carefully touch the narrow hole in the channel at the back of the boat.
- 7) What do you notice?
- 8) You will need to change the water after you do the investigation several times.

## My Results

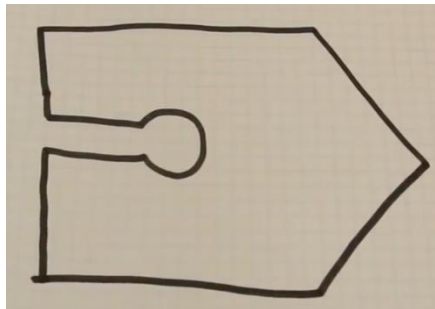
### Explanation

Although it looks as though the boat is being pushed along, the boat, in fact, is being pulled forward. The surface tension, which is the skin-like layer along the surface of the water, is under high tension. The high tension pulls the water and the boat equally in all directions. However, soap has a low-surface tension. When the soap is added to the water with the toothpick, the soap creates an imbalance in the tension surrounding the boat. Although the tension is still pulled equally from side to side, the front-to-back tension is no longer equal. As a result, the boat is pulled forward.

If the boat is evenly cut, it will go fairly straight. If the boat is not cut straight, it may propel forward and then begin to turn. By repeatedly adding soap in the channel of the boat, the soap will eventually be mixed throughout the water, and the water will have to be changed.

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Crew learned!

Template for soap boat



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