

# Propel the Boat

Science IDEAS Project  
Student Activity

## Goal:

To demonstrate cohesive forces in water and how these forces can be disrupted.

## Materials:

- 3X5 index card
- Shallow tray
- A few drops of liquid soap

## Procedure:

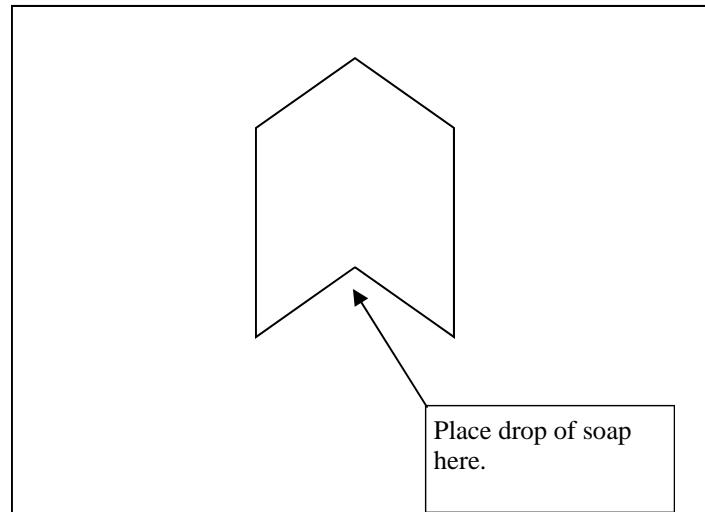
1. Fill the tray with water.
2. Cut out a boat as shown in the “boat pattern” diagram.
3. Place the boat onto the water so that it is floating in the middle of the tray.
4. Place a drop of liquid detergent in the center of the “V” shape at the rear of the boat.
5. Observe and record what happens to the boat.

Note: If you want to repeat the experiment, you can mix the water in the tray up so that the soap is more evenly distributed. Eventually there will be so much soap in the tray that you will have to replace the water.

## What Happened?

When you first place the paper cutout in the tray of water, adhesive forces between the water molecules and the paper pull the cutout equally in all directions. The result is that all of the forces balance out and the paper does not move.

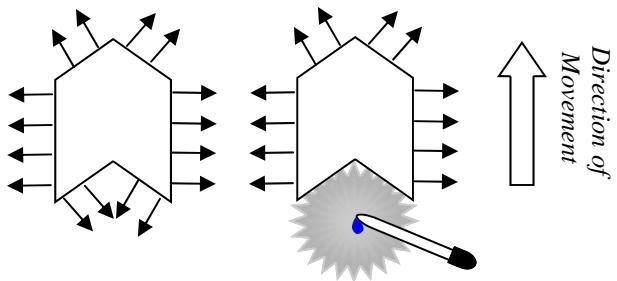
When soap is added to the water, it eliminates most of the water's adhesive properties. With no more adhesion, the water in the area of the boat where the soap is dropped stops pulling on the paper. The water in front of the cutout still has its adhesive properties, and continues to pull on the boat, making the boat move forward.



Boat Pattern Diagram

## Journaling Opportunities:

- What did you observe when the drop of soap hit the water behind the boat? Write and illustrate your observations.
- What does soap do to the water?
- How does removing the water's adhesive properties make the boat go forward?
- What other activities and / or demonstrations have we done in class that demonstrate the same properties of water in different ways?



A drop of soap removes the water's adhesive force pulling on the cutout, resulting in forward motion.