

Bread Clip Jet Boat

Make a little bread clip zip across the water like a speedboat.

WHAT TO DO

Use scissors to cut a plastic bread bag clip into a boat shape with the open part of the clip at the back or *stern* of your boat. Gently place your boat on the surface of the water. Using a pipette add a small drop of rubbing alcohol to the hole at the stern of your boat and watch it shoot forward like a jet-powered speedboat.

WHAT'S HAPPENING?

It's tempting to assume that your boat is floating in the water, but the plastic material of the bread clip is more dense than water, so it should actually sink (and if you push it under the water it will sink). What keeps it from sinking are strong attractive forces between the water molecules at the surface, usually referred to as *surface tension*. It's almost as if there is an invisible film stretched across the water surface that's strong enough to hold up the bread clip.

When you add rubbing (isopropyl) alcohol its molecules initially form a bit of a puddle or a hole within the water molecules at the surface. Just as with the water, there are also attractive forces between the alcohol molecules, but its surface tension is much weaker, so the stronger water molecules at the surface are able to pull away from the alcohol (almost like tug-a-war where the water is the stronger team). Since your bread clip boat is sitting in- or rather *on*- the water, it is pulled along with the receding water surface. It may look like alcohol is shooting out of the back of the boat, but it's really the water surface in front of the boat pulling it forward. The boat eventually stops moving because the alcohol quickly dissolves into the deeper water, restoring the stronger surface tension so that you can add another drop of alcohol and make your jet boat zoom again!