

Buoyancy of Air

Purpose: Demonstrates the buoyant force of the air surrounding a toilet float.

This is a simple demo that you can set up and test before class. A balance placed inside a bell jar weighs a toilet float. Pump air out and the float's weight increases. Bleed the air back in and the float rises as the air buoys it up again.



Air inside

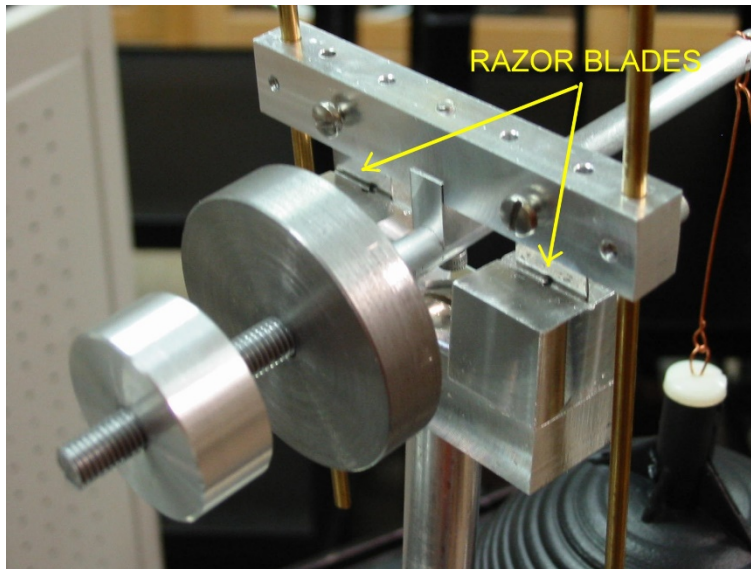


Under vacuum

I estimate the volume of the toilet float to be about 400 cm^3 . Using a density of air of 1.2 mg/cm^3 implies a change of weight of 480 mg . The balance has to be fairly sensitive to move dramatically enough for a 1.2 g change so I have used razor blades for the balance hinge.

To set up remove the Styrofoam protectors from the blades and set the balance atop the stand with the blades in the stand's grooves. Connect the float and adjust the counterweights if needed.

Note: Beware of the razor blades!!!



Extra Equipment: Pump and bell jar carts (M and N)

Location: Bottom of cart N