Required Training

UC Lab Safety Fundamentals

Required PPE

Lab coat, safety glasses/goggles,
nitrile gloves

Equipment

Chemicals

House-made 2L plastic drink bottle/test tube set-up

Procedure:

1. Pass the bottle around the class asking them to gently press the side of the container, or demonstrate it yourself.
2. Note that the water level will rise in the test tube inside as the pressure increases. The test tube sinks.
3. Releasing the pressure will make the sinking test tube float again.

Discussion:

According to Boyle’s law ($P_1V_1 = P_2V_2$), the pressure increase on the bottle (and therefore the gas inside the test tube—think of the air/water interface as a fourth wall) decreases the gas’s volume. The volume that used to be air is now occupied by water, and the total weight of the “diver” is greater than its buoyancy, and it sinks. This set up is designed to give the diver near neutral buoyancy at STP. This experiment was designed by and named for the French natural philosopher Descartes (1596-1650).

Hazards:

Be sure not to invert the bottle in transit as it will not function if the bubble in the test tube float

SOP:

N/A

Disposal (by Storeroom):

This demo should not need disposal.