

1. Place a small amount of water (about 10 mL) in an empty soda can. Heat the can on your hot plate. After about one minute of VIGOROUS boiling, use the tongs to turn the can over (in one quick motion) and immediately place the mouth of the can in a bucket of cold water.

During boiling, the air originally in the can is replaced with _____. Placing the can in the cold water causes the _____ to condense. (Decreasing the temperature of the gas causes its _____ and _____ to decrease.) A _____ results. The _____ pressure then crushes the can!

2. Be sure to do this over the sink!! Pour water into the glass container until it overflows. Place the provided piece of paper over the mouth of the glass container. Hold the paper in place while you invert the glass. Remove your hand from the paper.

The water shouldn't have spilled. WHY NOT? (What held the paper in place?)

3. Fill a 2-liter soft drink bottle to within 4 cm from the top. Half-fill a medicine dropper with colored water. Drop the entire dropper into the bottle and screw the cap on tightly. Firmly squeeze the sides of the sealed bottle until the "diver" descends.

Look at the level of colored water in the medicine dropper. As the "diver" descends, the level of colored water (increases, decreases) as pressure increases. Thus, the volume of air in the dropper (increases, decreases) as pressure increases. The water rises in the dropper to take the place of the compressed _____. The dropper now has (more, less) mass and sinks. When the pressure is released, the volume of air in the dropper (increases, decreases), forcing the extra water from the dropper. The dropper now has (more, less) mass, and is buoyant again. This relationship between pressure and volume is an excellent example of _____ Law.

4. Over the sink, fill the film canister with water. A hole has been punched in the canister, so of course, water will exit the hole. Now place your hand firmly over the top of the canister. You may have to practice this a few times because you have to quickly place your hand over the top before all of the water runs out!

What happened when you placed your hand over the top of the can?

What was apparently "pushing" the water out of the hole?

5. When Joseph Kittinger rode a balloon to a height 18.5 miles in the sky, he ran into trouble. At a height of 43,000 feet the pressure glove on his right hand failed to work. EXPLAIN what happened to his hand based on your knowledge of atmospheric pressure and the gas laws.
6. Calculate the pressure exerted by a 120 pound woman wearing high heels with a surface area of 0.02 square inches as she walks across a wooden floor.