

"Egg in a Bottle" Experiment

Objectives:

- *To develop a scientific attitude.
- *To develop a sense of curiosity that leads to developing observation skills.
- *To see the effects of high pressure vs. low pressure

Equipment:

Three hard-boiled eggs per class. (remove the shell)
One glass gallon jar with a small neck (about 1 1/2 in, in diameter) I use an old fashioned milk bottle. Use any glass bottle that has an opening slightly smaller than your eggs. I use a little vegetable oil around the mouth of the bottle and some around the diameter of the egg. This will ease the egg into to the bottle so it doesn't break. There will be a PLOP sound - cool!

Matches - wooden preferred.
Paper towels

Procedure :

Light a small piece of paper towel and immediately place it in bottle/container. Quickly put egg lightly on the opening and watch. I usually have a student place the egg on top after I light the paper. The paper should fall to the bottom of the bottle.

As the flame uses up the oxygen inside the jar, the air pressure in the jar will decrease causing a vacuum to develop. The egg will dance or jump around on top of the bottle. Then . . .

The low air pressure in the jar will cause a pressure difference with the outside air. The high air pressure on the outside will push the egg through the small opening and into the jar. The students will think it is sucked in. This is NOT true. It is pushed!

After all they wise guys say, I know what will happen. Ask them what happened? How does this happen? Well, how can we get the egg out of the bottle without breaking it? Be sure to write all their observations on the board/overhead and question their observations. Did everyone see this? When did it start to smoke? Does the same thing happen each time

we do it? Make them think! Make them listen to each other! How do we work in groups when we have differing opinions? This lesson goes on and on.

How do you get the egg out?

Hold the jar upside-down so the egg is pointed out the opening. Create a high air pressure inside the jar by blowing hard into it. The high air pressure inside the jar will push the egg back out the small opening. Practice this! Blow as hard as you can for about 10 seconds . . .move the bottle quickly to your left or right and voila the egg FLIES out of the bottle. I usually have a student try to catch it in a butterfly net. Ha. When you become experienced in this, you can be sure the jocks miss and the feeble catch it! You may get a few ashes on your face. The kids love it!

Conclusion:

An air pressure difference causes movement of particles. The amount of pressure is determined by the difference of pressure in the air and the amount of area affected. This is also a good experiment to show that the use of oxygen molecules in a particular area causes a loss of air pressure.

Are you brave enough to try this with a water balloon? use a pint jar.

The water balloon should be slightly larger than the opening. Prep as above. Have student place the balloon on top but hold onto the balloon.

Can they keep the balloon from going in the jar? Ha Ha . . watch out, sometimes the balloon will pop. The best way to get this one out is NOT by blowing into such a large opening but simply place a straw down the side of the jar. The balloon that was so hard to get out before the straw was placed there will simply glide out with ease!