

## Egg in a Bottle

### Purpose

To demonstrate atmospheric pressure and the effect of heat on a gas.

### Materials

milk or juice bottle	cotton balls
190 proof Ethanol	matches
Peeled, hard-boiled egg	

### Procedure

1. Soak the cotton ball in alcohol, ignite it, and drop in the bottle.
2. Place the balloon or egg in the top of the bottle.
3. Notice the balloon or egg bounce on top of the bottle and be pushed into the bottle.

### Additional Information

1. Use a bottle with a large enough mouth to just hold an egg.
2. A water balloon has some advantages over the egg. You can make it any size you'd like, and therefore fit it into an available bottle. With either the egg or the balloon you can tip the bottle upside down and blow into the bottle to remove the object. With the balloon, you can also do the following:
  - a. Tip the bottle upside down and grab the knot of the balloon.
  - b. Holding onto the knot, place the bottle upright on the table and push a straw into the bottle between the glass and the balloon.
  - c. Pull on the knot and the balloon should easily come out of the bottle.

This works with the balloon because the straw allows air to enter the bottle. You can also try to pull out the balloon without the straw to demonstrate how difficult it is.

### Questions for the Students

1. What is the pressure inside the bottle before the object is placed on the bottle? as it is on top of the bottle? after the flame goes out? after it is in the bottle?
2. How does the object get in the bottle? Is it pushed or pulled?
3. How can you get the object out? Why does it work?

## Reference

ICE Demonstration Workshop, University of Arizona, 1986.

Summerlin, L.R, Borgford, C.L., & Ealy, J.B. Chemical Demonstrations, Volume II, Second Edition, ACS, 1988.