Try This at Home Science:
Egg in a Bottle

Activity Overview:
Get a whole egg into a milk bottle using the power of air pressure.

Materials:
- Peeled, hard-boiled egg
- Glass bottle with an opening slightly smaller than the hard-boiled egg
- Matches or birthday candles
- A small amount of water

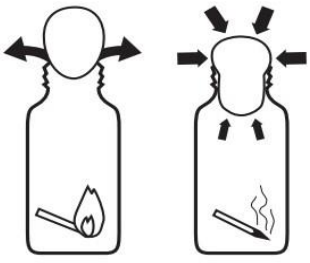
Safety:
This activity requires the use of matches and fire. Adult supervision is required.

Try This!
1. Place the glass bottle on the table.
2. Lightly coat the neck of the bottle with water.
3. Light three matches or candles at once and carefully drop them into the bottle.
4. Quickly place the egg over the mouth of the bottle.
5. Watch what happens!

What's happening?
The air around us is a form of matter. Like all matter, air has weight. We can measure this weight as air pressure. Initially, the air pressure was equal inside and outside of the bottle. Once the lit match was placed inside the bottle, the air molecules warmed up rapidly and began to expand. Some molecules escaped the bottle as the match burned, which may have even caused the egg to vibrate as the air rushed past it.

Once the match consumed all the oxygen inside the bottle, the flame goes out and the air inside the bottle cools back down. Cool air takes up less space than warm air, leaving behind an area of extremely low pressure.

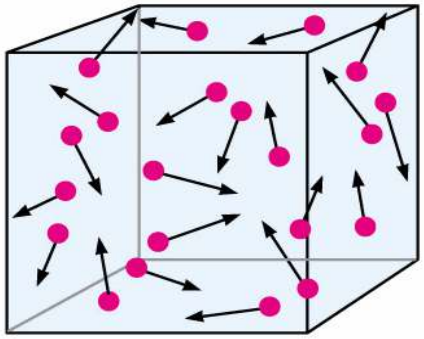
Molecules always want to move from areas of high pressure or concentration to areas of low pressure or concentration. In order to equalize the pressure between the two zones, the air outside the bottle pushed its way back inside to fill the empty space, squeezing the boiled egg through the opening with it. This same principle of high and low pressure is what pulls water and small objects down the bathtub drain.



Well, now what!?

To remove the egg from the bottle, turn it upside down and blow air into the bottle. The egg should come right out! By adding more air into the bottle, you create an area of high pressure inside and the entire process repeats itself in reverse. The egg is squeezed back through the opening as the air moves from high to low pressure zones.

How does this relate to real life?



Air pressure plays an important role in our lives from breathing to travel. Since air has weight, there is more of it closer to the ground than high in the atmosphere. Air pressure decreases as we move upward, which is why your ears will pop in the mountains as you go uphill and downhill in a car or train. Your ears are adjusting to the pressure in your eardrums when they pop. This equalizes the pressure in your ears so they will not burst when the pressure changes around you.

Now Try....

- Experiment using an object other than an egg, like a balloon! Fill a balloon with water until it is slightly larger than the opening of the bottle you're using and repeat the demonstration with the balloon instead of the egg.