

# Balloon Battle

*Smaller can actually be larger*

## Materials

- PVC valve for 1/2 in PVC pipe
- 2 pieces of 1/2 in PVC pipe, each about 2 in long
- 2 balloons

## Assembly

Place the two pieces of PVC pipe in the valve as shown in the photos.

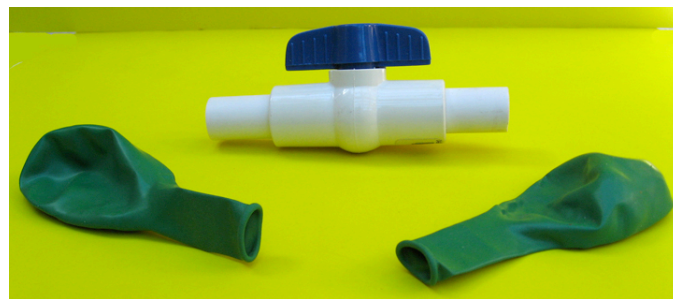


Figure 1

## To Do and Notice

Close the valve.

Blow up a balloon so that it's about half full, and put it over the end of one of the PVC pipes attached to the valve. See the balloon on the right side in Figure 2 below.

Blow up a second balloon until it's a little past the point when it starts to stretch tightly and gets notably hard to blow into, but isn't very large yet. Then put it over the end of the other PVC pipe attached to the valve. See the balloon on the left side in Figure 2 below.

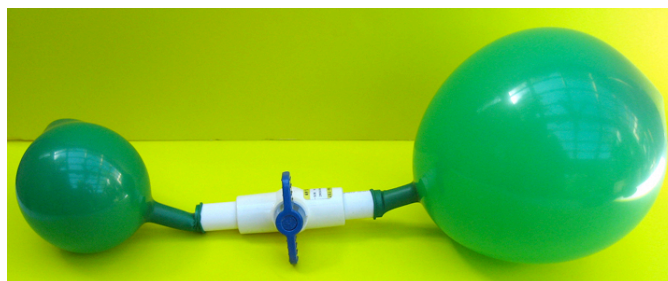


Figure 2

Predict what you think will happen when you open the valve. Will the resulting situation be closer to Figure 3a or 3b? Open the valve and notice what happens.



Figure 3a



Figure 3b

## What's Going On?

When you blow up a balloon, you may notice that it is very hard to blow up at first, and then all of a sudden it becomes easier. The pressure is actually higher just before the balloon reaches its transition point than it is once this is passed. So the pressure in the larger balloon is actually less than in the smaller balloon, and air goes from the smaller to the larger rather than vice-versa. The smaller balloon gets a little smaller and the larger balloon gets a little larger. Figure 3a should be closer to what you see than Figure 3b.

## Reference

**Fun with Balloon Pressure**, The Caliper (Vernier Software Newsletter), Spring 2002 (Volume 19, Number 1), [www.vernier.com/caliper/spring02/balloon.html](http://www.vernier.com/caliper/spring02/balloon.html). Shows a graph of Pressure vs. Time as a balloon is inflated. Data was obtained with Vernier Gas Pressure Sensor.

## Balloon Battle.....2/5/14

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