

Balloon in the syringe

Experiment: A disposable syringe as a mini pressure chamber

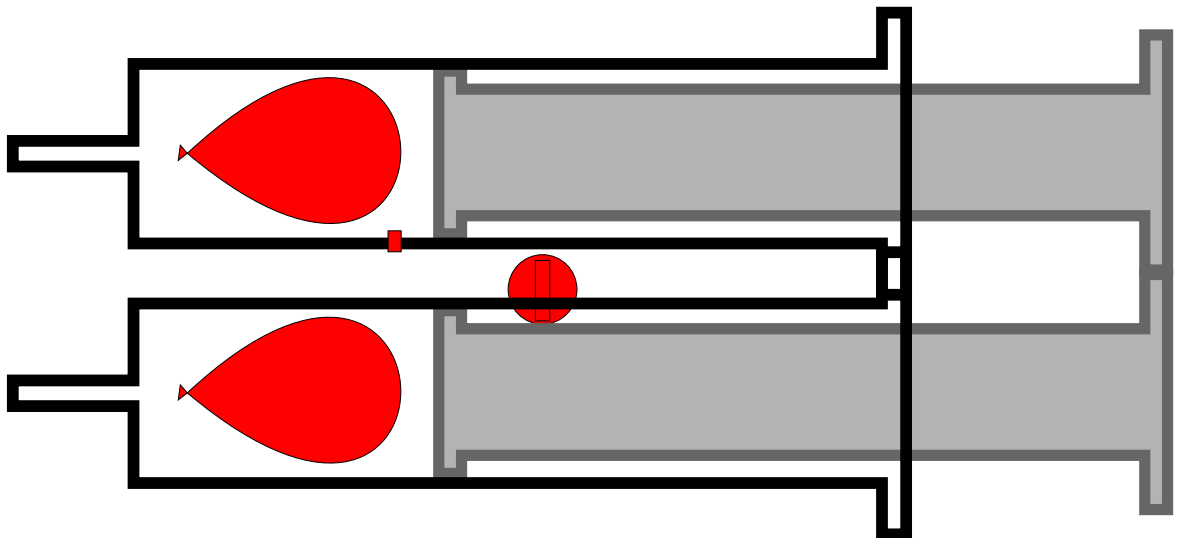
Material: Mini balloon (commercially available as water bombs or water balloons)

Video

[Effect of air pressure on the balloon in the syringe](#)

[Effect of air pressure on the balloon in the syringe](#)

Drawing



In the schematic drawing above, the tap is open, air can flow in and out of the syringe unhindered. The air pressure inside and outside the syringe is the same.

In the lower diagram, the tap is closed. The pressure in the syringe now changes when the plunger is moved, and the effect of the pressure change on the balloon is visible in that it changes size.

Questions

How does the pressure change when the plunger is pushed into the syringe?

How does the pressure change when the plunger is pulled out of the syringe?

Tasks

The plunger is so far inside the syringe that there is just enough room for the balloon. The tap is open so that the internal and external pressures are the same. Now close the tap.

1. Pull the plunger out of the syringe until the air pressure in the syringe corresponds to an altitude of about 1500m/NN. Air pressure at this altitude is about 850hPa.
2. Pull the plunger out of the syringe until the air pressure in the syringe corresponds to an altitude of about 3000m/NN. Air pressure at this altitude is about 700hPa.
3. Pull the plunger out of the syringe until the air pressure in the syringe corresponds to an altitude of about 5500m/NN. Air pressure at this altitude circa 500hPa.

Information

Pressure times volume equals constant ($P \times V = \text{constant}$)

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