

# Connected Soap Bubbles

## Equipment:

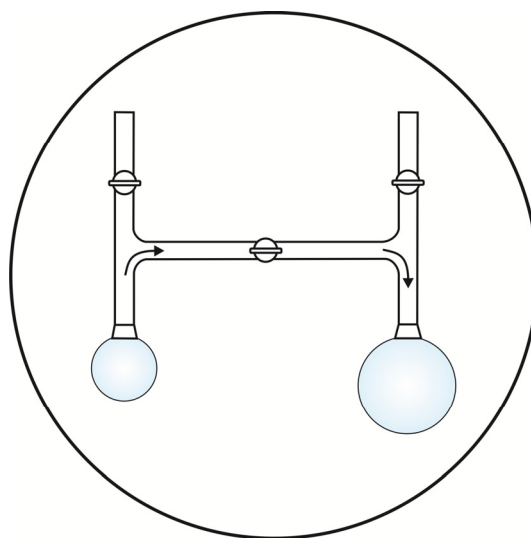
glass apparatus with three stopcocks  
small beaker

## Chemicals:

soap bubble solution

## Safety:

–



## Procedure:

Preparation: Some soap bubble solution is filled into the beaker.

Procedure: The stopcock in the middle of the glass apparatus is initially closed, the two stopcocks on the left and right are open. The lower end of one of the tubes is dipped into the soap bubble solution in the beaker. By carefully blowing into the upper end of the tube, a relatively small soap bubble is produced and the associated stopcock is closed. Subsequently, another soap bubble is produced in the same way at the lower end of the second tube, but it should be much larger than the first one; then the second stopcock is closed. Eventually, the stopcock in the middle is opened.

## Observation:

The smaller bubble “inflates” the larger one and disappears during this process.

## Explanation:

The Laplace pressure  $p_\sigma$ , meaning the excess pressure in a soap bubble (with a radius  $r$ ) as a result of the surface tension  $\sigma$ , results in

$$p_\sigma = \frac{4\sigma}{r}.$$

The Laplace pressure is thus inversely proportional to the radius of the soap bubble. Since the excess pressure in the small bubble is correspondingly larger than in the large bubble, the small bubble is able to “inflate” the large one.

## Disposal:

The soap bubble solution can be flushed down the drain.