

# Soap Film

## **Equipment:**

U-shaped wire frame with handle and slider (moveable piece of wire)  
glass jar

## **Chemicals:**

soap bubble solution

## **Safety:**

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## **Procedure and Observation:**

Preparation: The soap bubble solution is poured into the glass jar. If one dips the wire frame into the solution and cautiously pull it out again, a soap film forms between the frame and the slider.

Procedure and Observation: When the slider is slowly pulled away from the end of the frame (see the hand symbol), the soap film expands. If one lets go of the slider, the film contracts to its former size and the slider moves back to its original position (note the arrow).

## **Explanation:**

In order to increase the surface area of the soap film, energy has to be expended because of the surface tension. Interpreted atomistically, molecules are transported against the tensile forces toward the interior of the denser phase from inside the phase to its surface. The molecules at the surface of the phase therefore have an amount of energy that is higher by the surface energy  $W_{\rightarrow A}$  than the energy of the molecules inside the phase. During the reverse process—when the slider moves back—this surface energy is released again.

## **Disposal:**

The soap bubble solution can be flushed down the drain.

