

# BUBBLES

**THAMES & KOSMOS**



**WARNING** — Science Education Set. This set contains chemicals and parts that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.

## DEAR PARENTS,

With this experiment kit, children as young as five years old will be able to perform their first exciting experiments.

Experiments, astonishment, and play are all closely related, so it's good to offer plenty of fun if you want kids to learn. But even though the experiments here are easy, they won't necessarily come off without some help. So please do help your little researchers, particularly since the curiosity and powers of comprehension of children are more advanced than their manual abilities. And please make sure to assist your children in getting any materials they may need in addition to the ones contained in the kit.

To keep your child from swallowing any soap solution, it is important for him or her to understand the difference between sucking and blowing. So try blowing a cotton ball across the table together in order to demonstrate the proper action.

Because the experiment kit was designed with young researchers in mind, the read-aloud explanations have been kept as simple as possible.



= The sun symbol indicates experiments to perform outdoors.

**NOTE!** Not suitable for children under 3 years of age, due to small parts that might be swallowed or inhaled. Certain parts of this kit have sharp points, corners, or edges due to their function. Do not injure yourself!

A note about the soap solution: Do not consume! Keep away from infants. Do not apply to eyes or mucous membranes!

## CONTENTS



Soap solution



Rubber bands



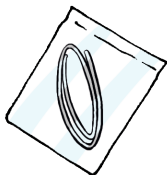
Pipette



Measuring cup



Petri dish with lid



Wire



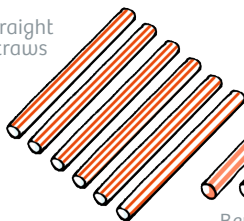
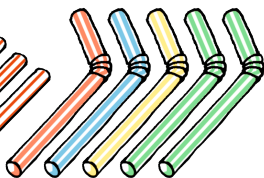
Funnel



Soap bubble ring



Balloon

Straight  
strawsBendable straws  
(not sorted by color)

**CAUTION!** Children under 8 years of age can choke on uninflated or popped balloons. Adult supervision is required. Keep uninflated balloons away from children. Immediately remove popped balloons. Made of natural latex. Use a pump for inflating the balloons.

# Water Skin

## EXPERIMENT 1



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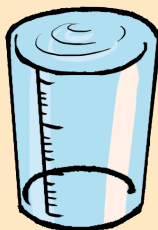
Water

**YOU WILL NEED ↑**

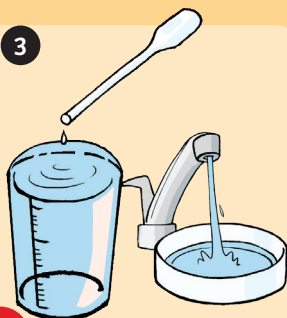
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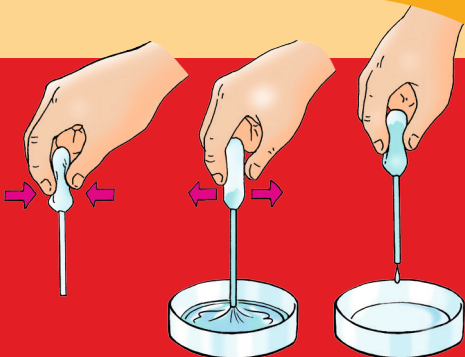


4





Tip: This is how the pipette works!



5



## HERE'S HOW

On top of the filled measuring cup, a skin forms which holds all the water drops together. This property is known as surface tension. You can destroy the skin by adding a drop of soap solution.

## EXPERIMENT 2

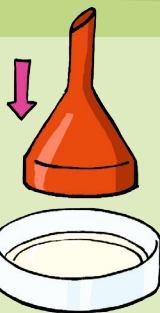


**YOU WILL NEED ↑**

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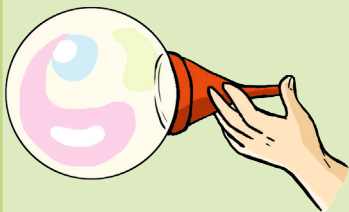


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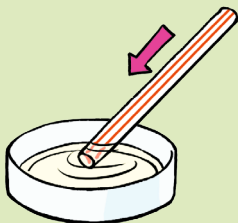


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## HERE'S HOW

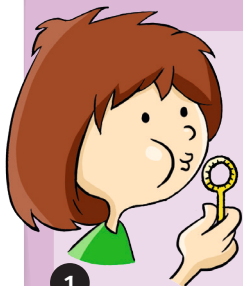
The soap bubble skin won't burst right away if you insert an object into it. But it's important to first dip the object into the soap solution, and then insert it very slowly.



## EXPERIMENT 3



### YOU WILL NEED ↑



## HERE'S HOW

You can use the soap container's ring insert to gently capture the soap bubbles again. Then, if you blow carefully on the captured bubble, you can make double, triple, or giant bubbles.

## EXPERIMENT 4



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Washcloth

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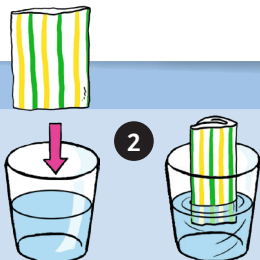
Glass of water

## YOU WILL NEED ↑

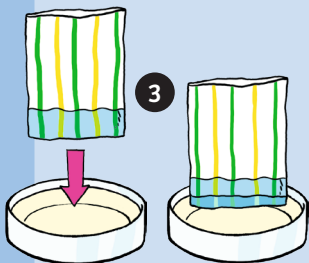
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2



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4



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## HERE'S HOW

Push the bottom end of the washcloth first into the water, and then into the soap solution. Then, if you blow into the washcloth from above, you will get a beard made of lots of little soap bubbles.



## EXPERIMENT 5

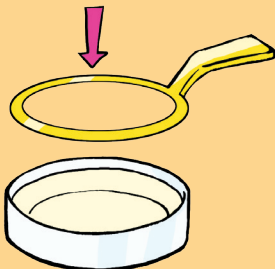


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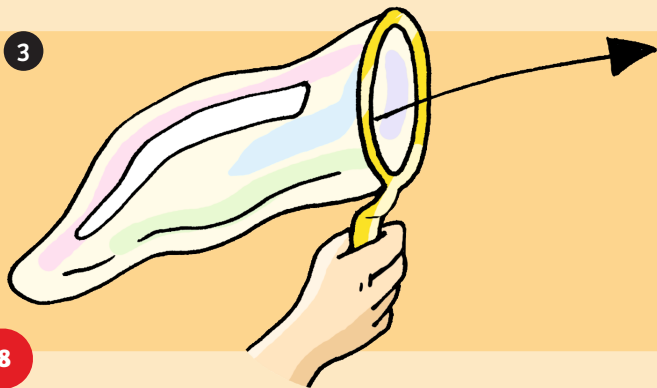
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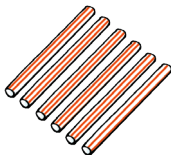
## EXPERIMENT 6



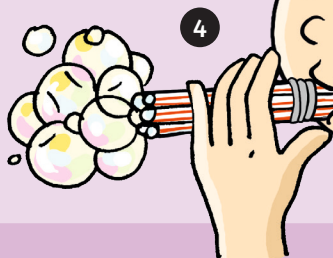
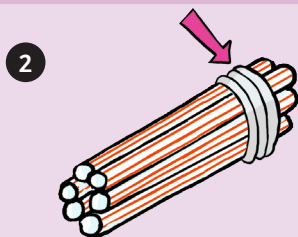
**YOU WILL NEED ↑**



## EXPERIMENT 7



**YOU WILL NEED** ↑





## EXPERIMENT 8



**YOU WILL NEED ↑**

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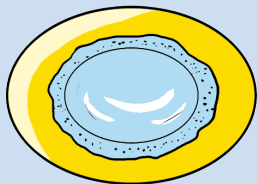
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## HERE'S HOW

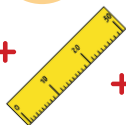
Just as in Experiment 1, the soap destroys the water's surface tension. Wherever there is no soap in the water, though, the tension still exists. That's what is pulling the pepper to the edge of the bowl.



## EXPERIMENT 9



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**YOU WILL NEED ↑**

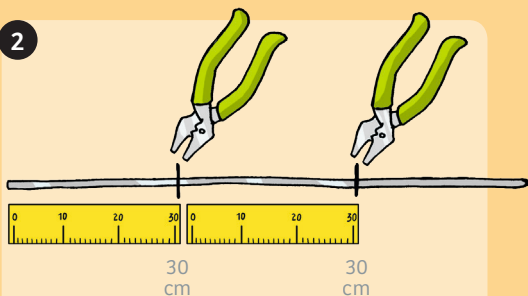
Ruler

Pliers

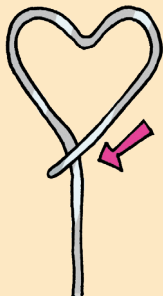
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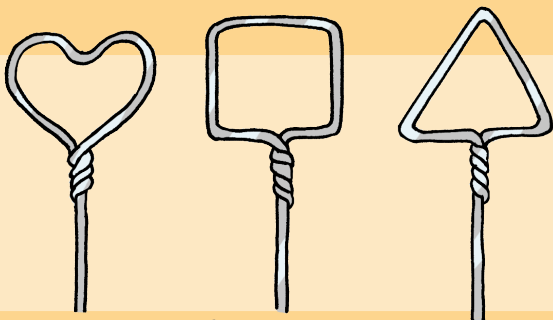
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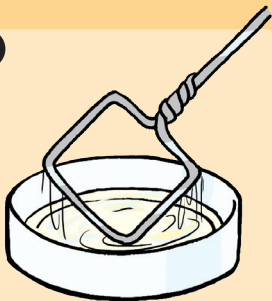
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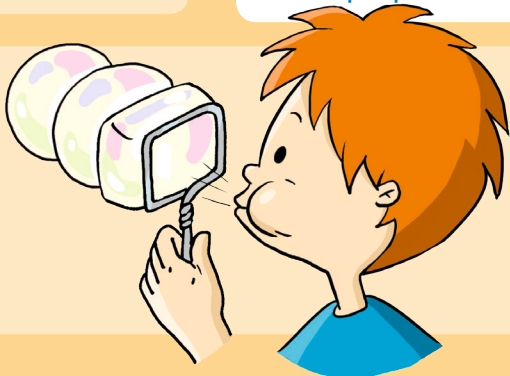
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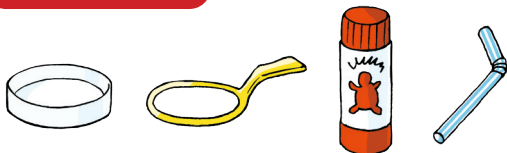
### HERE'S HOW

The soap bubble is formed by the minimal surface principle. That means that your bubble's elastic soap skin will always turn into a sphere, since a sphere (or ball) can enclose the greatest quantity of air with the least amount of soap.

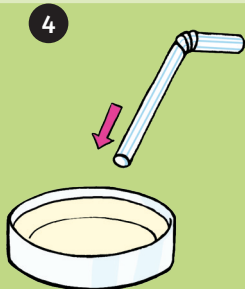
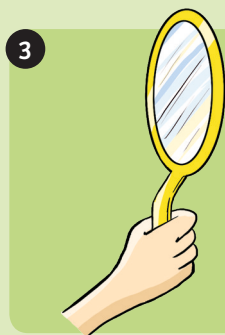
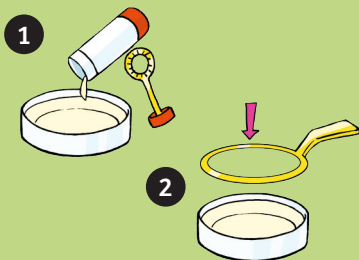
6



## EXPERIMENT 10



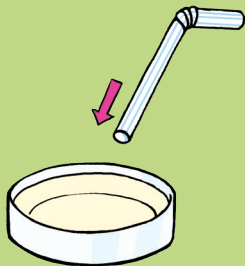
### YOU WILL NEED ↑



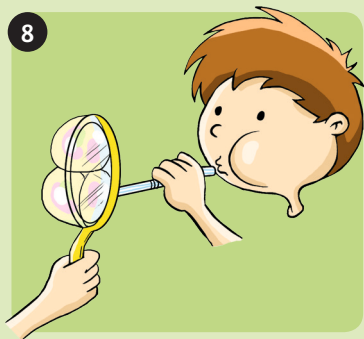
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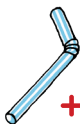


## HERE'S HOW

A soap bubble resting on soap solution will always turn into a hemisphere (half of a sphere). Just as in Experiment 9, the minimal surface principle is at work here too: the greatest amount of air is enclosed in the least amount of soap. If several soap bubbles meet up, they always attach to one another in the same way.

# Soap Bubble Machine

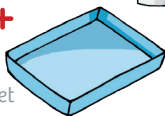
## EXPERIMENT 11



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Glass of water

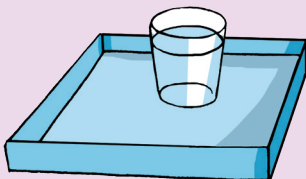
**YOU WILL NEED** ↑

Baking sheet

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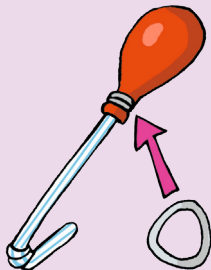


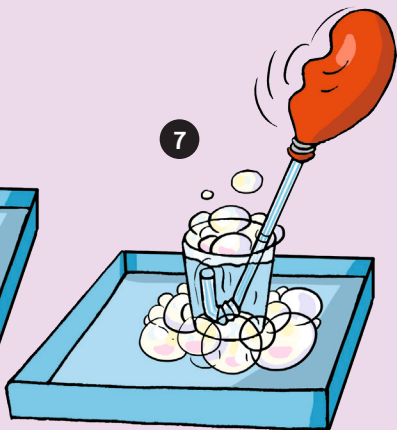
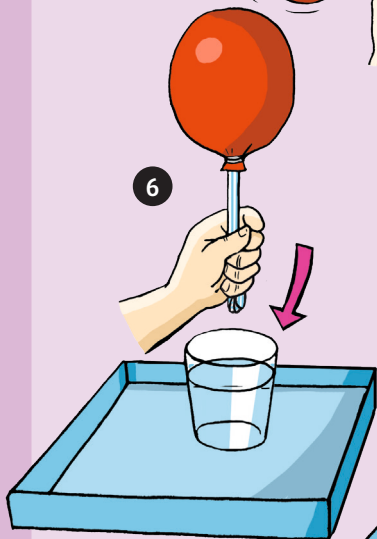
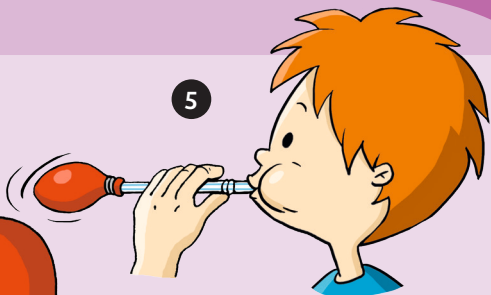
3

Tip: Blow up the balloon beforehand to stretch it out!



4





**Throw away the straw  
after the experiment!**

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