

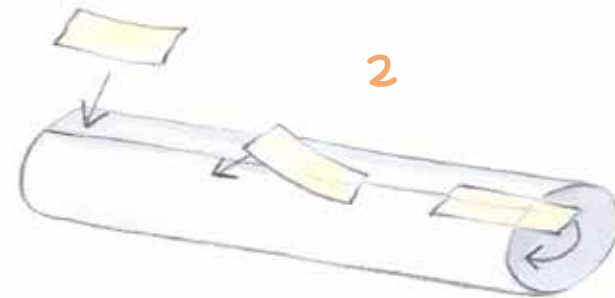
I've got a hole in my hand!



1 Take the sheet of paper and roll it into a tube, but being careful not to flatten it! Don't press strongly, just hold it. Stick it with the glue.

You will need:

- ◆ Sticky tape
- ◆ Stick of glue
- ◆ A sheet of white A4 paper
- ◆ (A hand)



2 Strengthen it with the sticky tape. It's best to fix it at three points: At the top, at the bottom and in the middle, so that it is well secured!

3 Place the tube in front of your eye. Yes, as if you were a pirate looking at a treasure island!

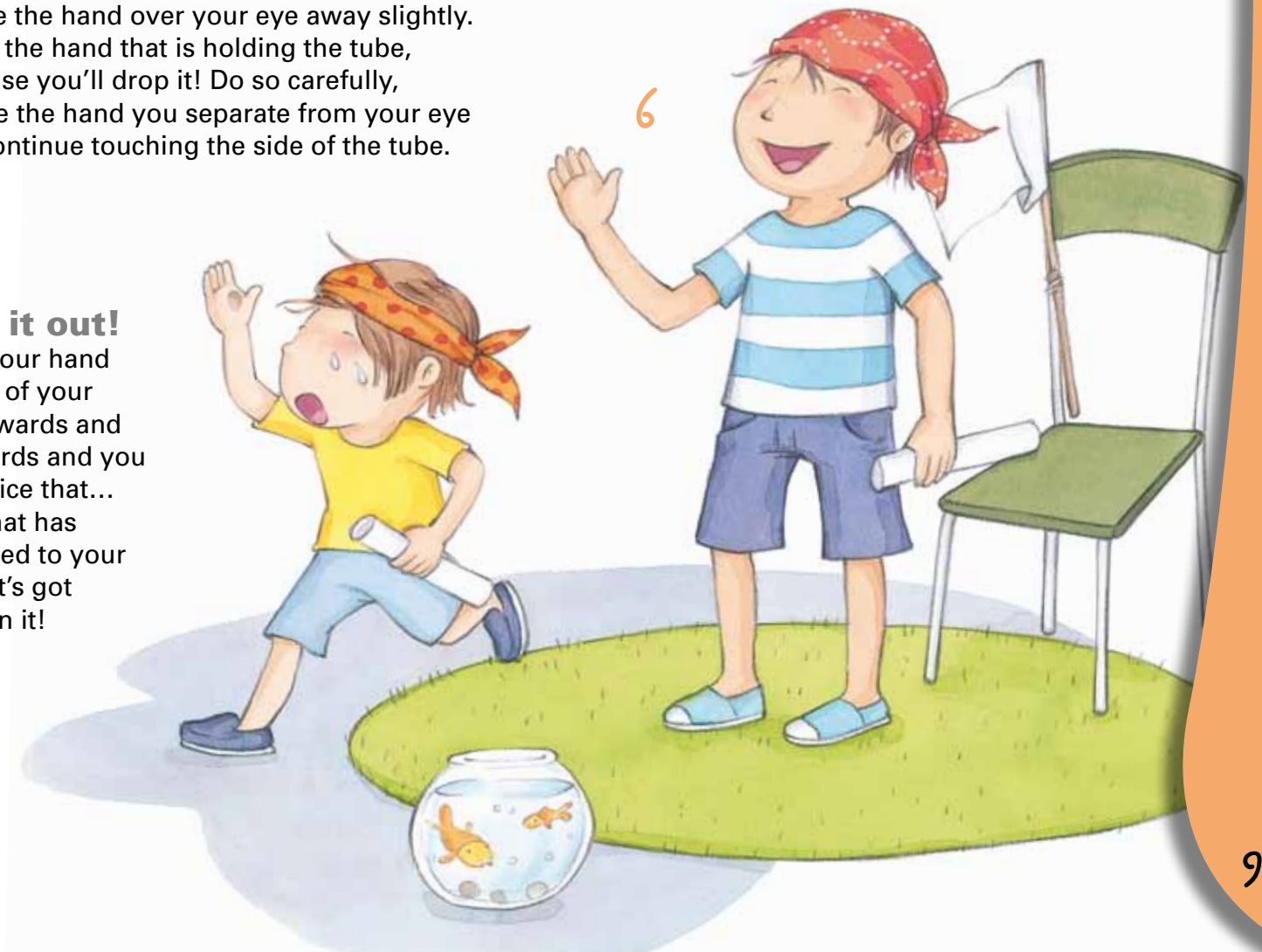


4 Cover the other eye with your hand, placing it so that it touches the side of the tube. Don't get your hand or your eye mixed up! What a muddle!



5 Move the hand over your eye away slightly. But not the hand that is holding the tube, otherwise you'll drop it! Do so carefully, because the hand you separate from your eye must continue touching the side of the tube.

6 Try it out! Move your hand in front of your eye forwards and backwards and you will notice that... Oh! What has happened to your hand? It's got a hole in it!



Why does it happen?

Your eyes work like two cameras: They receive the light that reaches them and take two photos that are similar but not identical, as each eye is in a different position. Your brain combines the images from both eyes to form a single image: This process is called **image composition**. If the images are found very close to your eyes, your brain places one image on top of the other and that's why it looks like your hand has a hole in it!



The eyes have memory!

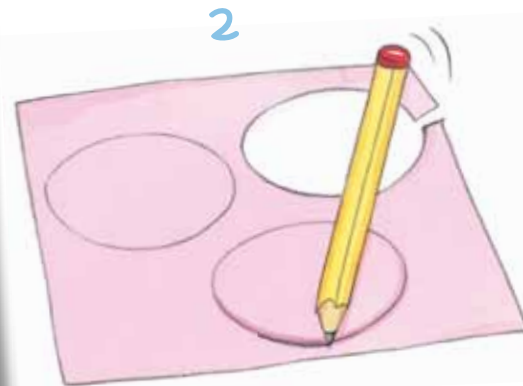
1 Place the glass upside down on the card and use it as a pattern for drawing a circle. Then cut out the circle, so!

2 Draw and cut two more circles, the same as the first!

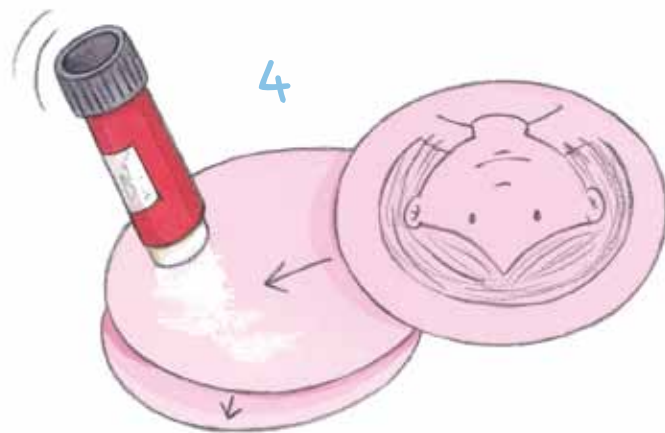
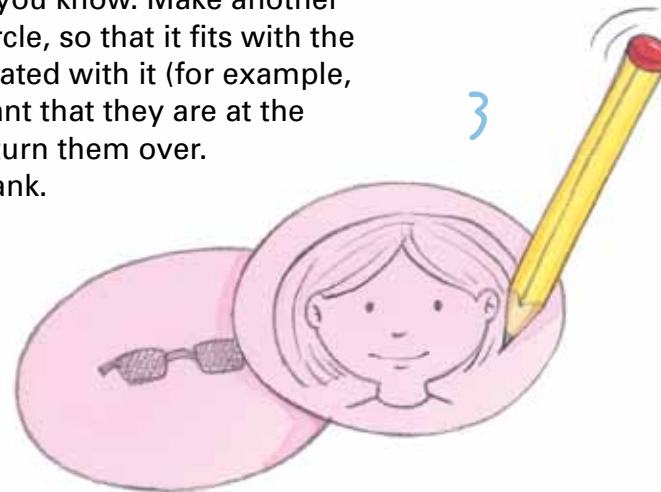


You will need:

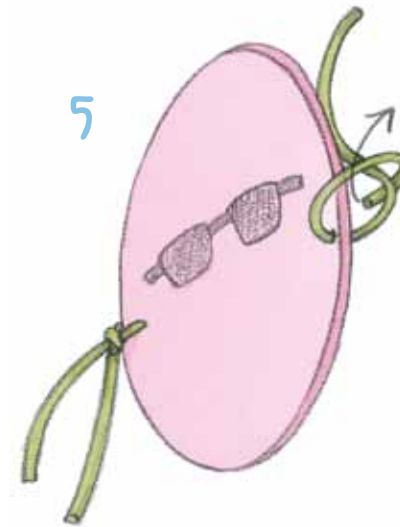
- ◆ Light colored card
- ◆ Pencil
- ◆ A glass
- ◆ Stick of glue
- ◆ Scissors
- ◆ Felt tipped pens
- ◆ Thin elastic or string
- ◆ A paperclip



3 Make a drawing you like on the circles, such as a portrait of somebody you know. Make another drawing on the other circle, so that it fits with the other drawing and is related with it (for example, sunglasses). It's important that they are at the correct level when you turn them over. The third circle stays blank. You can go over the drawings or color them in with pens so that they stand out better.



4 Glue the three circles so that the blank one is in the middle. The two with drawings must be on opposite sides, that is, one facing north and the other facing south.



5 Mark a point at each side of the circle and make a hole using the paper clip. If you can't make a hole in the card, try using a ballpoint pen. Then thread some elastic or string through the holes and tie them together well with knots.

Why does it happen?

When you see an image, the light that reaches the objects around you bounces off them and reaches your eyes. From there, the light travels a long path until **the image is formed in part of the eye called the retina** and then it reaches the brain, where it is interpreted. This process is quite slow and when you see two images very close together, the brain retains the first one as it starts seeing the second. That's why you see the sunglasses on the woman's face, despite the fact that the images are very different!

6 Try it out!

When it's ready, the great moment has arrived: Turn the elastic with your fingers! Then you will see both drawings superimposed! The person wearing sunglasses! Yes!





Colored bubble

1 Fill the two containers with water: The jug and the bowl. How generous! But you don't need more than two fingers of water; you don't need to waste it, do you?



You will need:

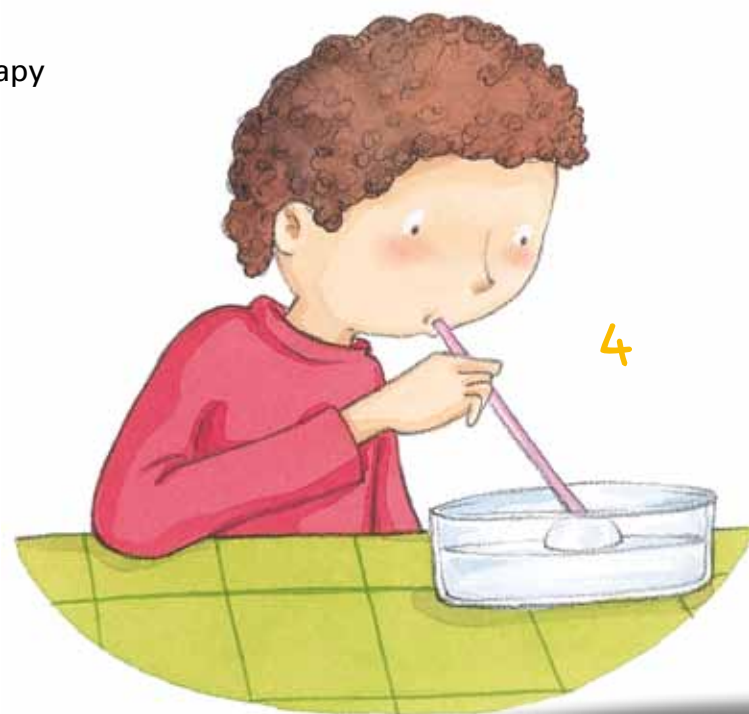
- ◆ A jug of water
- ◆ A low tray or bowl
- ◆ A glass
- ◆ Liquid soap
- ◆ Several drinking straws

2 Place a little soap in the glass with the water.



3 Wet the straw in the soapy water. You should obtain a soapy bubble mixture! Like a mini bubble bath! Cool!

4 Take the straw that you have just wet in the soap, fill your lungs with air and blow a bubble on the water in the bowl. Yes, very large!



5 Try doing the same on a table (its better if it has a glass surface) and blow one bubble inside the other! Even more difficult!

6 Try it out!

Place a dark background behind the bubble, such as a piece of black card and you will see a colorful bubble and how it changes color as you move it from one side to the other! Also, if you blow gently onto a soap bubble, you will see that the colors of the bubble create little waves. How Amazing!



Why does it happen?

What you saw in the bubble, as well as being a lovely sight, is the **phenomenon of interference** that occurs when several waves of light coincide at the same place and are positioned one over the other. You have seen that light is a wave: Well, in this experiment, what you see is that many waves of light coincide on the surface of the bubble and are reflected in your eyes. That's why you see bands of colors!