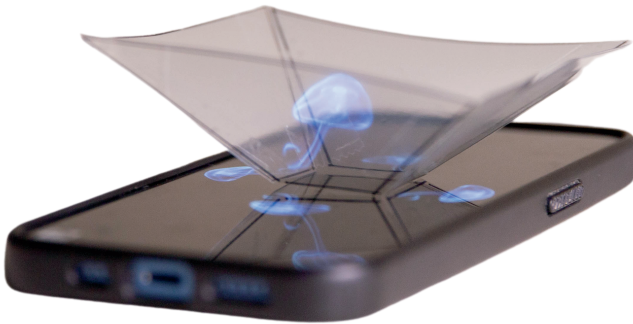




8-12

Physics, optics

Experiment guide

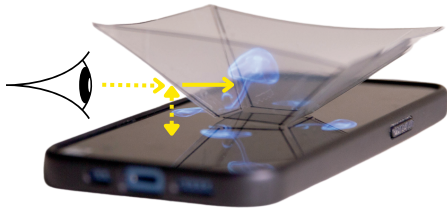


Floating pictures

Experience 3D like never before – easy to do at home!

What if you could turn a two-dimensional video into an impressive 3D spectacle? With this simple trick and a few everyday objects such as foil, tape and your phone, you can create a fascinating sensory illusion. Just imagine: Four people gathered around a smartphone, each with their own little 3D world in front of their eyes!

2D becomes 3D!



How does it work?

From the sketch you can see that the light from the phone screen comes from below and hits the foil. The rays of light are then bent (deflected) in a different direction before they hit your eye. Because your brain is trained to see light as a straight line, it now looks like the light is coming directly towards you, as if you were holding the phone upright in front of your face. This creates the illusion of a floating image!

Did you know?

Mirages, a similar phenomenon in the desert!

Plastic and air have one thing in common: they can deflect light. In the desert, rays of sunlight are deflected by layers of air at different temperatures, just like in your experiment. As a result, the blue of the sky is perceived as a welcome source of water.

Build your own 3D cinema:

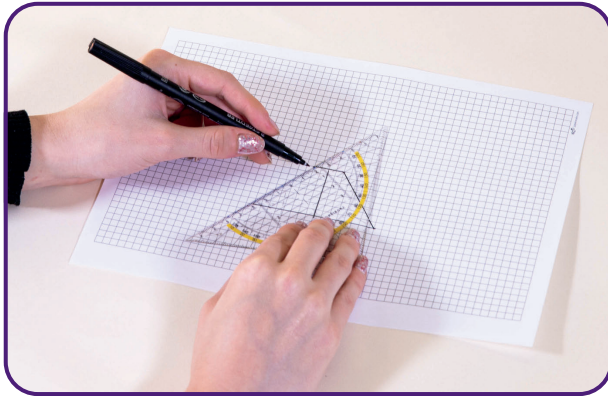
You will need:

- Sturdy plastic foil (for example: overhead transparency film, laminating film, food packaging...)
- Sheet of (squared) paper
- Scissors
- Adhesive tape
- Protractor triangle
- Ballpoint pen
- Waterproof marker
- Smartphone

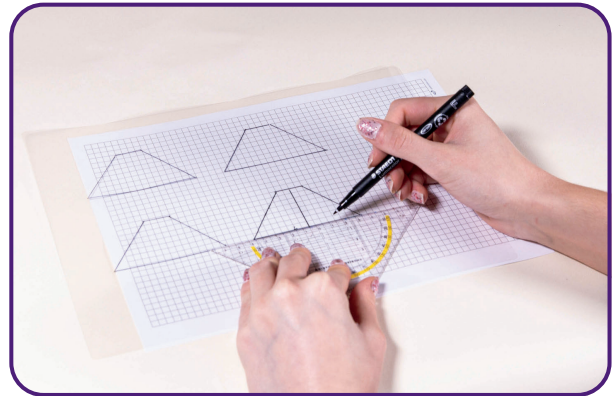


Let's go!

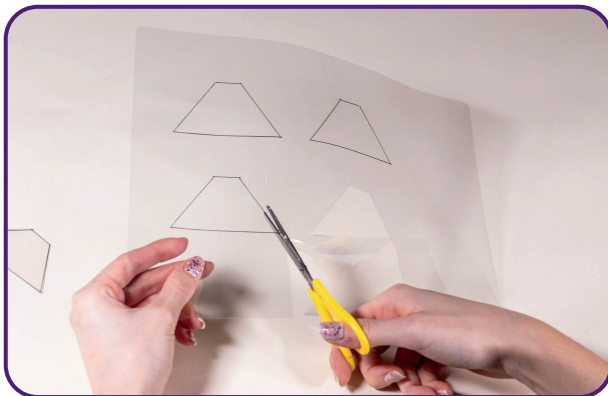
Step by step:



- 1 Take the sheet of paper, protractor and ballpoint pen, and use them to create a template for your trapezoids. The trapezoid should be 4 cm high, 8 cm wide at the bottom and 2 cm wide at the top.



- 2 Place the plastic sheet over your template and draw the outlines of four trapezoids on it with the waterproof pen.



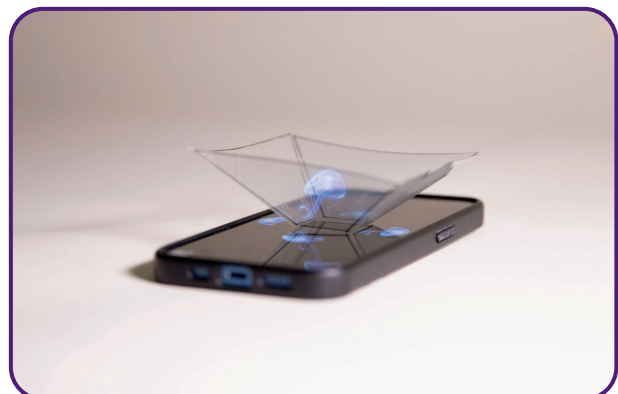
- 3 Cut out your trapezoids with the scissors.



- 4 Now stick the long sides of the trapezoids together with adhesive tape to form a pyramid.



- 5 Open the video "**Hologram Project by Kiste**" on YouTube. Scan the QR code to open the video.



- 6 Set the brightness on your smartphone to maximum and place the pyramid upside down (with the smaller opening facing downwards) on your screen. Darken the room as much as possible. Start the video and watch the objects float.

Want to try more experiments?

- ➔ Place the pyramid in a different position on your phone screen. What do you think will happen? Do you still see the same image as before?
- ➔ Adjust the brightness of your screen. What happens to your picture now?
- ➔ How can you adapt the pyramid so that you can even see floating images on a laptop screen?

Background knowledge

The behavior of light beams is central to this phenomenon. If a beam of light hits matter in a straight line, it can either pass through the matter, be stored as energy in the matter, be reflected or deflected. In our experiment, the light is deflected.

Scientists at ISTA are also making use of the fascinating properties of light. For example, researchers from the Danzl Group are developing new methods to make very small cells and molecules visible using light microscopy.