

How to make a pinhole camera

Introduction

We have all got so used to digital cameras – on our smart phones;
But 200 years ago the only way to capture an image was to draw or paint it.

Then in 1839 a French inventor called Louis Daguerre came up with a way to keep real images preserved on sheets of metal that he coated in chemicals.

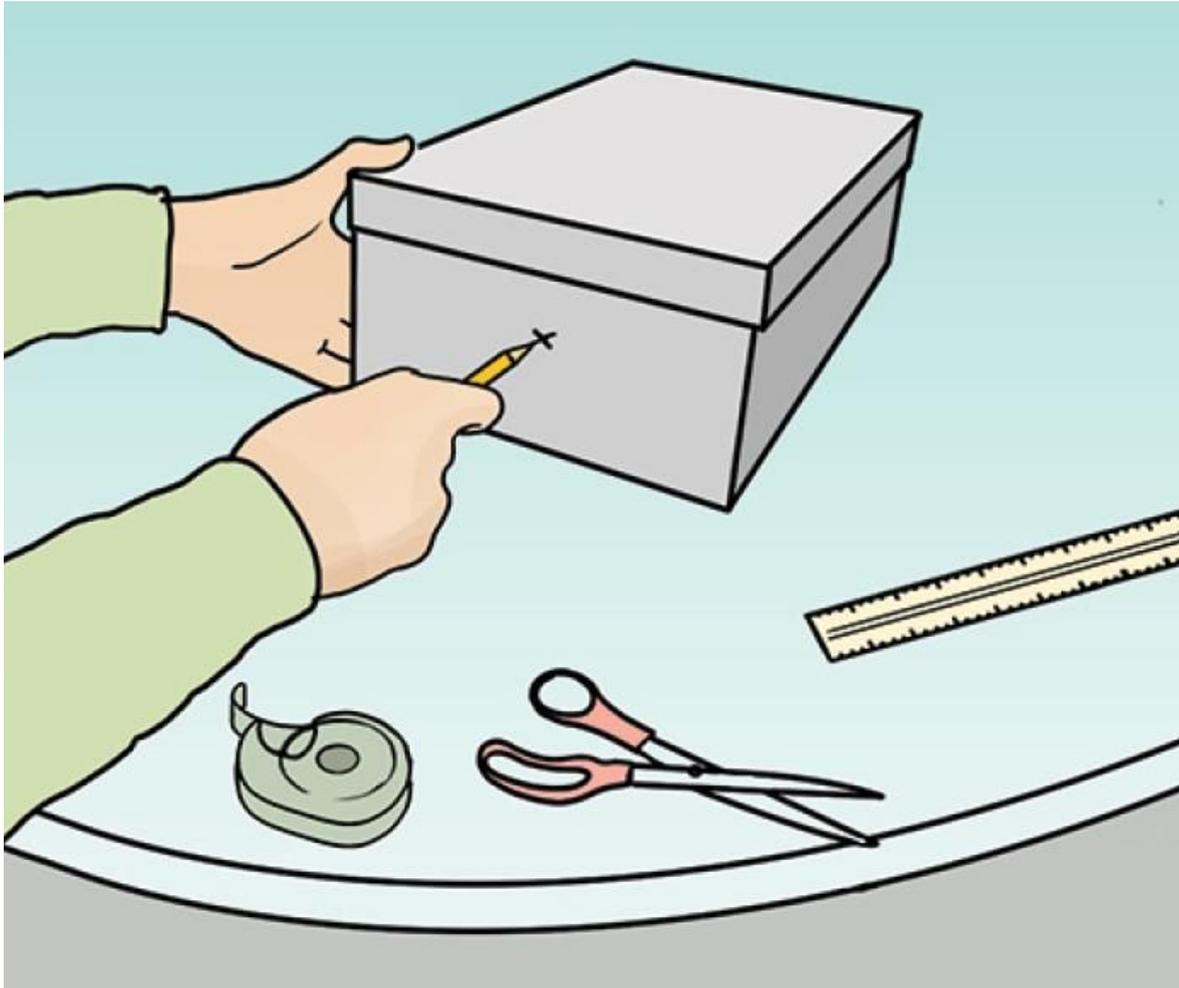
The challenge for you at home is to make your own pinhole camera – a simple device that really works without lenses and electronics. As ever for the tricky bits involving sharp objects you may want to get a grown up to help you.

What you need

- A box – a shoe box is ideal, but you can also use a cardboard tube (like the ones that contain curvy snacks that rhyme with dingles – make sure it is empty)..
- Something to make a pin hole – a pin is ideal
- Some scissors
- Tape
- Some tracing paper (or grease-proof paper from the kitchen)

This is what you do

Make sure that the box is light proof – so there are no other holes. Make sure that the lid fits snugly and doesn't let light in. If there are holes, cover them with tape, or wrap the whole box in paper.



At one end of the box, in the middle, make a tiny pin hole.

At the other end of the box, again in the middle, cut out a square shape about 5 cm (or 2 inches) square.

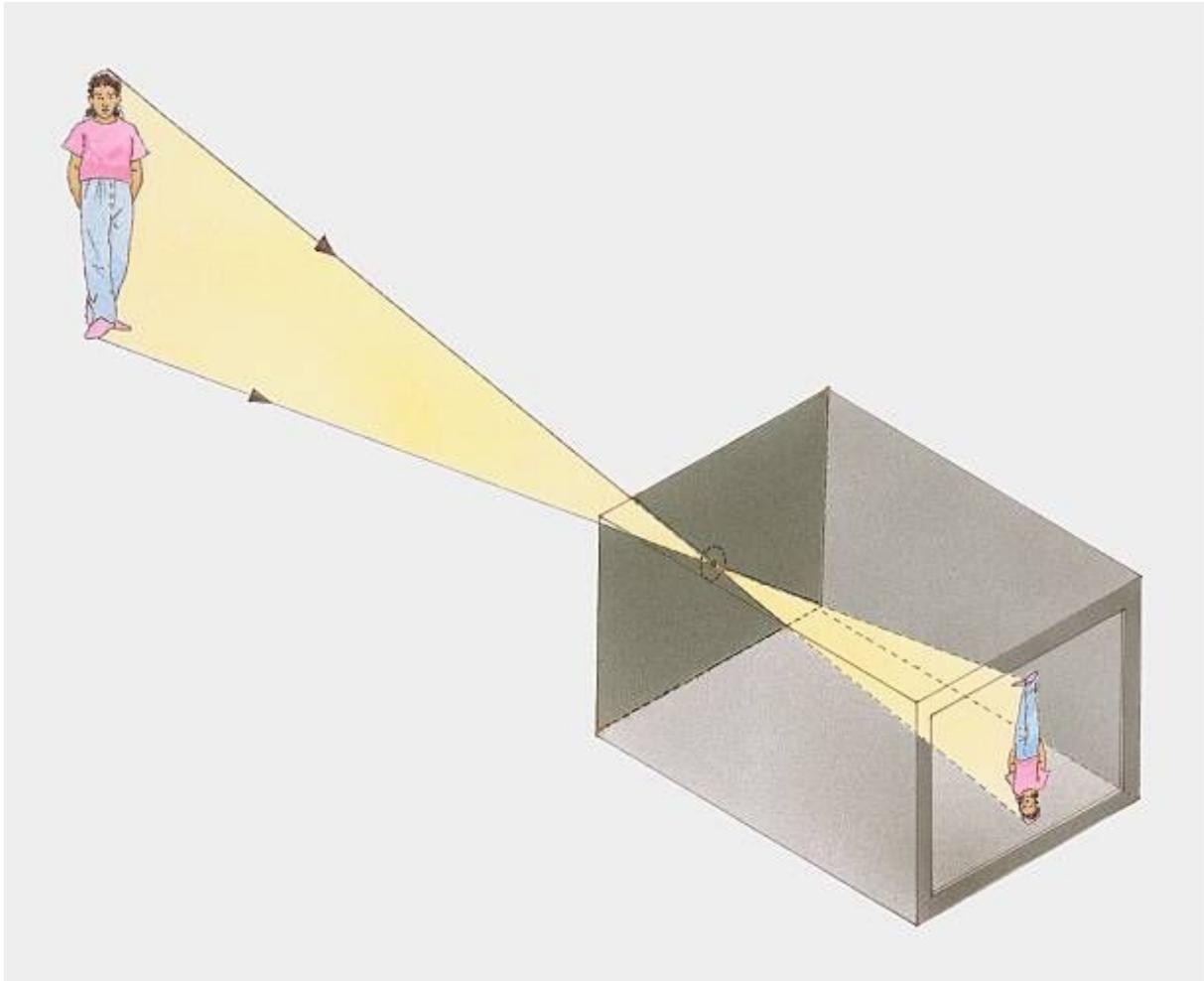
You now need to cover this square with the tracing or greaseproof paper – and to tape it securely to the box – so that you have a kind of window. This is the screen of the camera.

Put the lid on the box – and that's about it. That is your pinhole camera.

So how does it work?

Point the camera, that is the pinhole side of the box, towards a light object..
you could try pointing it at the window, or a light bulb, or even the TV..
The image that you are pointing at should appear on the screen of paper.

There is something odd about the image (it will appear upside down)..



What is going on?

Light from the object you are pointing at comes into the box through the very small pin hole, and because it is so small it acts like a focusing lens. The light is then projected on to the screen at the other end of the box.

This is exactly what happens in the eye. Light comes in through the lens of the eye (the black circle or iris in the middle of your eye) and is projected onto the 'screen' at the back of the eye (or the retina).

Does this mean that the image at the back of the eye is upside down? Well strangely yes it is... we actually do see the world upside down - except we don't of course. The nerve that connects the eye to the brain cleverly reverses the image for us and we do see things the right way up. This is called the optic nerve.

What would it be like if we did see the world upside down? How would we adjust? Maybe you could write a story about the world turned upside down.

Tips

The pinhole does need to be very small and as neat and round as you can make it.

The wall of the box that the light travels through the pinhole should be thin (like ordinary card). If you are using a box made of layers of cardboard (like corrugated cardboard), cut a square like the screen window, and tape thinner black card, or kitchen foil in the window and make the pinhole in that.

Other things you can try

How can you improve the sharpness of the image?

What happens if you have a different size box?

Or a different size pin hole?

If you can get hold of some light sensitive (photographic) paper, you can make actual photographs. But remember that light sensitive paper changes colour as soon as it is exposed to the light, so placing it on the inside screen of the box needs to be done in the dark. And you need a cover for the pinhole, so that light doesn't get in until you are ready and pointing at the subject of your picture.

Part of your photography experiments can be to work out how long you need to open (uncover) the pinhole to make a photograph.

So there you are – all in honour of Louis Daguerre – 182 years ago, the inventor of the camera.

Who else invented cameras in the 1800s – and what was different about the types of cameras that were invented then?

And when did moving images come along?

And when were digital cameras first invented?



This was Louis Daguerre's first photograph to include a human figure (in the bottom left hand corner) in 1838.