

**We're big believers in the power of play — and it's never been more necessary than it is now.**

We're sharing these three activities from our new book, *The Nature of Play: A handbook of nature-based activities for all seasons*, as free printable activities to explore at home. And whether you're remaining indoors or not, they offer a chance to slow down, connect once more with the world outside, and lose yourself in your imagination.

Like all the activities in *The Nature of Play*, they're simple, seasonal, require little more than curiosity, and provide a precious few minutes of calm enjoyment for children (and brief respite for adults!).

Please enjoy, share — and show us your wonderful creations on Instagram (@fannyandalexander).

For a year of making, exploring and wondering, purchase the full book here: <http://fannyandalexander.co.uk/book>

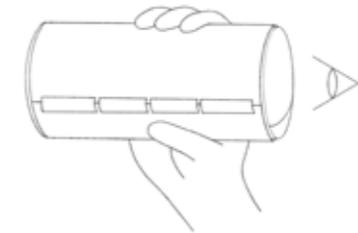
—  
1 hour  
All seasons  
Indoors and outdoors  
•• Adult assistance required

## Make your own pinhole camera

Get a new perspective on the world with this simple, satisfying camera.

### GATHER TOGETHER

- . An empty tube of crisps (Pringles or similar)
- . A sharp pencil or marker pen
- . A craft knife (ask an adult to help you with this part)
- . A drawing pin
- . Greaseproof paper
- . Glue
- . Scissors
- . A ruler
- . Masking tape
- . Aluminium foil



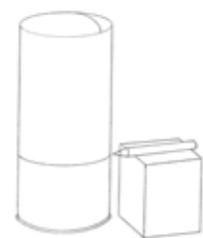


Fig. 1

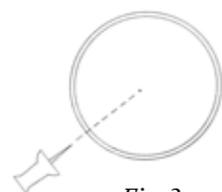


Fig. 3

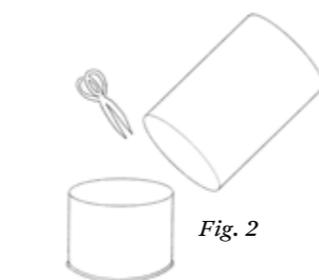


Fig. 2



Fig. 4

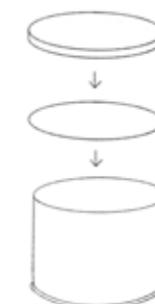


Fig. 5

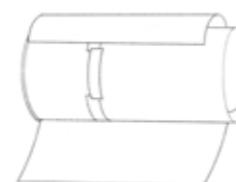


Fig. 7

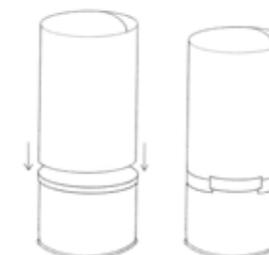


Fig. 6

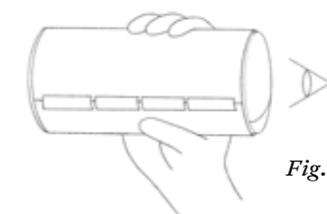


Fig. 8

ON A CAMERA, THE HOLE THAT LIGHT ENTERS THROUGH IS CALLED THE APERTURE.

**LET'S GO!**

**Step 1.** Prepare the body of your camera. Give the inside of your tube a thorough clean. Keep the lid as you'll need it in a minute.

**Step 2.** Mark your tube. About 5cm from the bottom of the tube, draw a line all the way around your cylinder. A good way to keep the line even is to find a small cup or box that's about 5cm tall and, putting it next to your tube, lie your marker or pencil across it so that the tip is just touching the outside of the tube. Don't move the pen – just hold it steady with one hand and rotate the tube with the other – you should get a straight line all the way around (Fig. 1).

**Step 3.** Cut your tube. Ask an adult to cut all the way around the tube where

you've marked your line using a sharp craft knife (Fig.2).

**Step 4.** Create your hole. On a camera, the hole that the light enters is called the aperture (which just means 'opening'). Push your drawing pin into the centre of the metal bottom of your tube to make a small hole (Fig. 3).

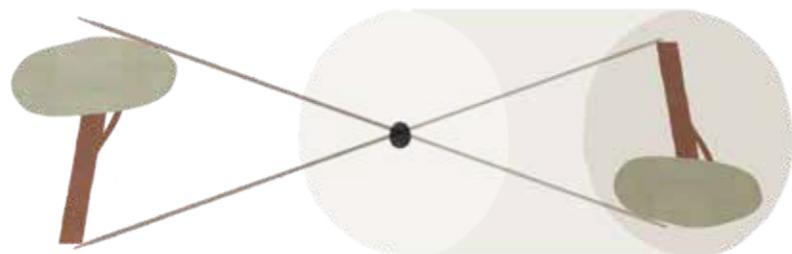
**Step 5.** Make your screen. On a piece of greaseproof paper or baking parchment, trace around the edge of your lid and then carefully cut out the circle shape. Glue the paper circle to the inside of your lid. Put the finished lid on top of the shorter piece of tube (Fig. 4).

Stack the longer piece on top and wrap the join with masking tape (Fig. 5).

**Step 6.** Wrap it well. Take a piece of aluminium foil measuring about 30cm by 20cm, and lie the tube on top so that the bottom lines up with the foil's edge. Roll the foil around the tube slightly and tape down one side. Wrap the whole tube tightly with foil and tape down – you need it to be completely sealed so that no light can enter your tube (Fig. 6). Tuck any overhanging foil into the open end of your tube.

**Step 7.** Take it for a spin. If it's a sunny day, cup your hands around the end of the tube to prevent light from entering, and look through the open end of your camera – you should see upside-down images on the screen inside (Fig. 7)!

Hold your hand in front of the aperture and move it up and down. The image you see will be doing the reverse! If it's a gloomy day, try it inside – turn a light on in a dimly lit room and stand facing it 1.5 metres away. Drape a blanket over your head to exclude any light from entering. You should see your lamp appear the wrong way up!



**FROM THE ARCHIVES**

This is the earliest kind of camera, and it's called a 'camera obscura'. They were used in China more than 2,500 years ago, and in 1,000AD an astronomer, Ibn al-Haytham, realised that they could be used to safely view solar eclipses. Ancient cultures feared solar eclipses, but there's nothing dangerous at all about them – provided you never look directly at the sun, which could seriously damage your vision. But with your camera obscura on hand, you're all set!

**DEAR GROWN-UPS**

The question this activity invariably provokes is 'But why is the image upside down?' So you're ready with a response, it's because light reflects off the surface of the object you're looking at. But it travels in a straight line, so light from the top of an object will pass downwards through the pinhole and to the bottom of the screen, and light from the bottom of the object will travel upwards through the aperture, making the object appear inverted. Now you know!

