

Home experiment: Pinhole cameras.

You are going to construct a simple pinhole camera and use it to form images.

Materials needed:

Light-proof cardboard box (e.g. old shoe box or smaller)

Aluminium cooking foil.

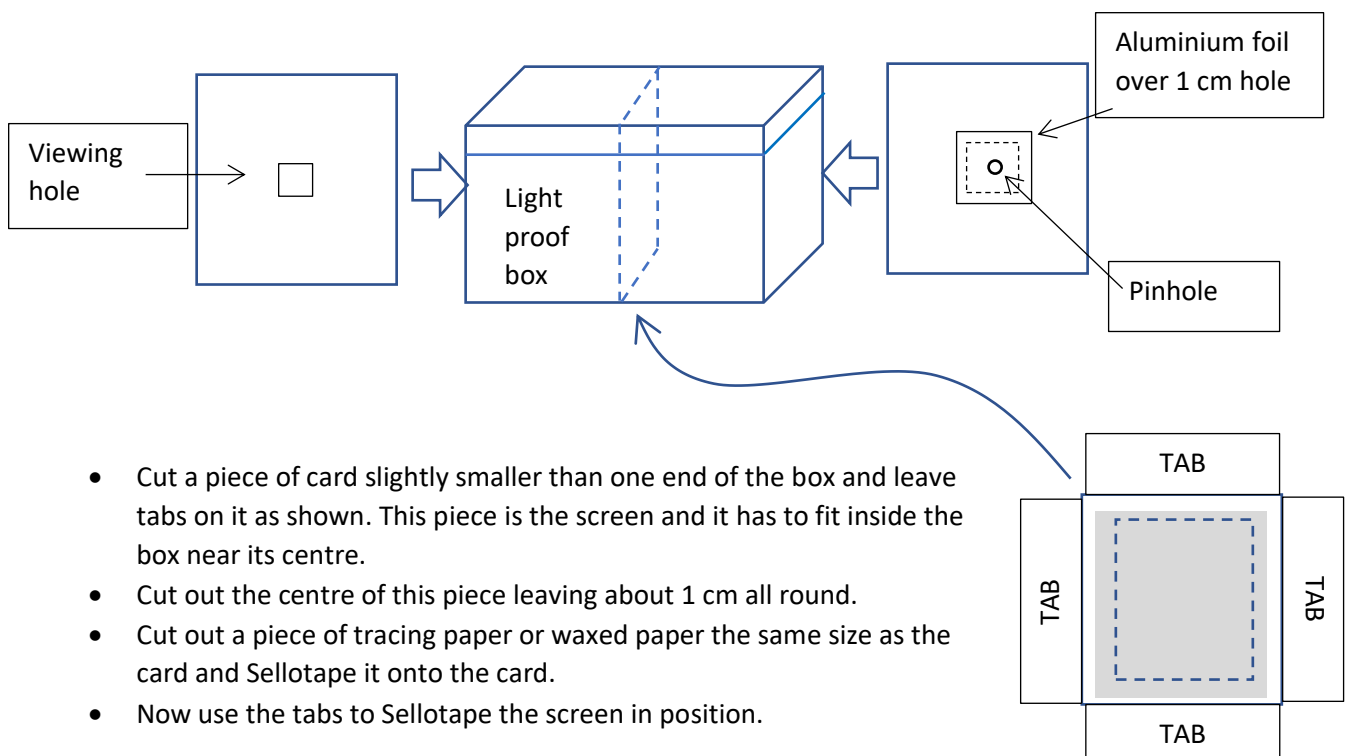
Tracing paper or waxed baking paper

Card

Sellotape

Instructions

- Cut square holes with sides of about 1.0 cm in both ends of the box.
- Place a square of taut aluminium foil so that it covers the hole and Sellotape its edges.
- Use a pin to make a small but clean hole (not jagged) in the centre of the foil.



- Cut a piece of card slightly smaller than one end of the box and leave tabs on it as shown. This piece is the screen and it has to fit inside the box near its centre.
- Cut out the centre of this piece leaving about 1 cm all round.
- Cut out a piece of tracing paper or waxed paper the same size as the card and Sellotape it onto the card.
- Now use the tabs to Sellotape the screen in position.

Using the pinhole camera:

- Point the camera at a brightly lit object
- Look through the viewing hole.

Experiments with your camera:

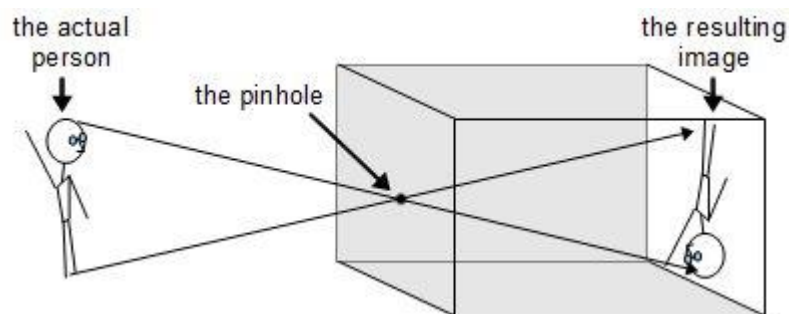
1. What are the features of the image formed on the screen?
2. How does the size of the image depend on the distance of the camera from the object?
2. What happens if you make the pinhole larger?
3. What happens if there are several pinholes?

Extension.

If you have a magnifying glass or convex lens handy make a larger hole in the camera and place the lens over it. By changing the position of the screen you should be able to form some bright well focused images!

How it works

Light reflected from each point on the object passes through the pinhole to form a point of light on the screen.



- Try to explain the results of your experiments by drawing simple ray diagrams like the one above.

Interesting fact: Another name for a pinhole camera is a **camera obscura**. Some are large enough for people to walk inside and view the image on a wall or table!

Now try the home experiment to build a sunspot viewer.

