nanogirl's LAB

SUPER POWER: Lenses!

PINHOLE CAMERA

LAB NOTES...

What is going on

We see things because light in the form of light waves bounces off all the objects around us, and into our eyes. If we could look inside our eyes, we would see a clear, curved jelly–like shape called the lens. It looks a bit like a contact lens. The lens in your eye is the first part of your body that light meets when it comes in.

When light bounces off something else and hits our eyes, we call it reflection. Most of the light that reaches our eyes has reflected off something else. Light likes to travel in straight lines. If our lenses were flat like the baking paper in your pinhole camera, we would probably see everything as an

UPSIDE-DOWN REFLECTION

The curved shape of our eye lenses actually bends the light back around, so that we can see things the right way up.

TO MAKE A PINHOLE CAMERA...

BUILD TIME 15 MINS

1. Watch the video of Nanogirl making her pinhole camera
2. Take one piece of card and roll it into a tube about 5–10cm wide.
3. Tape down the sides and make sure that there are no gaps.
4. Cut a square of baking paper large enough to fit over one end of your tube.
5. Place the baking paper over one end of the tube and hold in place with an elastic band.
6. Tape down the sides of the baking paper, making sure that there are no wrinkles or folds in the paper across the end of the tube. Take off the elastic band once it's taped securely.
7. Take the other piece of card and roll it loosely around the first tube to make a bigger tube.
8. Tape down the sides.
9. Cut a square of kitchen foil large enough to fit over one end of this tube.
10. Place the kitchen foil square over one end, and use the elastic band to keep it in place.
11. Carefully use a pin to make a tiny hole right in the centre of the foil. You might need to ask an adult to help you.
12. Slide the smaller tube, baking paper side into your larger tube.
13. Find something to look at, in a place with lots of light.
14. Push the smaller tube into the bigger tube so that the baking paper almost touches the foil.
15. Hold your pinhole camera up to one eye, close the other eye and look down the open end of the tube at the baking paper.
16. Slowly move the two tubes apart keeping it up against your eye. You should see a tiny bright dot from the pin-hole, eventually an upside-down image of what you are pointing at should appear.
17. It might help to put a dark blanket over the top of your head to stop light coming in to your eyepiece.

YOU WILL NEED

- 2 x sheets of A4 size card ◯
  (black works better but not essential)
- Baking paper ◯
- 1 x elastic band ◯
- Tape ◯
- Kitchen foil ◯
- Scissors ◯
- Pencil ◯
- Pin (e.g. safety pin, drawing pin) ◯

When you look down the pinhole camera with the baking paper and the foil at the right distance, you should see an upside–down picture of what you are looking at. Does the picture get sharper or more blurry if you keep on moving the baking paper further away from the foil?

How far away from something do you have to be to see it clearly in your pinhole camera?

Why do you think putting a blanket over your head to block the light by your eye helps?

What do you think would happen if you made the pinhole a bit bigger and let more light in?

Why do you think black card works better for the tube than white card?