

## ACTIVITY

### HOW YOUR BRAIN SEES THE WORLD

Your brain usually interprets the information from your eyes to give you one image. By separating the information that goes into each eye you can explore how your eyes and your brain work.

#### WHAT YOU NEED

- a well lit white wall
- Two sheets of white paper (about A4 size)
- Transparent sticky tape



#### WHAT TO DO

1. Roll up one piece of paper so that you have a long tube about 2 cm in diameter (this will be about 30cm long if you use A4 paper). Use the tape to keep the tube from unrolling.
2. Cut a strip off the second piece of paper that is about 30cm long and 7cm wide (this is a third of an A4 piece of paper). Take the smaller piece of paper and roll it into a tube and use the tape to keep the tube from unrolling. This tube should be the same diameter as the first one.
3. You should have two tubes that are the same length but one has thicker sides.
4. Now try these two experiments

#### HOLE IN THE HAND

Take the first, thicker tube that you made from the full sheet of paper and put it up to your right eye. Keep both eyes open. Place your left hand against the side of the tube so that you can see the palm of your hand. Move your left hand backwards and forwards and, keeping the tube against your right eye, move the tube up and down.

#### WHY?

One eye sees a hole and the other sees a hand. When your brain combines the image you get a hole in your hand!

#### LATERAL INHIBITION

Take the first, thicker tube that you made from the full sheet of paper and put it up to your right eye. Keep both eyes open. Look at the wall. Notice that the bit of the wall that you see through the tube is lighter than the rest of the wall. Try the same thing with the thinner tube you made out of a strip of paper. The wall looks darker through the tube than through your left eye.

#### WHY?

When light receptors in your eyes receive light, they send a signal to your brain. The receptor also sends signals to other receptors, telling them to turn down their sensitivity to light. When you look through the tube made from a full sheet of paper, the spot appears brighter. This is because the receptors here are not turned down as the thick tube creates a surrounding dark ring so no signals are sent. When you look through the thin walled tube the spot appears darker. This is because light comes through the sides of the tube, causing the receptors at the centre of your view to be turned down. This is known as lateral inhibition.

You can see this effect by looking at the Hermann Grid below. Look between the black boxes and you can see what looks like grey splotches. These are due to your eyes turning the receptors up near the dark areas where the boxes are and down in the bright areas between the boxes.

