

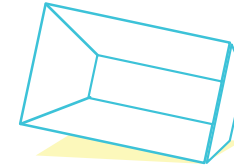


# SUPER POWER: Depth Perception!

## DEPTH PERCEPTION BOX

### LAB NOTES...

#### TO MAKE A DEPTH-PERCEPTION BOX...



1. Watch the video of Nanogirl making her depth-perception box.
2. If your box has a lid like a shoe box keep it open. If your box does not have a lid, you might need to cut a flap in the top so that you can get your hand inside.
3. Measure and cut a small viewing window 1 cm wide, in the centre of the long end of your box.
4. At the other end of the box, poke two small holes using a sharp pencil or scissors, just wide enough for your sticks to fit in.
5. Thread one stick through each hole so that they are half-sticking into the box
6. With your ruler, measure how wide the box is, and draw a line that long on your paper or card. Make this into a rectangle as wide as your shoebox.
7. Draw two rectangular tabs about 5cm wide onto each short end of the rectangle
8. Cut out the rectangle, and bend each tab backwards.
9. Place this rectangle into the box close to the end with the sticks, and tape the tabs into place along the sides so that the far end of the box can't be seen from the viewing window.
10. Poke your two sticks through this rectangle shape.
11. On your paper or card, draw and cut out two small coin-sized circles, one slightly bigger than the other.
12. Using tape or blue tac, stick one circle on the end of each stick.
13. Look through the viewing window at the circles using only one eye.
14. Move the sticks forwards or backwards until the two circles look like they are the same size.
15. Use both eyes to look at the circles from the top of the box to see how your one eye was tricked through distance.
16. Try this out on your family - ask them to use one eye through the viewing window and tell you if the circles are the same size.

### What is depth perception?

With both eyes open, we can see that things which are very close look bigger, and things which are far away look smaller.

It's important for our eyes and brains to be able to tell how far away something is so that we don't walk into things all the time! Your brain uses information from light reaching both eyes at once to make sure that the images coming from both eyes are the same. That's how your brain knows how far away something is – using two eyes it can always check that it has the right information about how far away something is against how big it is. We call this...

### DEPTH PERCEPTION

When you looked through the box, you could only use one eye, so your brain was missing half the information it usually uses to tell how far away something is, and couldn't check its own information very well. Only using one eye probably made it harder to tell which circle was closest when they looked the same size.

### YOU WILL NEED

- Cardboard box .....   
e.g. shoebox, tissue box
- Scissors .....
- Tape .....
- Two sticks the same length....   
e.g. wooden skewers
- Card .....
- Blue tac .....
- Plain paper or card .....   
at least as wide as your box
- Pencil .....
- Ruler .....

**Hold up one finger right in front of your nose.** Do you see one finger or two? Slowly move your finger backwards until you start to only see one finger. Measure this distance with a ruler, it should be about 2 cm in front of your eye. This is your "focal length". Your brain is great at measuring distances for everything further away than this point, but not so good at seeing everything closer than this point!

**FIGURE OUT WHICH EYE IS YOUR SUPERHERO EYE** by making a triangle with your hands and looking through it at something far away. Move your hands slowly back towards your face until they are not quite touching your nose, making sure that you can still see the object.

**Close one eye and then the other.** You may find that with one eye the image seems to jump whereas it stays the same for the other eye. The eye where the image didn't jump is your dominant eye which is really good at measuring distance.

**Measure the focal length of everyone in your house. Does everyone have the same focal length? What about dominant eye, does everyone have the same eye that is dominant?**