

# Reversible Ears

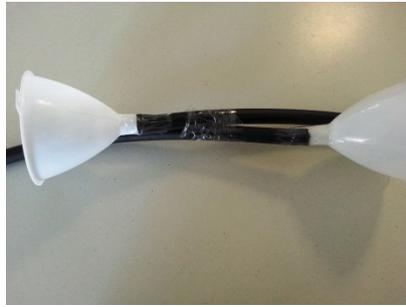
*Sound is an amazing thing!*

Build this simple toy to trick your ears into hearing things from the wrong direction!

**Gather the materials:** two funnels, sticky tape, blue tac for safety, and two lengths of thin plastic pipe.



1/ Attach a funnel or roll of cardboard to one end of each piece of pipe. You may need a grownups help to cut the end and insert the funnel. Then you should tape the funnel on.



2/ Tape the two pieces of pipe securely together, with the funnels quite close to each other but the open ends pointing in opposite directions.



3/ It makes good sense, especially if you piping is quite firm, to soften the ends with blue tac. This prevents you from scratching your ears by accident.

Now turn the ends around and listen. **THE WORLD IS REVERSED!**

How it works: The sound waves are collected by the funnels, and travel down the tube to your ear.

Your brain uses the slight difference in time between when the sound arrives at one ear compared to the other ear to help it determine where a sound is coming from. With this toy, you can trick your brain into thinking the sound is coming from the opposite direction by channelling the sounds into the furthest ear first. Heaps of fun!!



Tips: You may also use cardboard rolled into a funnel shape. It works best if the tube is right at the end of the funnel, not sticking out into the middle of the cone.

What is that sound? Is it the ocean? Actually, sound is made from waves, and waves each have a certain size. That whooshing echo sound is the tube filtering out all sound waves that don't fit in quite right.

### **Creating science:**

Can you develop an improved model that cuts out the outside sounds completely so that the only sound coming into someone's ears are from the reversible ears? Do the reversible ears work if the funnel (not the part you listen to!) are under water? If the piping can focus the *sound* down it's length, are there tubes that can carry *light* instead?

**BE CAREFUL!**

**DON'T** shout into the cones when the reversible ears are set up. The sound is amplified by the cone shape, and can be so loud it can really **HURT**. Be careful.