

Coat hangers

Materials

- Wire coat hanger
- String, two pieces, each about 50 cm long

Instructions

1. Tie a piece of string to each of the curved corners of the coat hanger
2. Take the end of one piece of string and wrap it around one of your index fingers, holding it in place with your thumb.
3. Take the end of the other piece of string and wrap it around your other index finger. Hold it in place with your thumb.
4. While standing, put your index fingers in your ears and lean forward, so the coat hanger swings freely in front of you.
5. Have a helper hit the coat hanger with a hard object, such as a metal spoon, ruler or pen. Alternatively, swing the coat hanger so that it hits a hard object, such as a table leg.
6. Take your fingers out of your ears and hit the coat hanger again. Does it sound any different?



For younger children, they might find the coat hanger easier to use if plastic cups are attached to the ends of the string. They can then hold the cups over their ears, instead of putting their fingers in their ears.

What happens?

When your fingers are in your ears, the sound of a hard object hitting the coat hanger sounds quite loud and the sound lasts a long time – it sounds a bit like a “Bong!” sound from a bell. Sound moves quite easily through solid objects, like the coat hanger and the string, so a lot of the sound energy reaches your ears.

When your fingers are NOT in your ears, the sound is much quieter and doesn’t last very long. In this case, the sound must travel through air to reach your ears. The sound energy spreads out in all directions through the air and only some of the sound energy reaches your ears. Also, sound doesn’t move as easily or as quickly through air as it does through a solid object, so the sound is much quieter than when your fingers are in your ears.

Why does it matter?

It is important for scientists and engineers to understand how sound energy moves through different materials, such as solids, liquids and gases. Sound insulation is important for designing many things including buildings, cars and aeroplanes. Understanding how sound moves through air affects the design of speakers and sound systems for cinemas, sports arenas and music venues.

Related activities

Try replacing the coat hanger with different object such as a metal spoon or fork. Does it work with a wooden spoon?

Listening to sound through solid objects: Place one ear against solid objects and tap them to explore any differences in sound. Put one ear against a cup pushed against a wall to listen to the sounds coming from the other side of the wall.

Listening to sound in a liquid (an activity to try at home) – Place one or both ears underwater in the bath. Tap the side of the bath and hear how loud it sounds. Lift your ears out of the water and tap the bath again. The sound will be much louder when your ears are under the water.

Mystery sounds: Collect a range of objects that make sounds (e.g. musical instruments, saucepan with lid, whistle, rice in a container, squeaky toy) and hide them behind a box or in a bag. Ask children to guess what object is making each sound.