

# PLANET LANGUAGE



## Noisy coat hangers



Sound is like a wave and can travel through different substances. But it travels at different rates.

Today we want to answer the following question: Can you hear better when you put your fingers in your ears? No? Watch..!



### What you need:

- One wire coat hanger
- Two pieces of string each about half a metre long
- A metal spoon



## What to do:

1. Take the wire coat hanger and turn it upside down so that the hook is pointing towards the ground.
2. Tie a piece of string to each of the corners of the coat hanger now at the top.
3. Wrap about half of the strings around your index fingers so that the coat hanger can hang down freely.
4. Sit on a chair and lean forward so that coat hanger hangs down in front of you, not touching your body or the floor.
5. Get a friend to hit the coat hanger with the spoon and notice that you don't hear very much.
6. Now, with the string still wound around them, stick your index fingers in your ears.
7. Get your friend to hit the coat hanger with the spoon again - this time it should be much louder.



## Why?

Sound waves travel through a substance (like air) by making its molecules vibrate. As one molecule receives the energy of the sound wave, it moves, bumping into a nearby molecule which then moves and bumps into another one and so on. The sound

wave is passed through the substance by a long series of different collisions.

In gasses (e.g. in air), the molecules are spread out and they have to move fairly far before they can hit each other. They are also free to move in any direction so the sound wave can spread out in all directions so the sound can't travel very far before becoming very quiet.

In solids (e.g. a metal), the molecules are all much closer together and the vibration can be passed from molecule to molecule very quickly. The molecules in solids can also only vibrate in certain directions, transferring the sound very efficiently.

In this activity, when your fingers are in your ears, the sound waves travel straight through the coat hanger, straight up the string and straight into your ears. Less sound is lost and you hear a louder clang that when you were listening to the sound wave that had travelled through the air to reach your ears.

