

# Sound insulation

Outstanding Science Year 4 - Sound - OS4D002

## National Curriculum Statutory Requirements

**4D2** - recognise that vibrations from sounds travel through a medium to the ear; **LKS2W3** - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers; **LKS2W5** - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables; **LKS2W9** - using straightforward scientific evidence to answer questions or to support their findings;

### Learning Objective



I can investigate how well sound travels through different materials.

Me:

Teacher:

### Scientific play

Ask your partner to talk to you. Place your hands over your ears. How does this change the sound? Why does this happen?



### Scientific question

Which materials are best at blocking sound?

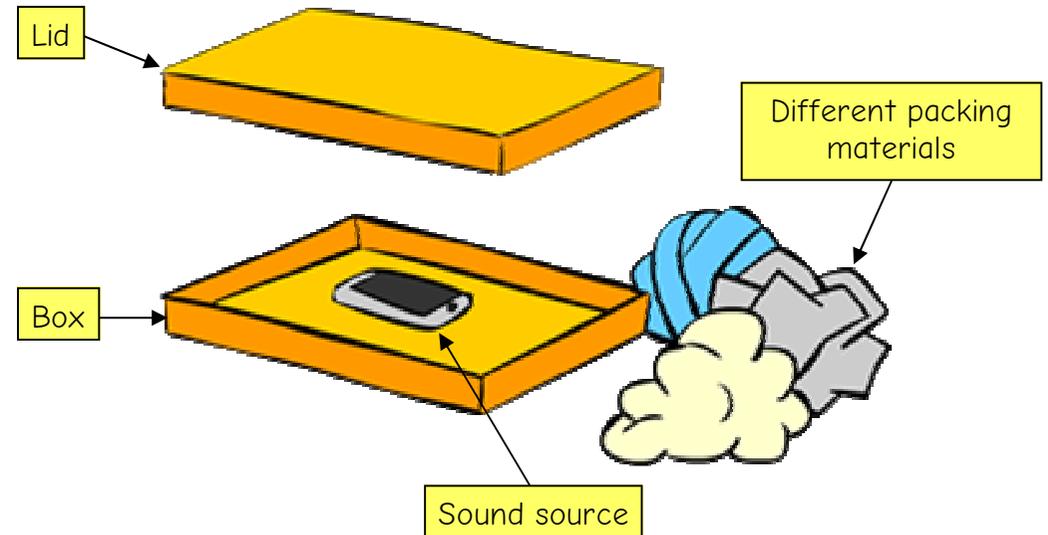
### You will need:

- A sound source (such as an alarm clock, metronome or mobile phone)
- A box with lid (to place the sound source inside)
- 5 different packing materials, such as tissue paper, newspaper, packing chips, a towel and cotton wool

### Method

Listen to the sound source outside of the box. The loudness of the sound that you are hearing is **100%**. Predict the loudness of the sound when it is inside the box with no packing material. Give your prediction as a percentage and record it in the table.

Figure 1. How to set up the investigation



Place the sound source in the box with no packing material and close the lid. Give the loudness of the sound that you can hear as a percentage. Record this in the table.

Predict and then measure the loudness of the sound source when it is placed in the box surrounded by the first packing material. Repeat for the 4 other packing materials.

Repeat the entire investigation twice again, so you have **three measurements** for each packing material. We do this because it is very hard for us to measure the loudness of a sound without special equipment. We repeat the measurements to try and be more **accurate**.

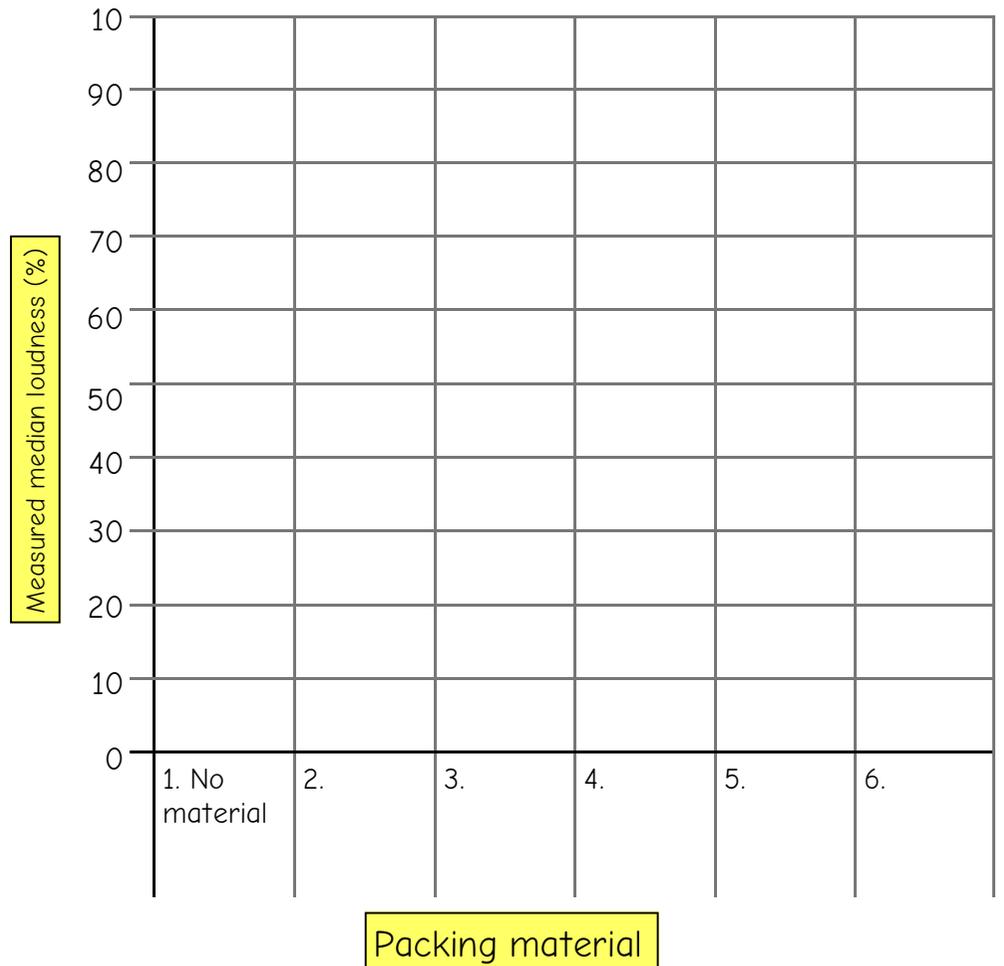
Table showing the loudness of a sound source when placed inside a box with different packing materials

Name of packing material	Predicted loudness (%)	1st measure (%)	2st measure (%)	3rd measure (%)
1. No material				
2.				
3.				
4.				
5.				
6.				

Look at your three sets of measurements for the first packing material. Which one is the highest? Which one is the lowest? Which one is in the middle?

Choose the measurement that is **in the middle** and put a circle around it. This is the measurement we are going to use in our **bar graph**. When we put our results in order and choose the middle one, it is called finding the **median**. The median is a type of **average**. Repeat for all 6 sets of measurements.

Bar chart showing the loudness of a sound source when placed inside a box with different packing materials



### Discussion

Which material is best at blocking sound? How do you know?  
 Can you put the materials in order of how well they block sound, from worst to best?  
 Was our test fair? Why? How could you make it fairer?  
 Which material would make the best ear defenders?