

# Sound and Distance

**Subject: Physics**

## Overview:

Sounds are all around us from traffic in noisy streets to birds in the country side. Have you noticed, however, that some sound is loud and some is quiet? Why? What can change the loudness of sound ?

## Aim:

Using the sound sensor we can investigate one of the properties of sound – its volume or loudness. The class can spend some time discussing loud and quiet sounds and what can effect the volume (the change between noisy and quiet).

## Equipment required:

LogIT Datalogger  
Datalogging software, computer,  
Constant sound source e.g. electronic keyboard, radio not tuned to a station ('hiss')  
Metre rule to measure start and finish distance.  
Clamp stand (optional)

## Hazards:

Children should be supervised at all times.

Prolonged exposure to high noise levels (e.g. of 90dB or more) can result in permanent damage to your hearing.

If used outside shield sensor from wind and ensure that no liquid contacts any of the datalogging equipment or cables.

Always check your local regulations or the school advisory service such as CLEAPSS or SSERC for guidance on the use of any hazardous material.

## Method:

1. Place the metre rule on a flat desk with the sound source at one end.
2. Mount the Sound sensor in the clamp stand and position it in front of the sound source.
3. Turn on the sound source.
4. Turn on the datalogger or start the software.
5. Slowly move the sound sensor away from the sound source - ensure that the sensor is kept pointed at the source.
6. At about 1 metre stop logging.

## Results:

- Did the level of sound change with distance?
- What shape graph was plotted - was it a gradual slope?
- Did the volume continue to drop or did it fall to a certain point and then remain there?
- Was care needed in 'aiming' the sound sensor at the sound source?
- Did the type of sound source matter – try different sources (ensure their volume is set so that the starting level is the same as the original sound source; also ensure that the sound sensor is the same starting distance from the source).

## Going further:

- What else can effect the loudness of a sound ?
- Do sounds appear to be the same loudness to everybody ?
- Think about noise pollution.
- Study the difference between noise in the school, by roads and in rural areas.
- Monitor and analyse classroom noise for a day
- Monitor traffic noise - do certain vehicles make more noise than others ? did the noise level change during the day ?
- Point the sound sensor across a road (at a 90° angle to the kerb side) and notice what happens when a vehicle passes from one side to the next - passing in front of the sound sensor.