

Folder: Science P1-3
Topic: Energy – Sound, p21-22
Level: B

- How do we detect sound?
- Sound travels in all directions

Introduction

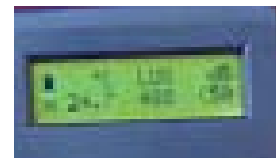
The key Level B Attainment Target for sound energy is to link sound to hearing. However, LogIT Explorer can be used to confirm and reinforce sound observations that pupils have made with their own ears, by actually measuring the sound levels. The simplest way to use Explorer is without a computer, by reading the digital display.

Just switch on the Explorer and read the digital display (measured in dB or decibels) as different noises are made. Pupils do NOT need to understand or know about decibels, simply that the numbers are bigger or smaller.



The drawback for young pupils of measuring sound this way is that the display also records temperature and light, which may be confusing. Also, the sound reading will have to be read very quickly for short noises.

Using the Explorer in this way may therefore have to be a teacher-led activity.



However, if you have access to a computer, you can use the software to demonstrate sound changes very clearly, even for young pupils

You need:

LogIT Explorer, connected to the computer with the USB cable (see 'An introduction to using the LogIT Explorer datalogger' document)

Musical instruments (optional)

A source of steady sound, eg badly-tuned radio hiss, buzzer or timer (optional)

Ideally, a projector so that the whole class can see the display clearly

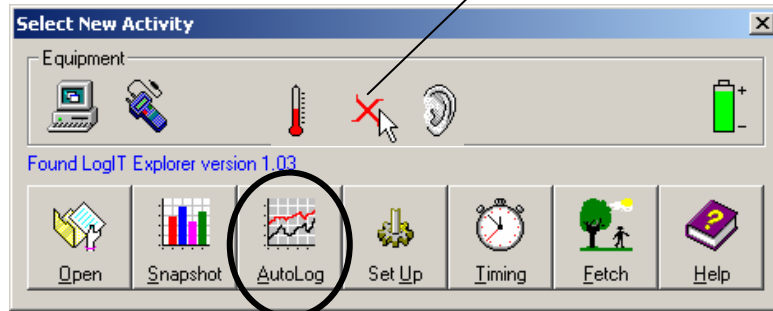
Now here's what to do:

Step 1



Switch on the datalogger with the green start button. Double click to open LogIT Lab Level 1. Click to cross off the other sensors, leaving only the sound sensor.

Open RM Favourites folder, then look inside the Datalogger folder.



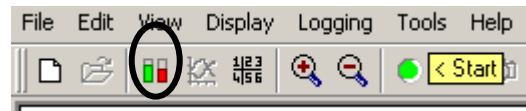
Step 3

Click the Autolog option.

Step 4

The Autolog option opens as a graph. (See Step 8 if you feel your pupils are able to interpret a line graph). The best way to introduce the LogIT is to look at the Display Meter first. Find it in the tools above the graph.

Click the Display Meter tool and you will see the sound bar which will move as the data changes.



Step 5

Test out the sound meter bar by making different sounds. Make the link between the volume of the sound and the height of the bar. See who can cough loudly enough to make the bar go off the scale. Can the datalogger 'hear' a pin drop? Can you be so quiet that the bar does not show at all? Different sounds can be compared by the teacher marking where Sound 1 reached on the sound scale (blutak a marker) and then seeing whether Sound 2 is louder or softer. Discuss fair testing – the sound sensor should be the same distance from each sound and pointing towards it.

Step 6

Use musical instruments. Who can play the drum really quietly? Mark a level on the sound bar, by sticking on a marker, and challenge pupils to beat the drum without going over the marker (very useful!). Which is the quietest instrument? What is the loudest sound it can make?

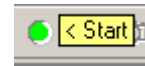
Step 7

Test whether sound travels in all directions. Make the same sound from all 4 corners of the room. Can the datalogger still 'hear' it? This will be a fairer test if:

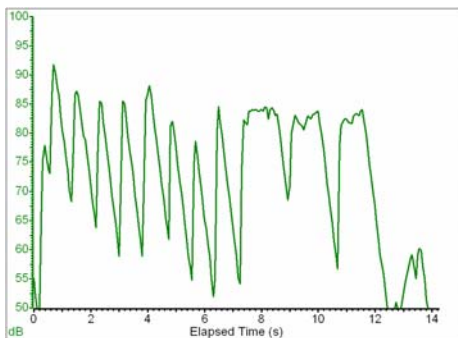
- The datalogger is placed on its end, so that the sound sensor is at the top and never pointing away from the sound
- The datalogger is placed in the middle of the room
- The sound is a steady sound, eg badly-tuned radio hiss, buzzer or timer

Step 8

Note: If you feel your pupils would be able to interpret a line graph, the software will draw a graph for you. Miss out Step 4 altogether. Once you are ready to start the experiment, click the green Start Logging button in the tool bar.



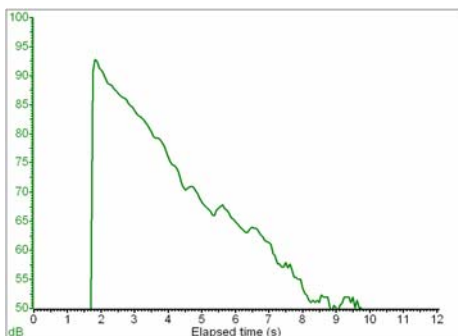
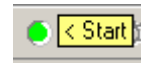
A line graph will be drawn as you watch.



Graph of a recorder being blown – short sounds followed by long sounds

If you want to keep the graph, you can save it, or go to the Edit menu and copy it, then paste it into Word.

Click the green Start button again to draw another graph



Graph of a guitar string being plucked

Click the green Start button again to draw another graph

