

Investigating volume

Outstanding Science Year 4 - Sound - OS4D006

Learning Objective



I can investigate how to affect the volume of a percussion instrument.

Me:

Teacher:

Scientific question

How does the strength with which we hit a drum affect the volume of the sound it makes?

You will need:

- A drum (a snare drum is ideal)
- A metre rule
- A small weight (such as a pound coin)
- A calculator (if required)

Method

Set up the apparatus as shown in the diagram. Drop the weight from 10cm above the drum. Rate the volume of the sound from 0 (silence) to 10 (very loud). Repeat with the weight at 20, 30, 40, 50, 60, 70, 80, 90 and 100cm above the drum.

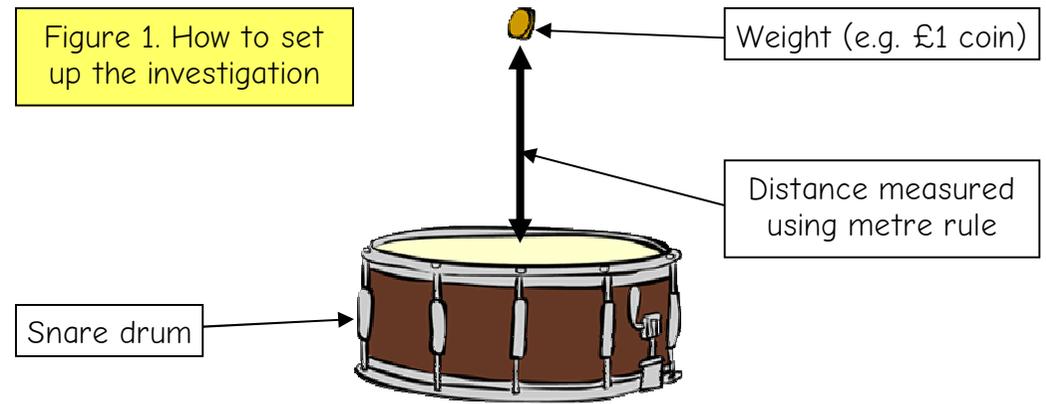
Accuracy

Repeat the investigation a total of 5 times, so you have 5 sets of results for each height. We do this because it is hard to measure the volume of a sound without special equipment.

National Curriculum Statutory Requirements

4D4 - find patterns between the volume of a sound and the strength of the vibrations that produced it; **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; **LKS2W6** - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions;

Figure 1. How to set up the investigation



Fair testing

We are trying to make our test fair.

What is the one thing that we are changing?

What are we trying to keep the same?

Prediction

What do you expect will happen? Why?

Table showing the volume of the sound made when a weight is dropped on a drum from different heights

Height	1st	2nd	3rd	4th	5th	Total	Mean
10cm							
20cm							
30cm							
40cm							
50cm							
60cm							
70cm							
80cm							
90cm							
100cm							

We have 5 sets of results, but we are only going to use one for the graph. We are going to find the **mean**.

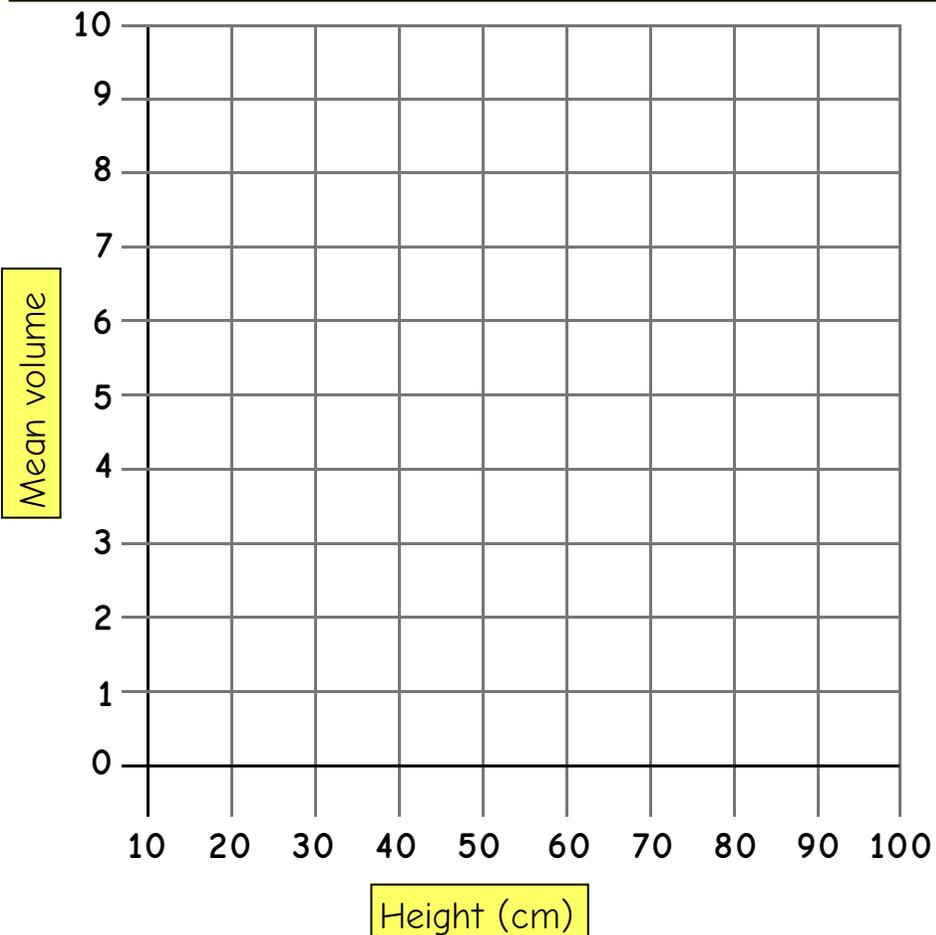
Look at your first row of results. Use your calculator, or a written method, to add all 5 numbers in that row. Write the answer in the 'total' box.

Use your calculator, or a written method, to divide your total by 5 (the number of results). Write the answer in the 'mean' box. Use this number to complete the line graph.

Completing the line graph

Add a small cross for each result and connect them using straight lines to create a line graph.

Line graph showing the volume of the sound made when a weight is dropped on a drum from different heights



Discussion

How accurate was your prediction?

Are your results the same as the other children? Why?

What happens to the volume of the sound as you increase the height at which you drop the weight? Why is this?

What do you think would happen if you dropped the weight from 200cm? What about 300cm?