**ACTIVITY: Sound detectives**

**Activity idea**

In this activity, students take part in a class experiment to locate sounds when blindfolded.

By the end of this activity, students should be able to:

* design a sound location experiment and demonstrate their ability to organise this class experiment
* collate and interpret data into a sound location map.

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**Introduction/background**

Two things help people locate where a sound comes from:

1. The sound will reach your right and our your left ear at slightly different times because of the different distances the sound waves travel. This time difference is called the interaural time difference (ITD).
2. The sound will have a slightly different volume because the sound wave is spreading out and weakening as it moves through the air, and your head absorbs and reflects a little bit of the sound. This difference in volume is called the interaural level difference (ILD).

These time and volume differences provide your brain with clues about where the sound is coming from.

It is harder to detect where sound is coming from if you are deaf in one ear, but all is not lost, as the brain can use clues about how the sound is being reflected off your body.

**What you need**

* A quiet room
* 12 sound generators that produce a constant sound (such as a tuning fork, bell or clicker)
* Blindfold
* One [sound location record sheet](#sheet) per subject

**What to do**

1. Appoint a student as director – they will point to each person to make a sound.
2. Appoint a student as recorder – they will use the [sound location record sheet](#sheet) to record the:

* name of the subject
* actual position of the sound source
* the position of the sound source.

1. Arrange a circle of 12 people and give them each a number (see the [sound location record sheet](#sheet) for layout) and sit a blindfolded subject on a chair in the middle.
2. Tell the subject that they must point to where they think a sound has come from.
3. Ensure that only the director gives instructions so that only one person makes a sound. The sound maker makes the sound when instructed and the recorder records the origin of the sound and where the subject has located it.
4. Let each member of the group be the subject in turn.
5. Construct a sound location map and record the class results on it. Identify on the map where it is difficult to locate sounds.

**Discussion questions**

* Why was the subject blindfolded?
* Are there any other clues that helped the subject locate the sound?
* How could you make it easier for the subject to locate these sounds?
* How can you display the data so that there is a pattern of sound location where individual subjects’ responses are not identified?
* Why would this be important?

**Extension activities**

* Repeat the experiment using different volumes or frequencies.
* Try the experiment with the subject having one ear blocked.
* Carry out the experiment again with ambient (background) sound in the room.

**Sound location record sheet**

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1

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10

11

12



|  |  |
| --- | --- |
| **Name of subject:** | |
| **Position of sound source** | **Position pointed to by the subject** |
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