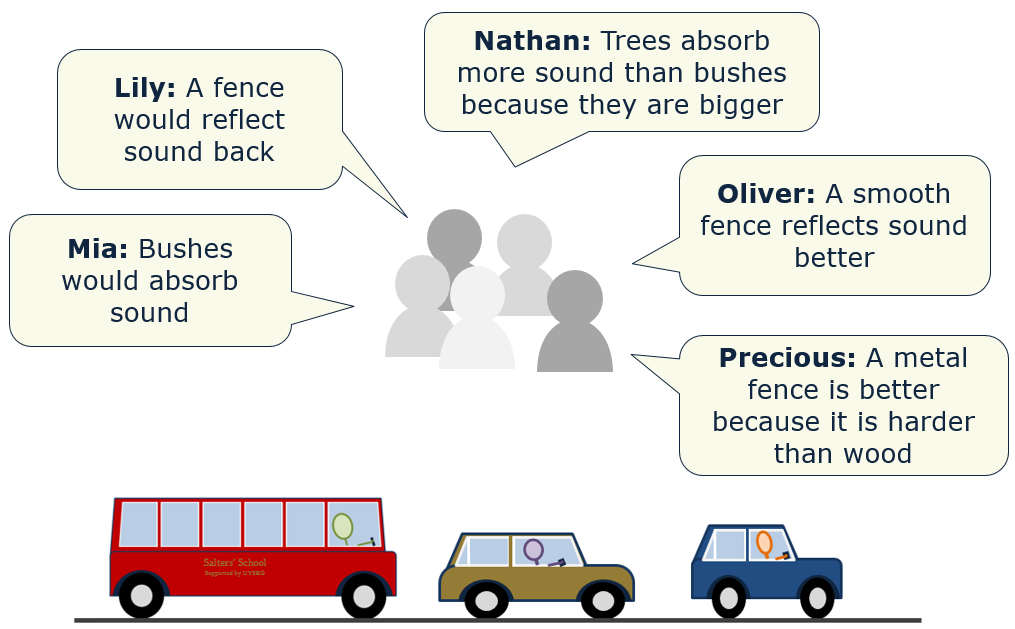
**Noisy road**

The road outside Salters’ School is very noisy.

Some students are thinking about how to reduce the noise.

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**To answer**

1. Who do you think is right about how to reduce the noise?

*Explain your answer*

1. What mistake do you think the other student(s) made?

*What would you say to them to help them to understand?*

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| --- | --- |
| **Noisy road**  Student statements | **Lily:** A fence would reflect sound back |
| **Mia:** Bushes would absorb sound | **Nathan:** Trees absorb more sound than bushes because they are bigger |
| **Oliver:** A smooth fence reflects sound better | **Precious:** A metal fence is better because it is harder than wood |

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*Physics > Big idea PSL: Sound, light and waves > Topic PSL1: Sound and light > Key concept PSL1.1: Production and transmission of sound*

|  |
| --- |
| **Response activity** |
| **Noisy road** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Sound needs a medium to travel through. It radiates out from a source in straight lines in all directions and when it strikes an object or new material it is transmitted, reflected, scattered or absorbed – or a combination of these. |
| Observable learning outcome: | Explain why sound is absorbed by soft surfaces and reflected or scattered by hard ones. |
| Activity type: | Talking heads |
| Key words: | Absorb, reflect, scatter, particles, vibrations |

This activity can help develop students’ understanding by addressing the sticking-points revealed by the following diagnostic question:

* Diagnostic question: Sshhh… curtains

**What does the research say?**

When sound is absorbed Asoko *et al* (1991) found that students often described the absorbing surface as ‘trapping’ the sound and very few referred to vibrations in the absorbing material.

This activity gives students the opportunity to apply their understanding of how sound is absorbed to a new situation.

**Ways to use this activity**

Students should complete this activity in pairs or small groups, and the focus should be on the discussions. The statements are also provided as cut-out cards for students to physically organise.

Students should work together to follow the instructions on either the worksheet or the PowerPoint. Giving each group one worksheet to complete between them is helpful for encouraging discussion, but each member should be able to report back to the class. Listening in to the conversations of each group will often give you insights into how your students are thinking.

If there is disagreement when you take feedback, a good way to progress might be through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs.

*Differentiation*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in the each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Expected answers**

Lily, Mia are both right.

Nathan is right, but because trees have bare trunks, a lot of the noise is likely to pass under the absorbing leaves.

Oliver’s smooth fence would reflect sound only in a less scattered way so any sounds would remain more distinct.

Precious’ harder fence would reflect more and absorb less, so there would be more sound travelling in the air.

**Acknowledgments**

Developed by Peter Fairhurst (UYSEG).

Images: UYSEG

**References**

Asoko, H. M., Leach, J. and Scott, P. H. (1991). A study of students' understanding of sound 5-16 as an example of action research. *Annual Conference of the British Educational Research Association.* Roehampton Institute, London.