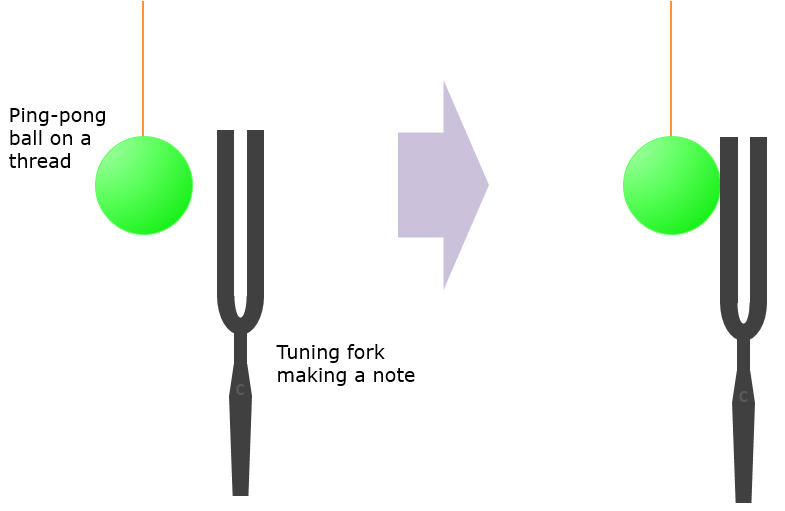
**Touching note**

A tuning fork makes a note when it is struck.

What happens when it touches the ping-pong ball?



**Predict**

What do you think will happen when the tuning fork touches the ping-pong ball?

**Explain**

Explain why you think this will happen.

|  |
| --- |
| **Now watch the demonstration** |

**Observe**

Describe what happens.

**Explain**

Were your prediction and explanation correct?

If not, can you explain what you observed?

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

|  |
| --- |
| **Response activity** |
| **Touching note** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Objects and materials can be made to vibrate to produce a sound that becomes louder as the size of vibration increases and higher pitched as the rate of vibration increases |
| Observable learning outcome: | Explain how sound is produced by objects that do not appear to vibrate |
| Activity type: | Predict, explain, observe, explain - demonstration |
| Key words: | Vibrate, vibration |

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

* Diagnostic question: Wood-rock

**What does the research say?**

Young children and some students may attribute the production of sound to the physical attributes of an object (for example, the tautness of a drum) or to the force used to make the sound (such as a hand hitting a drum), before developing an understanding that sound is caused by vibrations (Driver et al., 1994).

In a study of two-hundred-and-sixty 4-16 year old students Asoko, Leach and Scott (1991) found that students use of vibrations to explain the source of sound increased with age, but this was also dependent on the context: 80% of students aged 11-16 used vibrations to explain sound when the vibrations were obvious (for example in a string); when air was vibrating in a horn this fell to 40%; and very few students used vibrations to explain the sound caused by knocking two small stones together.

This activity demonstrates to students that all objects that make a sound vibrate, even when they look as if they do not.

**Ways to use this activity**

Students should complete this activity in pairs or small groups, and the focus should be on the discussions. It is through the discussions that students can check their understanding and rehearse their explanations.

To begin, each group should discuss the activity and use their scientific understanding, firstly to predict *what* they think will happen, and then to explain *why* they think they are going to be right. If students in any group cannot agree, you may be able to direct them with some careful questioning.

Students now watch a demonstration, and afterwards each group should be given the opportunity to change, or improve their explanation. A good way to review your students’ thinking might be through a structured class discussion. You could ask several groups for their *explanations* and put these on the whiteboard. Then ask other groups to suggest which explanation is the most accurate and the most clearly expressed, and through careful questioning work up a clear ‘class explanation’.

A useful follow up is for individual students to then write down explanations in their own words – without reference to the class explanation on the board (i.e. cover it up).

*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.

**Equipment**

For the class:

* Ping-pong ball on a thread
* Clamp and stand
* Tuning fork (in stand if available)
* Large rubber bung - to strike the tuning fork on

**Technician notes**

* The ping-pong ball is hung from a stand away from the upright.

**Health and safety**

Striking a hard surface, like a bench, can damage a tuning fork or hurt a hand.

Practical work should be carried out in accordance with local health and safety requirements, guidance from manufacturers and suppliers, and guidance available from CLEAPSS.

**Expected answers**

The ping-pong ball ricochets off the tuning fork on contact. This is most obviously caused by vibrations in the tuning fork if it is held in a stand.

Using student volunteers to demonstrate this is more convincing, as they typically show genuine surprise at how much the ball moves at the slightest contact.

**Acknowledgments**

Developed by Peter Fairhurst (UYSEG).

Images: UYSEG

**References**

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