

Sound: Activities for Teaching the Key Concepts

Sound is caused by a **vibration** known in everyday language as a **wobble**! Use both words at first and then move to using only the scientific term, 'vibration'. Sometimes this vibration can be seen or felt and sometimes it is too fast for this to be possible.

Sound travels through air: demonstrations

- Demonstrate how to place your hand on your throat and feel the vibrations of your voice box as you speak. Then the children can do it too so that they feel the vibrations as they speak.
- By speaking we make the air vibrate but we cannot normally see this. However, if you (carefully and warning children not to do this themselves!) hold a candle in front of your mouth as you speak, it can be seen flickering backwards and forwards. This is because sound is made by something vibrating and, in this case, the 'bits' of air (the molecules) are made to vibrate.
- Place a drum (if you don't have one, stretch a balloon across a circular tin and tape it in place) on a stand close to, but not touching, a speaker that can blast out some loud music. Place some loose tea leaves or rice on top of the drum. Music with a strong beat is perfect and when it is played, the bits of tea or rice will be seen to 'dance'! The speaker makes the air vibrate, this in turn makes the drum and the material on top of it vibrate and see can see it move.
- Big ears: make big cones with paper. Place them as close as possible to your ears and compare your hearing with and without them. Can you explain? Think about which animals have large ears and why.

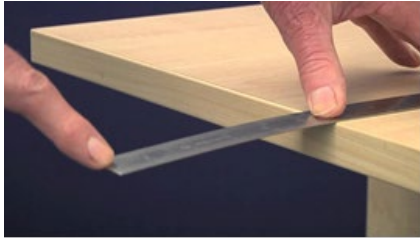
It is important to help children understand the difference between pitch and volume. This not always at all obvious to primary children.

Pitch and volume: demonstrations

- You can do this by singing high and low notes (pitch) and loud and quiet notes (volume).



- A ruler overhanging a desk can be made to vibrate by pulling down on it and letting go – you can see it move and hear the resulting sound. N.B. Make sure you hold it tightly on the edge of the desk as in this picture.



Practical: This can be turned into an investigation where children find out what changes the pitch of the sound produced. It is an excellent opportunity for the learning objectives to focus on drawing conclusions, as well as the development of their content knowledge. The intention is that children understand that the shorter the ruler, the higher the pitch (or vice-versa).

Musical Instruments

Similarly, all musical instruments produce a sound by causing a vibration. This can be a result of:

- Something being struck – a drum or a saucepan lid or whatever
- A string being plucked or bowed – elastic bands stretched across a box, a guitar, a violin etc.
- An air column being made to vibrate – blowing across the top of a bottle, or into a recorder, or flute etc.

Illustrative practicals develop or reinforce children's understanding – they illustrate the subject knowledge that is being learnt. As this is the sound part of the curriculum, brace yourself for noise! It is good to have a range of the above for them to explore. The learning objective can be focused on them explaining how the sound is made in each case. They can also be turned into investigations, where children find out what changes the pitch of the sound produced as elastic bands are plucked, or bottles with different amounts of water in are blown across etc.

Musical instruments: demonstrations

- If you or any of your colleagues play a musical instrument, the children can be asked to suggest how the sounds are changed as you play, i.e. how the pitch is changed, can the volume be changed? For example, you can use a guitar to show that the pitch of the note depends on the length of the string and also on the thickness of the string. You can also show that plucking the string gently produces a quiet sound and plucking it more forcibly produces a louder sound.

Demonstration/a Practical Prompt for Thinking

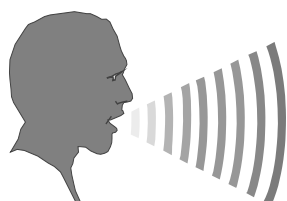
Prepare a straw: cut it into a length of about 20cm and then cut one end into this shape:



This requires practice! Place the cut end of the straw into the **middle** of your mouth. Close your lips around the straw and blow. You are not trying to blow down the straw itself – keep the end of the straw in the middle of your mouth, seal your lips tight and blow hard! If you keep trying, you will find that you can make an impressive sound – oboe players should find this easy! Once you have mastered this, you can keep blowing whilst using scissors to reduce the length of the straw. Ask children to explain what they hear. If you can manage this, it's a great demonstration – the pitch increases as the straw is cut shorter and shorter.

How sound travels: a simulation activity – acting it out

When we speak, the air is made to vibrate. These vibrations travel through the air and reach your ears which detect the vibrations and send the signals to your brain which decodes them.



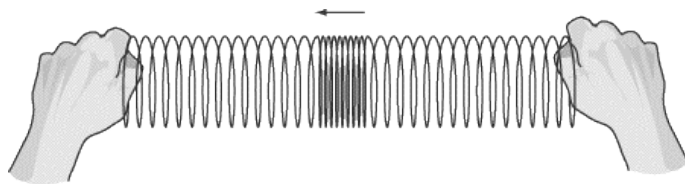
So when we hear a sound, the vibration has travelled from the source of the sound to our ears. When sound travels through air it is rather like a domino effect. The 'bits' of the air (molecules) next to the source are made to vibrate and these then bump into the air molecules next to them which are also made to vibrate and so on until the vibrations reach our ear drum. A group of children can act this out by standing in a row, with the last person next to the classroom wall:



The person at the end of the row wobbles backwards and forwards, knocks (gently!) the person next to them who wobbles backwards and forwards, knocks the person next to them ... and so on until the vibration has travelled all along the line. This takes time and so you can also see that sound takes time to travel from one place to another. When the vibration has moved all along the line, it reaches the classroom wall and will 'bounce' off it, causing the vibration to travel back in the other direction. This is an **echo**. Echoes from large, flat surfaces such as cliff faces, are examples of the **reflection of sound**.

How sound travels: demonstration

A slinky is also good for showing how sound travels



The coils of the slinky can be made to vibrate back and forth and you can see the coils bumping into each other. The air molecules vibrate back and forth, just like the coils of a slinky, when the sound travels through the air.

Sound travels through liquids and solids too

Because sound is caused by a vibration, something needs to vibrate so it needs something through which to travel (called a medium). The medium can be air (a gas) but it can be a liquid or a solid too such as string, metal, water etc.

Illustrative practicals

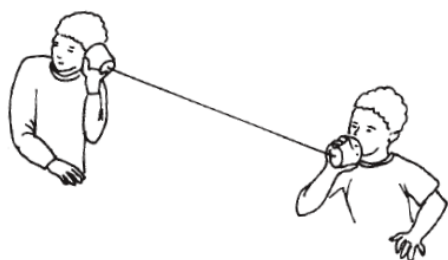
Children can do the following:

- Metal coat hanger (or metal spoon, slinky ...) and string in ears



Tie strings onto a metal coat hanger (or spoon, slinky ...) and hold the ends of the strings right next to your ears. Let the coat hanger swing and bang into a hard surface, such as a table, wall or floor. The sound travels through the string into your ears and can sound quite amazing!

- The string telephone – N.B. the string needs to be tight for this to work



It is important for all children to experience using a string telephone.

- Hearing underwater – children in swimming pools, the bath at home etc.

Data logging

The loudness of sound is measured in Decibels and increasingly primary schools have data logging equipment linked to the computer which allows measurements of sound levels to be recorded and monitored. It is a great demonstration to use the interactive whiteboard to show a graph of volume against time being created by a data logger – as the children shout the graph goes up and when they are quiet it goes down. You can ask them to create a sound level which is half way up the scale etc.

You can also use a data logger to show that the intensity of sound decreases as the distance from the source of the sound increases or, more simply, a noise becomes quieter as you get further away from it! A simpler way of doing this is to have some loud music playing and just walk further and further away from it.

Health & Safety:

Teachers always need to risk assess practical activities for their children and defer to their health and safety advisor for the most up-to-date source of health and safety guidance.

This training cannot be relied upon as source of health & safety guidance.

