

Phizzi focus

Sound



Sound is an area of the primary curriculum that provides great opportunities for children to make cross-curricular connections between their learning of physics and music as well as making links between ideas about the human body and physics. This Phizzi focus includes inspiration, links and resources to put this area of the physics curriculum in the spotlight.



Credit: The Royal Society

Scrutinising sounds

Investigating hearing in Key Stage 1 is a great opportunity to explore enquiry types. For example, children could investigate the scientific question “Does our hearing get worse when we get older?” by carrying out a **pattern seeking** enquiry to gather some simple data such as how many footsteps away people of different ages need to stand from a quiet data source to just hear it. This could even be an opportunity to use a simple sound measuring app to measure the volume of the sound that the different people are hearing; our [Phizzi focus: using technology when working scientifically](#) offers some advice on how to do this. This technology could also be used to make **observations over time** to find out “When is our classroom the noisiest?”.

When Year 1 children are learning about senses and hearing they could carry out an **identifying and grouping enquiry**.

Phizzi focus
Age 5-11 years

Using technology when working scientifically

When carrying out enquiry work linked to the areas of physics in the National Curriculum there are many opportunities for children of all ages to develop working scientifically skills linked to the collection and analysis of data. The increasing availability of technology in primary schools provides a wide range of opportunities for children to measure a broad range of physical quantities to help them in answering their scientific questions. This Phizzi focus includes inspiration and links for teachers to plan opportunities for young learners to use technology when working scientifically around physics themes.

Apps for measuring

There are a wide range of measuring apps that can be downloaded to tablets in schools for children to use when carrying out enquiries, many of which are freely available. Children can use tablets to measure quantities such as the brightness of light, and volume and pitch of sound.

Key Stage	Quantity to measure	Possible lines of enquiry	Available apps
KS1	Brightness	• Which materials are best for curtains to block the light?	Luc Light Meter FREE Age rating: 4+
	Volume	• Which materials are best for making ear defenders?	Decibelle: Elegant Sound Level Meter Age rating: 4+
KS2	Brightness	• Which sunglasses are best for protecting our eyes? • Which materials reflect the most light? • How does the brightness of sunlight change over time?	Luc Light Meter FREE Age rating: 4+ Arbitrio Science Journal Age rating: 4+
	Volume	• What factors change the sound produced by musical instruments? • How do sounds change as you move further from the source? • How does the volume of sound in our classroom change over time?	Decibel X Age rating: 4+ Arbitrio Science Journal Age rating: 4+
	Pitch	• What factors change the sound produced by musical instruments? • How does the length of a boom whacker/hunting fork affect the pitch of the sound it produces?	Arbitrio Science Journal Age rating: 4+

Children wearing blindfolds begin by identifying mystery sounds; there are many [sound effects websites](#) where you can download free audio files of familiar sounds such as a plane taking off, a waterfall, rolling marbles or sawing wood. Once children have identified the sounds, they can then use Venn diagrams or Carroll diagrams to sort the sound sources into groups.

Children may also have scientific questions about hearing, which links their senses learning to ideas about animals. This could lead to a simple **comparative test** by answering question such as “Do bigger ears make animals hear better?”. Children can model different sized ears with paper cones and compare the furthest distance they can stand away from a quiet sound source. The [BSA’s Sounds Like science resource](#) is packed with ideas for other practical activities that could also be developed into simple comparative tests.

👣 = 1 footstep

Size of my ear	How far away I can hear the sound (footsteps)
Small	👣👣👣👣👣
Medium	👣👣👣👣👣👣
Large	👣👣👣👣👣👣👣
Extra Large	👣👣👣👣👣👣👣👣

	loud	quiet
high	ice cubes in glass	
low	plane landing duck quack	pin drop mirror breaking

When children revisit ideas about sound in Key Stage 2 they could build on their prior learning with a range of different pattern seeking enquiries such as the [Royal Society’s Sound Circus resources](#) created with Professor Brian Cox or by analysing data to explore the question “What is the loudest sound there has ever been?” using the Ogden Trust [Ideas over time: loudest sounds](#) timeline activity.

Reading that resonates

Key Stage 1 ideas about hearing could be developed through a research enquiry exploring how our ideas about helping people hear have changed over time. Why not use the Ogden [Research cards: Helping us hear](#) to encourage guided reading linked to science? Children can make notes on their findings and develop writing around the theme to share their findings. Jeans for Genes have some great resources to support learning about people with hearing difficulties such as the video [Ashley’s Story](#) and their [Sound Survey](#).

In Key Stage 2, children can develop science understanding through reading by carrying out a **research** enquiry to find out how our ideas about sound have changed over time. Using the [Research cards: sound](#) children can find out about the ideas of a number of notable scientists through history, and how they worked scientifically to gather evidence

Research cards

Ear trumpets and speaking tubes

Ear trumpets were first used in the 1600s by people who could not hear well. A French man called Jean Leurechon described them in a book that he wrote in 1634. Jean was amazed how the shape of the ear trumpet helped to make sounds louder.

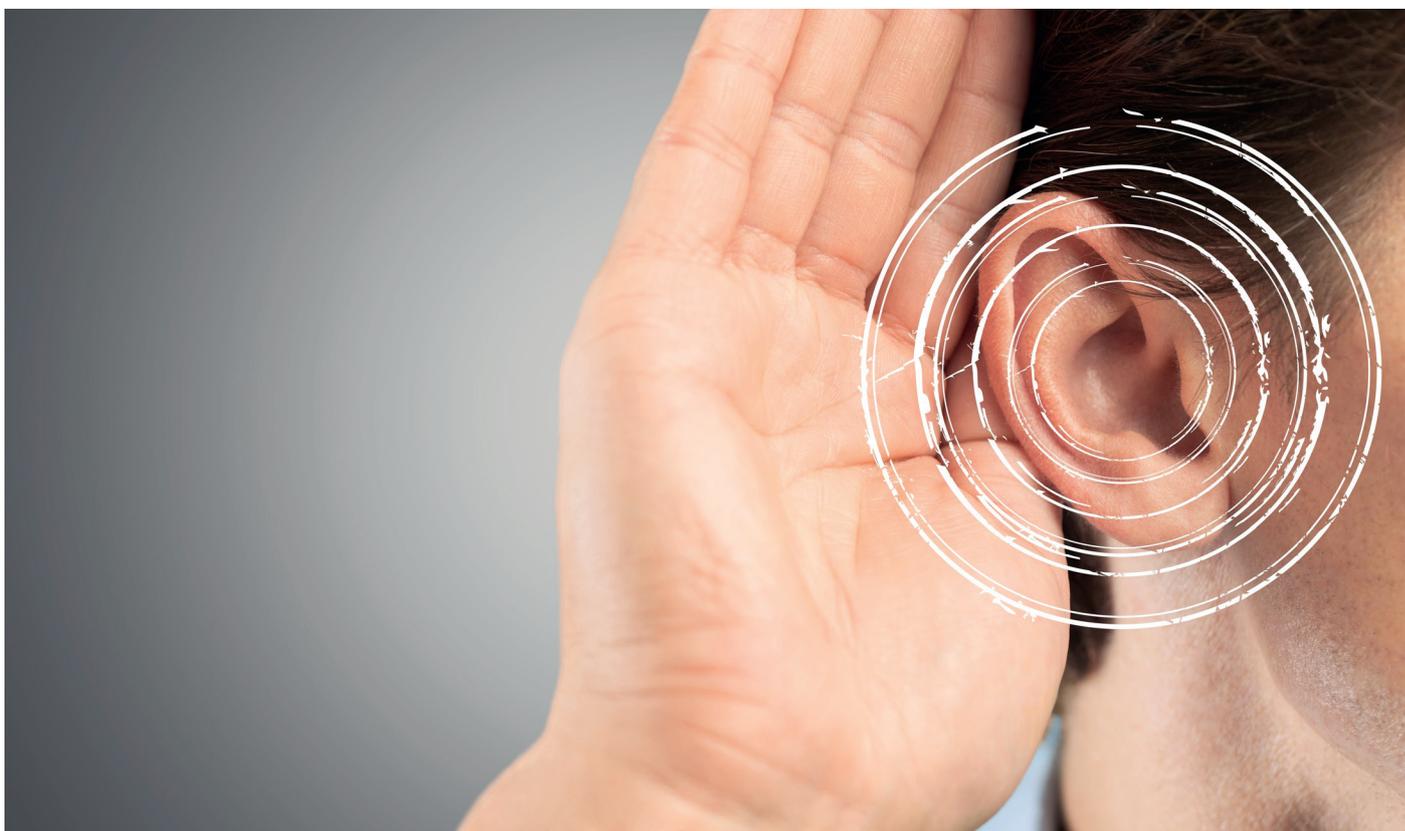
An ear trumpet was a tube with a wide cone shape at one end. They were usually made from metal. People would hold the small end of the trumpet to their ear and would point the large opening towards the sound that they wanted to hear. The ear trumpet would make sounds louder so that they could hear them more clearly.

In Victorian times, an inventor called Fredrick Rein started the first hearing aid company. In his factory he made ear trumpets and speaking tubes. A speaking tube was just like an ear trumpet but with a longer tube. A person would speak into the large open end and the sound would travel through the tube to the other end that was inside the listener’s ear.

King John VI of Portugal could not hear well. He asked Fredrick Rein to design a throne with speaking tubes built into its arms to enable him to hear peoples’ voices better.

Speaking tube

Image: National Museum, Creative Commons



to support their ideas. Children can develop note making skills, work collaboratively to share research and then report their findings in a chronological report. They will learn about how Colladon and Sturm invented the hydrophone to measure the speed of sound in water and could take this further by making their own using the [Phizzi practical: make a hydrophone](#) instructions.

Making music

There is great opportunity for cross-curricular links between science and music when learning about hearing and sound, for example the Primary Science Teaching Trust has a [resource called Growing Music](#) where children apply their science ideas to grow bamboo as a material to make pan pipes that can be used in music lessons. The European project [ENGINEER resources Music to the ears](#) shows an alternative method of making musical instruments and Barefoot Computing demonstrates how computing could be linked to projects on sound and music with their [Classroom Sound Monitor resource](#).

Perhaps children could lead their own whole school assembly to share their learning about hearing and sound? [The Association for Science Education resource Assembly on Sound](#) suggests how this could be organised.

Growing Music

Aims & Objectives

Growing Music is a project which has run successfully in many schools. It engages children in a cycle of planting, growing and investigating bamboo and making and playing pan pipes from bamboo canes. The children 'grow' their own music.

You may want to take on the whole project or select specific sections such as:

- Growing and investigating bamboo plants and the uses of bamboo as a material.
- Understanding sound through making and playing a musical instrument.
- Developing Literacy and Numeracy skills through the context of the bamboo plant.
- Finding out about Colombia.

PROJECT AIMS

- To develop new pathways into music, science and technology.
- To create awareness amongst young people of how environment influences all aspects of their lives and how in turn they have the ability to influence their own environment.
- To explore the links between science, technology and music.
- To demonstrate the relationship between plants, culture and music.
- To support young children's creativity and natural desire to interact with the world.
- To demonstrate how creativity leads to innovation and enterprise.
- To encourage children to be actively involved in the cycle of planting, growing, harvesting, making and playing an instrument.

LEARNING OBJECTIVES

SCIENCE	MUSIC
<ul style="list-style-type: none"> ■ To identify the requirements of the Bamboo plant for growth. ■ To observe, measure and record the growth of Bamboo and use patterns in the data to make predictions. ■ To compare Bamboo with, and contrast Bamboo to, other plants such as trees and other grasses. ■ To explore the properties of Bamboo and the many ways it is used. ■ To use Bamboo to investigate how sound is made through vibration and how to change pitch and volume. ■ To understand how sound waves work. 	<ul style="list-style-type: none"> ■ To play an end blown Bamboo pipe with control and rhythmic accuracy. ■ To improvise and explore the sounds that can be made with a Bamboo pipe. ■ To explore sounds that can be made with different combinations of Bamboo pipes. ■ To listen to detail and to internalise and recall sounds. ■ To practise, rehearse and present performance. ■ To play music as part of a group. ■ To become aware of the range of music that is produced throughout the world using Bamboo.

DESIGN TECHNOLOGY

- To explore the sensory qualities of Bamboo and recognise how the characteristics of Bamboo influence how it can be used for making a musical instrument.
- To measure, mark out, cut and shape the Bamboo.
- To use finishing techniques to strengthen, decorate and improve their musical instrument.
- To look at the design and making opportunities for Bamboo and how it is used around the world.

www.pst.org.uk
www.womadfoundation.org
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Booklist

Sounds all Around by Susan Hughes

Charlie the Crow by Elly Gedye

Super Hearing by Jennifer Whitehead

The Senses: Hearing (Science in Action) by Sally Hewitt

Sound: Let's Investigate (Essentials Key Stage 2) by Ruth Owen

Sound by Georgia Amson-Bradshaw

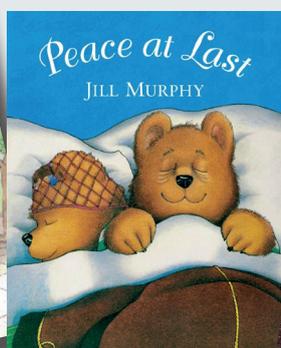
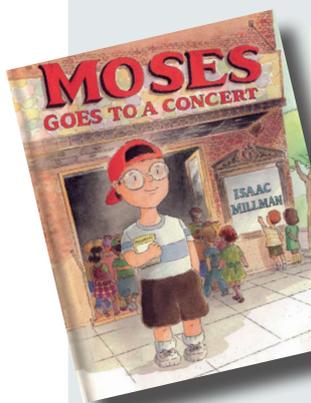
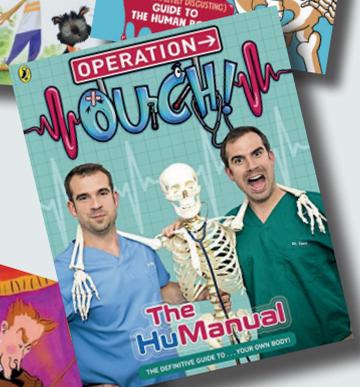
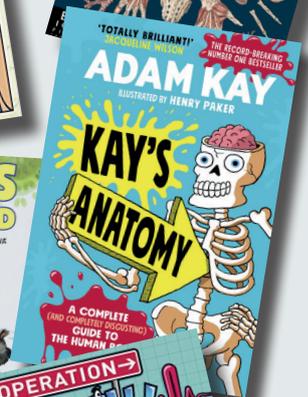
Anatomicum by Jennifer Paxton

Operation Ouch!: The HuManual by Ben Alcomb et al.

Kay's Anatomy: A Complete (and Completely Disgusting) Guide to the Human Body by Adam Kay

EYFS / KS1

- Moses Goes to a Concert by Isaac Millman
- Peace at Last by Jill Murphy
- Ranvir Cannot Hear by Genevieve Yusuf
- Zin! Zin! Zin! Violin by Lloyd Moss
- Sounds all Around by Wendy Pfeffer



The books on this list were recommended by **David Gregory**, KS2 class teacher at Newsham Primary School.