TOPIC 1 What's that sound?

About this topic

Curriculum link: Year 4, Sound

SUMMARY:

Children will already know many things about sound, even without any formal teaching of it. They will encounter how sounds are made on a variety of instruments and how they can be changed in volume, pitch and over distance. They will explore making sounds on a range of objects that aren't instruments, in order to investigate how sounds are created to make music.

UNITS:

1.1: How are sounds made?

1.2: Sound travelling

ACTIVITY RESOURCES:

- 1.1: What a racket
- 1.2: Can you hear it?
- 1.3: Moving data from a table to bar graph
- 1.4: Make a string telephone
- 1.5: My own questions
- 1.6: Let's make it louder! Investigation

ONLINE RESOURCES:

PowerPoint presentation: What's that sound?

Interactive activity: What's that sound?

CPD video: What's that sound?

Pupil video: What's that sound?

Word mat: What's that sound?

Editable Planning: What's that sound?

Topic Test: What's that sound?

Learning objectives

This topic covers the following learning objectives:

- Identify how sounds are made, associating some of them with something vibrating.
- Recognise that vibrations from sounds travel through a medium to the ear.
- Find patterns between the pitch of a sound and features of the object that produced it.
- Find patterns between the volume of a sound and the strength of the vibrations that produced it.
- Recognise that sounds get fainter as the distance from the sound source increases.

Working scientifically skills

This topic develops the following working scientifically skills:

- Ask relevant questions and use different types of scientific enquiries to answer them.
- Set up simple practical enquiries, comparative and fair tests.
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support findings.

CROSS-CURRICULAR LINKS

This topic offers the following cross-curricular opportunities:

English

- Perform a poem or a story using the voice expressively accompanied by sound effects.
- Write a story and set it to music or sound effects.
- Develop children's understanding of onomatopoeia.
- Listen to and recite the poem *'The Sound Collector'*, by Roger McGough (see Useful Websites list)
- Rewrite *'The Sound Collector'* putting in new verses about rooms around the house or school

- Identify and use vocabulary related to everyday sounds
- Descriptive writing about life without sound.
- Write lyrics for a song.

Numeracy and mathematics

- Draw and use tables, plot data on graphs.
- Measure distance.
- Read a line graph produced by sound data logger.
- Measuring decibels.

Geography

- Learning about music from around the world.
- Using plants and vegetables from around the world for music, e.g. gourds, bamboo.

History

- Research inventions related to sound, e.g. musical instruments, television, radio, telephone.
- Create a timeline of inventions, include recent inventions such as mobile phones, electric guitar.

Design technology

- Design, make, use and evaluate a musical instrument.
- Research how musical instruments are made.
- Make and paint Australian Aboriginal clapsticks.

Art

- What does sound look like?
- Research Australian Aboriginal art.
- Illustrate sounds using paints or sculptures, e.g. bang, whisper
- Show children oscillation – sound patterns how can children use these in art?
- Look at cartoon sound images, e.g. bam, kapow, boom. wham, bang, whizz.

Music

- Stomp music – using different objects, e.g. broomsticks, saucepans to stomp out a rhythm.
- Body music.
- Explore how to make different notes in order to compose a tune.
- Making musical instruments, e.g. pan pipes, xylophone, shakers, drums, box guitars.
- Changing volume and pitch in different musical instruments.
- Learning to play an instrument.

PSHE

- Discussing understanding of hearing impairment.
- Communicating with hearing impaired people – search for British Sign Language sign of the day.

STEAM (SCIENCE TECHNOLOGY ENGINEERING ART AND MATHS) OPPORTUNITIES

Invite into class

- Musicians. e.g. member of staff, parent, local musician / band to tlak about their instrument and music and to create music with the class.
- Sound recordists / technologist from local radio station.
- Audiologist to explain about how to test hearing.
- Carpenter to help make wooden instruments.
- Request a STEM ambassador with knowledge and skills relating to the physics of sound, musical instrument maker.
- Parent who works with loud noises and required to use ear defenders.
- Artist to develop sound paintings or sculptures.

Visit

- Large buildings, e.g. cathedral, railway station, football stadium where sound is affected by the building.
- Theatre or concert hall to learn about the acoustics and play their own instruments.
- Radio station.
- Music rehearsal room.
- Local environment to carry out a sound survey.
- Local environment to find out about sound pollution, e.g. taking sound readings near road traffic, building sites.

TEACHER SUBJECT KNOWLEDGE

Vibrations

Sound is produced by vibrations, even when it is hard to see them. The vibrations travel through the air and are detected by our ears. Within the ear is an ear drum which vibrates and turns the vibrations into signals to the brain, which then 'hears' the sounds.

The speed of sound in air is approximately 340 m/s (metres per second). The denser the medium, the faster sound travels: for example, it travels faster through liquids than air, and even faster through solids.

Sound will not travel through a vacuum, because sound needs particles to make the vibrations. No-one can hear anything in space.

There is often a misconception regarding the terms 'sound' and 'noise'. Noise can be defined as unwanted sound.

Volume

The loudness (volume) of a sound depends on the size of the vibration: the bigger the vibration, the louder the sound. The greater the volume of air vibrating, the louder the sound will be. A large drum struck with the same force as a small drum will sound louder because the bigger drum can make more of the air move, simply by have a bigger 'skin' to vibrate. A vibrating tuning fork cannot be heard until the stem is placed on a table. This causes the table to vibrate very slightly, but there is a large volume of air in contact with it compared to the small volume of air in contact with the prongs of the tuning fork.

Pitch

Pitch refers to how high or low a sound is.
A high-pitched sound has a high frequency.
A low-pitched sound has a low frequency.
Frequency is the number of vibrations per second.

The pitch of a vibrating string depends on:
The length of the string – the longer the string, the lower the pitch.
The tension of the string – the tighter the string, the higher the pitch.

The pitch of a vibrating air column (e.g. a bottle) depends on:
The longer the air column, the lower the pitch.
Whether the air column is open at one end or both ends.

Other vibrations related to pitch:
For striking a length of tubing, the shorter the tubing, the higher the note.
For striking a glass bottle with different amounts of water in: the more water in the bottle, the more glass that can vibrate, so the lower the note.

HEALTH AND SAFETY

Too much sound can damage our ears. Examples of when ear defenders might be worn include: using electric drill, tree-cutting, driving a tractor, airside workers at an airport, disc jockeys, workers in noisy factories.

Use the opportunity to emphasise the damage that can be caused by listening to personal music players if the volume is too loud.

In this topic you will:

- observe and name a variety of sources of sound
- find out how sounds are made
- find patterns between the volume of a sound and how it is made
- notice that sounds get fainter as they move away from you
- explore how to change the pitch of a sound.

CHILDREN'S MISCONCEPTIONS

Children might think…

- That 'noise' and 'sound' are the same.
- That 'volume' means how much liquid is there. It has two meanings, and this needs to be clarified with the children.
- That 'pitch' is related to a football playing field, or even a road covering.
- That 'volume' and 'pitch' are the same thing.

Children already know…

- That we hear with our ears.
- How to make loud noises.

SCIENTIFIC VOCABULARY

You can download a Word mat of essential vocabulary for this topic from *My Rising Stars*.

pitch: how high or low a note is

sound source: something that makes a sound

vibration: when something moves up or down, backwards and forwards or from side to side quickly

volume: how loud a sound is