WOODVALE PRIMARY ACADEMY

| Year | 4 | SCIENCE | Sound<br>*How do we hear?* |
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Pupils should be taught to:
- 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.

## Prior Learning

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)

## Future Learning

At KS3 children will learn:
- Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.
- Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound.
- Sound needs a medium to travel, the speed of sound in air, in water, in solids.
- Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal.
- Auditory range of humans and animals.
- Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound.
- Waves transferring information for conversion to electrical signals by microphone.

## What Pupils Need To Know Or Do To Be Secure

### Key Substantive Knowledge

- A sound produces vibrations which travel through a medium from the source to our ears.
- Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter).
- The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source.
- A sound insulator is a material which blocks sound effectively.
- Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.
- **SCIENTIST:** Alexander Graham Bell (1847 - 1922) Alexander was a Scottish scientist and inventor. His most famous invention was the first telephone. Although Alexander Graham Bell invented the first telephone, people continue to invent new versions all the time! James West and Gerhard M. Sessler invented microphone design which is used in more than 90% of the 2 million microphones made every year.

### Key Disciplinary Skills/ Knowledge

Working Scientifically:

**Asking relevant questions and using different types of scientific enquiries to answer them** - children consider their prior knowledge when asking questions. Given resources, children decide themselves how to gather evidence to answer the question.

**Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment –** They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

**Setting up simple practical enquiries, comparative and fair tests –** They follow their plan to carry out observations and tests.

**Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables –** The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts.

**Using straightforward scientific evidence to answer questions or to support their findings –** Children answer their own and others' questions and their answers are consistent with the evidence seen/presented.

**Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions –** identify how they would do it differently if they repeated the enquiry.

## Lesson Sequence

1. How do we hear sounds?
2. How do vibrations from sounds travel through a medium to the ear?
3. What material best insulates sound?
4. What is volume?
5. What is the pitch of a sound?
6. Does distance impact how we hear sounds? (Super Scientist)
7. Assessment

## Curriculum Drivers

**Developing Oracy-** Pupils will be given the opportunity to explore and use scientific vocabulary which is linked to their learning of sound. Children will be able explain what the difference is between pitch and volume.

**Embracing Cultural Richness-** Pupils will have a developed understanding of looking after our hearing and the impact to our day to day lives.

**Nurturing Social Intelligence-** Children will have the opportunity to work independently and in collaboratively when following a line of enquiry.

## Common Misconceptions

Some children may think:
- sound is only heard by the listener
- sound only travels in one direction from the source
- sound can't travel through solids and liquids
- high sounds are load and low sounds are quiet.
- Pitch and volume are frequently confused, as both can be described as high or low.

## Key Vocabulary

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|---|---|---|---|
| decibel | eardrum | pitch | speed of sound |
| soundproof | sound wave | vacuum | vibration |