Holly Park Learning Organiser

Year 4 - Science

Sound How does the distance from the sound source affect the volume of the sound?

Prior Knowledge:

Hearing is one of my five senses..Sounds can be combined using musical instruments.

Describe what they see, hear and feel whilst outside. Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Essential Knowledge:

- children learn that sounds are made when objects vibrate. children should understand that we hear sounds because an object vibrates. These vibrations then travel through the air (or another medium) to our ears.
- children are introduced to the main parts of the inner ear and the roles that they play in how sounds are heard.. Children build on their understanding of vibrations to explore how the ear drum vibrates, which allows us to hear sounds.
- to explore sound and understand how the intensity of sound is measured. They learn that the intensity, or loudness, of sound is measured in decibels (dB)
- children explore how the strength of the vibrations affects the volume of a sound. They should understand that, in general, louder sounds have bigger vibrations and quieter sounds have smaller vibrations. Children should explore the concept of volume using musical instruments.

Key Questions:

- Which organ in our bodies detects sound? What does "vibration" mean? How do we hear sounds? If you hit a drum harder, what does it do to the sound produced? How does a guitar produce sound when played? How does a drum produce sound when it is hit? Does sound only travel through air?
- What is the outer ear? How does the outer ear help us to hear? What is the inner ear? How does the inner ear help us to hear? How does sound travel to the ear? What else does the inner ear help us with? What is the function of the ear drum?
- •How is sound measured? •What equipment is used to measure sound? How many decibels is a human talking? How many decibels is a human shouting? How many decibels is the quietest sound a human can hear? What is the level of sound in the classroom? How is that different from the level of sound in the lunch hall/playground? How does the loudness of sound in the classroom change over the day?
- What are vibrations? What is volume? How can you increase the volume of a sound? How can you decrease the volume of a sound? How do wooden blocks produce a louder sound than ice cubes? Do bigger or smaller vibrations produce louder sounds? How do different materials insulate sound? • Which material would be the best insulator of sound? Why? What is "pitch"?

National Curriculum 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.
- Identify how sounds are made, associating some of them with something vibrating.
- 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

Key Vocabulary	
vibration	a quick back-and-forth movement
ear	an organ in humans (and many other animals) that detects vibrations, allowing hearing
sound	vibrations that travel through the air, or another medium, and are heard when they reach an ear
pitch	how high or low a sound is
volume	how loud or quiet a sound is
decibel (dB)	a measure of the loudness of a sound
decibel meter	a piece of equipment used to measure the loudness of sound
vibration	a quick back-and-forth movement
insulate	o protect something from the transfer of heat, sound or electricity
ear	organ in humans and many other animals that detects vibrations, allowing hearing
background noise	any type of noise that is not the sound that you are listening to or measuring



Working Scientifically:

- Asking relevant questions and using different types of scientific enquiries to answer them
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.
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- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Setting up simple practical enquiries, comparative and fair tests
- Identifying differences, similarities or changes related to simple scientific ideas and processes.

SEND Core Knowledge:

- children learn that sounds are made when objects vibrate.
- produced. By the end of this step, children should understand that we hear sounds because an object vibrates. These vibrations then travel through the air (or another medium) to our ears.

Common Misconceptions:

- • Children may think that sound only travels through air. They should be made aware that sound can travel through other mediums, such as solids, liquids and gases. Children could have a discussion around whether sound can be heard through walls or under water to address this.
- • Children may find it difficult to understand how vibrations are detected by the ear. Show children how a drum skin vibrates to produce sound and link this to the ear drum in the middle ear. • Children may find it difficult to understand how sounds travel through solids, liquids and gases. This is because vibrations cannot be seen, especially in the air.
- • Children may need support with measuring sound in decibels. If using data loggers or decibel meters, children will need to learn how to use them accurately, as this is the first time they have used this equipment. • Children have not yet been introduced to decimals, it is important that they record data from the decibel meters as whole numbers.
- Children may find it difficult to make the link between the strength of the vibrations and and the volume of a sound.
- Children may think that the pitch of an instrument can only be changed in one way.

Cross Curricular Links

Computing programs that respond to sound using sensors.

English sound poems

Possible Practical Activities:

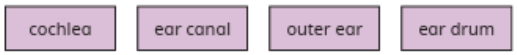
Vibrations



Gather some musical instruments such as a guitar, drum, violin, recorder and tambourine. Ask the children which part of the instrument produces the sound and how it produces it. • Stretch cling film over a plastic bowl. Put a thin layer of sand or rice on the cling film. Produce a loud noise near (but not touching) the bowl. The sand or rice will move. • Use a metal spring toy to show how sound waves travel. Stretch the spring between two people. Tap one end of the spring to model a sound wave.

Ears

Provide children with an unlabelled diagram of the ear.



Ask them to match label cards to the parts of the ear. • Use secondary sources to research the ears of other animals and how they are adapted. Ask questions such as: • Do frogs have ears? • Why do elephants have large ears?

Investigate sounds

Children should record the intensity or loudness of sound at different times throughout the day. Examples are highlighted below. • Record the loudness of sound in the classroom in hourly intervals throughout the day. • Record the intensity of sound in each classroom from Reception to Year 6. Children can identify which classroom had the highest decibel reading. They may want to identify whether the age of the children in the classroom has an impact on the intensity of sound produced. • Record and compare the volume of sound in different areas of the school. Suggestions include the playground at playtime, the lunch hall, different lessons during the day and the office of a senior leadership team member.

Explore volume

Hit a drum softly, then hit the drum harder. Ask children to comment on the difference in volume. How is this linked to the amount of vibration? You can put grains of rice on the drum skin to show the vibrations. • Children can use four different materials to test which is the best insulator of sound. Put a loud toy or an alarm clock in a plastic lunch box. Allow children to wrap the box in a different material each time. They should measure the loudness of sound with a decibel meter before and after the object has been insulated, to see the difference in volume.



Explore Pitch



Ask children to stretch an elastic band between their f ingers. Stretch the elastic band further and notice any change in pitch when plucked. • Give children different–sized pans. Allow them to bang the pans and notice any changes in pitch. Ask questions to help children to spot patterns between pitch and the features of the object. Do larger pans produce a lower pitch? Do smaller pans produce a higher pitch? • Pluck different strings on a guitar. Ask the children to describe the differences in pitch.