


Mendell Primary School

Aspire Challenge Achieve

Medium Term Plan Science



Year Group: 4	Term: Summer 2	Teacher: Hannah Jones	Subject lead: Sarah Bride	<p>Overview: Plants</p> <ul style="list-style-type: none"> <input type="checkbox"/> identify how sounds are made, associating some of them with something vibrating <input type="checkbox"/> recognise that vibrations from sounds travel through a medium to the ear <input type="checkbox"/> find patterns between the pitch of a sound and features of the object that produced it <input type="checkbox"/> 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 <div style="background-color: #e0f0e0; padding: 5px; margin-bottom: 5px;"> <p>Research Using secondary sources of information to answer scientific questions.</p> </div> <div style="background-color: #e0e0f0; padding: 5px; margin-bottom: 5px;"> <p>Comparative / fair testing Changing one variable to see its effect on another, whilst keeping all others the same.</p> </div> <div style="background-color: #e0f0ff; padding: 5px;"> <p>Pattern-seeking Identifying patterns and looking for relationships in enquiries where variables are difficult to control.</p> </div>	<p>Key End Points: By the end of this unit children will be able to:</p> <ul style="list-style-type: none"> • Experience a variety of sounds around us, observe and describe them • Order sounds in a variety of ways e.g. loudest to quietest, highest to lowest • Compare sounds using words and decibels • Explain how we use sounds in everyday life • Be able to explain how sounds travels <p>Describe how volume and pitch are produced by a variety of simple instruments</p> <ul style="list-style-type: none"> • Describe how sounds get fainter as the distance from the sound source increases • Explain how the ear works and how we can protect our hearing
<p>Common Misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • 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 loud and low sounds are quiet. 		<p>Unit key Vocabulary: Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, soundwaves</p>			
Links to other learning:	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: Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3) • Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3) • Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3) • Sound produced by vibrations of objects, in loud speakers, detected by their effects on	High Quality Text: Little Beaver and the Echo—Amy Macdonald The Sound of Silence—Katrina Goldasito & Julia Kuo Scientist to study: Aristotle (Philosopher who developed the concept that sound travels through air due to the movement of air particles) Isaac Newton - search document for information (Mathematician & Physicist who measured the speed of sound)	Risk Assessment:	Teacher CPD: ASE plan exemplification – Hamza Reach out CPD https://www.reachoutcpd.com/ sign up for free.

		microphone diaphragm and the ear drum; sound waves are longitudinal. (KS3) • Auditory range of humans and animals. (KS3) • Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3) • Waves transferring information for conversion to electrical signals by microphone. (KS3)			
	<u>Learning Intention</u>	<u>Lesson Outline</u> (Key Questions in colour)	<u>Resources</u>	<u>Vocabulary</u>	<u>Lowest 20% Adaptations</u>
1	L.I. I can observe how sounds are made and explain this in terms of vibration 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is asking questions and making observations.</p> <p>Pre assessment: Complete vocabulary check – repeat at the end of the unit. Pre assessment children will repeat this at the end of the unit – How does the human hear the dog barking? Provide the children with the template and ask them to draw and annotate how they think the human hears the dog barking. Encourage drawing and annotations or labelling.</p> <p>Word of the week: Sound: vibrations that travel and can be heard when they reach a person's or animal's ear. Big question: How is sound made? Explain to the children that today they will be investigating sound and making observations of what happens when a sound is produced.</p> <p>Carousal: Activity 1: tapping a drum topped with rice. Activity 2: tapping a forking fork against a table and putting it into water. Activity 3: metal hanger and string activity – see link in resources for explanation.</p> <p>Explain to the children that they need to record what they see, hear and feel at each activity similar to the outcome example below:</p>	Teacher CPD: Hanger activity explained: https://www.youtube.com/watch?v=2yx8y006_3c	Sound, vibration, travel, source, vibrate.	

	What did you see?	What did you hear?	What did you feel?
Tap a drum with bird seed on it. Experiment with different amounts of force.	I saw the the I saw when I hit the drum with stick hard it it ^{spread out} away. When I spread ^{spread} it out.	I heard the ^{the} vibrate and it carried on.	I felt the drum stick vibrate when I hit it it ^{and} I put my finger ^{finger} on it, it vibrated a little bit.
Tap a tuning fork against a hard surface and the quickly place it in a container of water.	I saw when I hit the tuning fork the bench and put it in the water it ripples it out.	I heard vibration when I hit it ^{the} bench. It was high ^{high} with high ^{high} rith.	I felt vibration when I hand ^{hand} holded held the tuning stick.
Wind string, attached to a coat hanger, around your index fingers and put the fingers in your ears. Now dangle and gently hit the coat hanger against different objects.	I saw the finger ^{finger} hit the table and ^{and} it vibrated.	It heard ^{was} like a bell, it was loud and it felt heavy. The noise was quite long.	I felt the ^{the} hanged vibrate. It was like a low pitch.

After completing the carousel ask the children to consider if their ideas about sounds have changed or developed?

I used to think that sounds were made by our mouth then it goes to our ears straight away. Now I know that sound is made by vibration in the air. I know this because when an object vibrates it bumps into each other ^{these are called waves} then it travels into your ear then it fades away. ^{the sound waves}

For example when I hit the jump drum and it vibrates.

What happens if an object vibrates far away from you?
It will run out of energy then it will fade away then we can't hear it.

Marking CH: what happens if an object vibrates far away from you?

2 L.I. I can investigate if sound

This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations, recording data and evaluating.

Prior learning:

Metal spoons, water

Sound, vibration, travel,

travels through solids, liquids and gas to our ears.



What are the three states of matter?

What is sound?

How does sound travel? What part of our bodies hears sound?

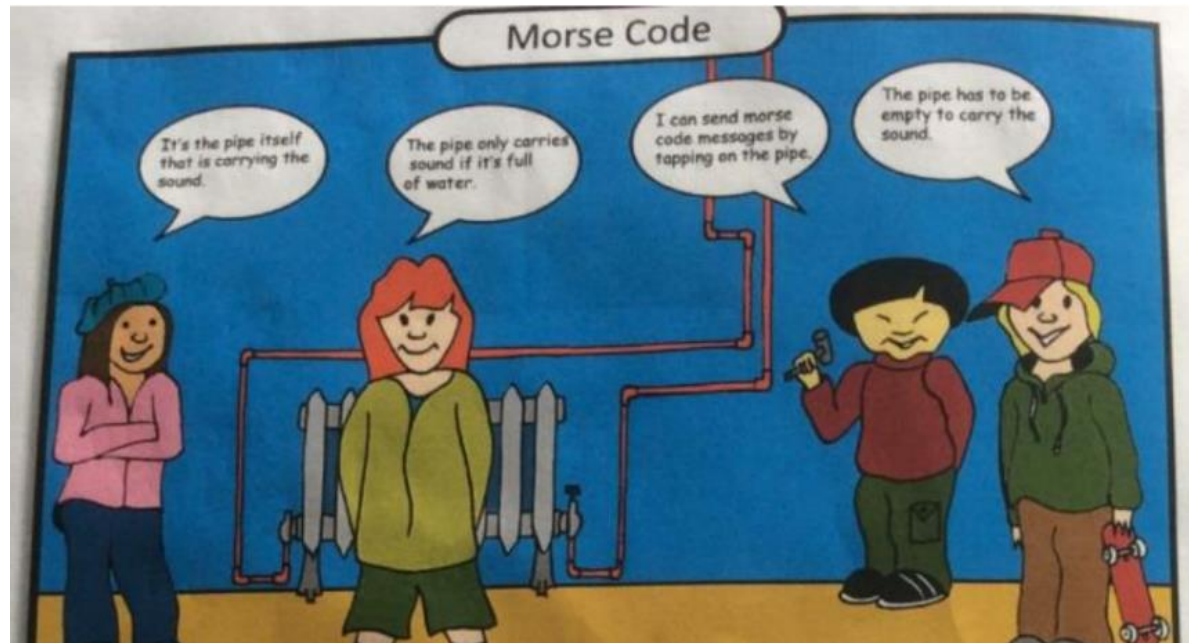
Explorify: zoom in zoom out: Hidden depths.

Big Question: Can sound travel through solids, liquids and gases?

How do our ears detect sound? Gather feedback from the children about what they already know then watch

<https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/z3d4g7h>

Share the concept cartoon – Morse Code. Discuss the concept cartoon and gather children's responses. From what they know so far **who do they agree with and why?**



Ask the children to investigate: **Can sound travel through solids, liquids and gases?** Yes/No – **How do you know?**

Ask the children to come up with ways in which they might find the answer to the question. Take feedback if children give different activity ideas allow them to follow their ideas. Discuss the children's experiences of hearing sound in each state of matter. **What did we do last week? Was the sound travelling through solids, liquids or gas? Can the children think of real life experiences or situations where sound would travel through each state?** – do the children think about animals who live underwater and how they communicate e.g. dolphins and whales.

Suggested activities:

Liquid: banging metal spoons underwater.

container,
paper cups
and string.

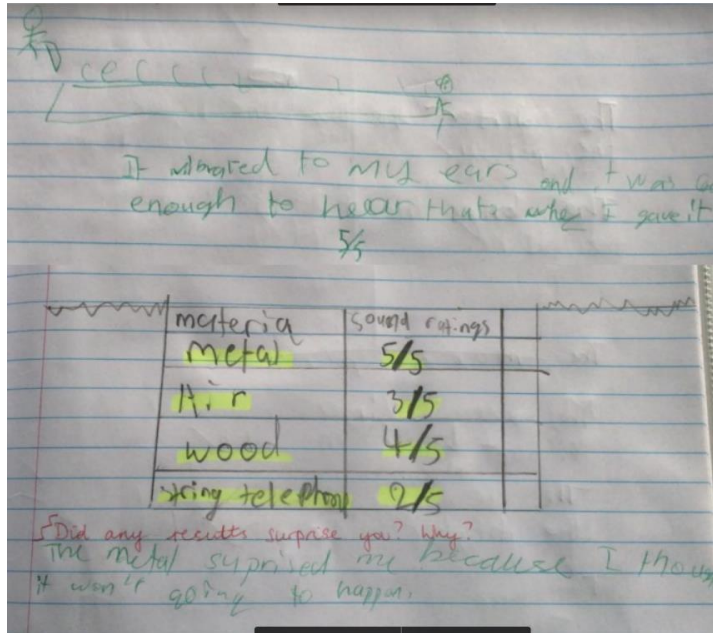
**source,
vibrate,
volume,
loud,
quiet,
sound
waves**

Solid : string telephones

Gas: clapping at distance in the playground.

After the activities discuss how the vibrations travel to our ears - gather children's ideas before explaining that sound vibrations travel in soundwaves to our ears.

Ask the children to develop a way of recording their results e.g. via a scaled score 1-5 of how well they could hear the sound in each activity. Diagrams and images.



Evaluating skill: How could we make our data more accurate? How can we improve this investigation? – evidence in books.

3 I can explore how the pitch of sound can be different and why



This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and asking questions

Prior learning:

How does sound travel?

What can sound travel through?

Word of the week: Pitch

Explorify – what is going on video – Bottle orchestra? Allow children time to discuss and come back together to share observations and suggestions as to what is happening in the video. After you've watched the video, ask **Why do the class think the bottles are lined up like this? What do they think will happen to each bottle when they're tapped?**

Lass jars or bottles, water, guitar, recorders.

pitch (high, low),

Why do the class think there are different levels of liquid in each bottle? How do they think the sound is made?

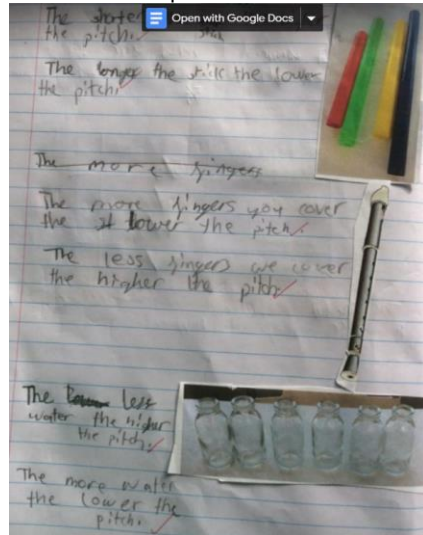
Ask the class to describe what they saw using only one word.

Share the video on <https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/z8s62v4> about pitch and watch the investigation video below it.

Allow the children to explore a range of musical instruments including: guitar, recorder and glass jars or bottles filled with water to different capacities. This can be done as a carousel or on tables.

Ask the children to explore the instruments and discuss the different pitch, **can they change the pitch of the instrument by doing something different?** E.g. plucking a different string or covering more holes in the recorder. **What do they notice? How can they produce the highest and lowest pitch sounds from each instrument?** Ask the children to record any patterns they notice under a picture of each instrument.

Outcome example:



Oral evidence

“When we plucked the guitar, we noticed that the thicker strings made the lower-pitched sound and the thinner strings made the higher-pitched sound. I think it also depends how tight the strings are.”

Exit Pass: complete the pitch quiz <https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/z8s62v4>

4 L.I. I can investigate if distance from a source affects the volume of sound.

This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is measuring, making observations and recording data.

Prior learning:

What can sound travel through?

How do we hear sound?

What is pitch?

Big Question: Does the volume of sound change with distance?

Explorify – what if – what if we heard every sound at the same volume.

Data loggers

Tape measures

Sound, vibrations, source, distance, decibels, volume, data logger, soundwaves.



In pairs, discuss what might be a Plus, Minus and Interesting way to think about the question. Stuck for ideas? They could think about:

- **Which sounds are the loudest and which are the quietest?**
- **Why are some sounds louder than others?**
- **How would it affect our daily life?**
- **What could you do to muffle sound to make it quieter or amplify it to make it louder?**
- **How would we protect our ears from damage?**

Ask the children to share their partner's ideas then encourage a broader discussion as a class, remember there is no wrong or right answer!

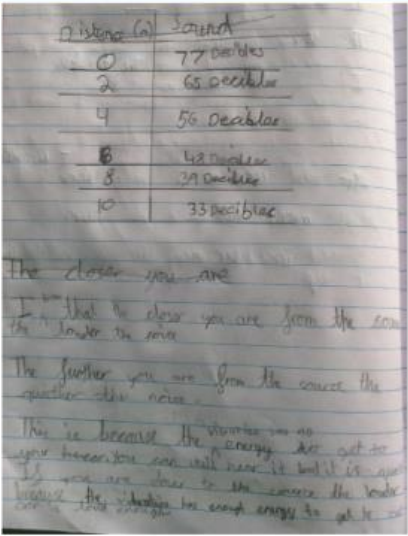
Play a sound clip of a train passing by. Ask the children what they notices about the volume of the train at different points in the audio clip. - They should notice how it got louder as it approached and then quieter again as it got further way.

Ask the children if they have had personal experiences of this. **How could we gather scientific evidence to back up our observations linked to distance and volume?**


Show the children the equipment you have selected for today's investigation: data logger, musical triangle, tape measure and ask the children to think how we might use these to gather data to answer our big question.

Explain the children will take a musical triangle on a part of the school field with their group and decide on the distances the wish to test. Ask them to record the volume using the data logger at set intervals and record their results in decibels. Back in class as the children to explain what their results tell them about the volume of sound closer to the source and further away from the source. **Can they suggest why this happens?**

Outcome example:

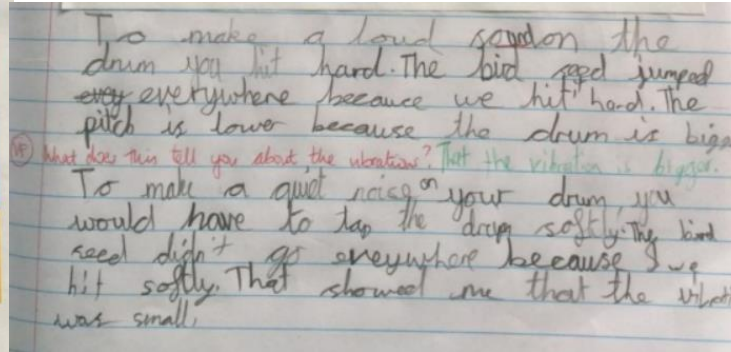
EVIDENCE OF LEARNING		ASSESSMENT
<p>Oral evidence</p> <p>"My mum always gets cross with me because I don't hear her calling me for dinner when I'm in my bedroom. That's because I'm upstairs."</p>	<p>Examples of work</p>  <p>The closer you are I think that the closer you are from the sound the louder the noise The further you are from the source the quieter the noise This is because the vibrations are so small however you can still hear it but it is so quiet you are closer to the source the louder because the vibrations are enough energy to get to you</p>	<p>Knowledge</p> <p>Hamza gathers data to show that sounds get fainter the further away you are away from the sound. He identifies the pattern and gives a simple explanation of why this happens.</p>
<p>Teacher observations</p> <p>Hamza suggested to his group that they could test this by measuring the sound at different distances.</p> <p>They were careful to stop when there were other sounds, i.e. airplanes and sirens.</p>		<p>Working scientifically</p> <p>Hamza constructs a simple table to record his evidence. He reports on his findings and draws simple conclusions.</p>

Exit pass: what other factors might affect the volume of a sound?

<p>5</p> <p>L.I. I can explain how to increase and decrease volume and pitch.</p> 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is communicating results</p> <p>Prior learning: What is a force? What is a source of sound? How can you change the pitch of a sound?</p> <p>Ask the children to discuss the concept cartoon as a group explaining to the class who they agree and disagree with and why. Model to the children hitting the drum hard and then soft – what is the same what is different? How can we describe the way I hit the drum the first time compared to the second time? – encourage the use of force applied. Allow the children to experiment with changing the volume and pitch of the drum and think about how they can explain how to change each like the example below.</p>	<p>Drums, rice, musical instruments.</p> <p>Post assessment sheet and vocab check.</p>	<p>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, soundwaves</p>	
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Explain how to change the volume, remember to say what happens to the vibrations. Then explain how to change the pitch in your book.



Provide the children with a range of musical instruments to choose from. Ask them to record each other making an explanation video about everything they know about sound and how to change the volume and pitch of a sound. They might also wish to explain how volume of a sound can change with distance as well as force. see example from ASE plan exemplification – Hamza <https://www.planassessment.com/videos?wix-vod-video-id=518098eb17364fd7b6b38c72c58be21c&wix-vod-comp-id=comp-kd04dier>

Post assessment: Complete vocabulary check –

Post assessment– **How does the human hear the dog barking?** Provide the children with the template and ask them to draw and annotate how they think the human hears the dog barking. Encourage drawing and annotations or labelling. Children should have a better understanding of how to draw sound vibrations and add greater detail to their annotations than the pre assessment. Children may wish to add a diagram of the ear to explain how we hear alongside how sound vibrations travel and what they can travel through.