Year 4 Sound Term 1B

Background Knowledge
This is the first unit on sound therefore children will have a range of prior knowledge. They will have looked briefly at the sense of hearing in year 1. Decibel meters can be downloaded if required. In lesson 2, you might want to make string telephones as part of the lesson to show how sound travels through different materials. Boomwhackers are available in the studio and are a useful resource to explore pitch and volume of musical instruments. Pitch can be investigated by twanging rulers, plucking different thicknesses of rubber bands and blowing over glass bottles amongst others. 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 part of our body inside our ear 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. <u>Common misconceptions</u> 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.

What children know / can do
Identify, name and label the basic part of the human body and say which part of the body is associated with each sense.(Y1)

National Curriculum objectives	Children's 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 produce it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that the sound gets fainter as the distance from the sound source increases.	I can describe how a sound is made. I can explain how sound travels from a source to our ears. I can explain the correlation between the pitch and the object producing a sound. I can explain the correlation between the volume of a sound and the strength of vibrations that produced it. I can explain what happens to a sound as it gets further away from its source.
<u>Working scientifically.</u> asking relevant questions and using different types of scientific enquiries to answer them making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers identifying differences, similarities or changes related to simple scientific ideas and processes gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions.	I can set up a simple enquiry to explore a scientific question about sound. I recognise the 5 different types of scientific enquiry which will answer questions about sound. I can use them to answer questions about sound. I can use equipment including data loggers to make accurate measurements of the volume of sound. I can recognise patterns relating to the pitch and loudness of sound and write these as statements. I can present my findings clearly. I can record my results clearly in tables and bar charts. I can use my results to draw simple conclusions. I can use and spell the scientific language of sound to explain my findings.

Assessment

1. Name different sound sources.
2. Explain how a musical instrument makes a sound.
3. Which materials can sound travel through?
4. Finish the comparative statements; The higher the pitch, …….
   The lower the pitch…..
5. How can we make the noise of the drum louder?
6. What happens when you move away from a sound source?
7. Which question did we investigate? What type of enquiry did we use? What did we find out?

Working towards	Expected	Exceeding
I can pose questions about sound and start to identify the type of scientific enquiry needed to answer them. I can name some sound sources and know sounds are made by objects vibrating. I can investigate that vibrations from sounds travel through different materials to the ear. I can state the relationship between the pitch of a sound and the features of an object with support. I can state the relationship between volume and the strength of the vibrations producing it with support. I can record my results in tables and bar charts and say what they show. I can observe that sound gets quieter as distance increases. I can use and spell scientific vocabulary related to sound.	I can pose questions about sound and identify the type of scientific enquiry needed to answer them. I can name a variety of sound sources and explain how sounds are made by objects vibrating. I can recognise that vibrations from sounds travel through different materials to the ear. I can state the relationship between the pitch of a sound and the features of an object. I can state the relationship between volume and the strength of the vibrations producing it. I can record my results clearly in tables and bar charts and use these to draw simple conclusions. I can recognise that sound gets quieter as distance increases. I can use and spell scientific vocabulary related to sound in my explanations.	I can pose questions about sound and identify the type of scientific enquiry needed to answer them confidently. I can name a variety of sound sources and can clearly explain how sounds are made by objects vibrating. I can recognise that vibrations from sounds travel through different materials to the ear and identify the materials sounds travel through more easily. I can confidently state the relationship between the pitch of a sound and the features of an object. I can state the relationship between volume and the strength of the vibrations producing it explaining why I think this may be the case. I can record my results accurately in tables and bar charts and use these to draw simple conclusions. I can recognise that sound gets quieter as distance increases explaining why. I can use and spell scientific vocabulary related to sound accurately in my explanations.

Key Vocabulary	
Decibel- the unit the volume of sound is measured in. High pitched sound- a squeaky sound. Low pitched sound- a deep sound. Pitch- how low or high a sound is. Sound- a form of energy that can be heard. Sounds are made by vibrations. Vibration- a regular and repeated movement backwards and forwards. Volume- the loudness of a sound.	Bar chart- presenting your result in a way that can be seen visually. Comparative statement- Comparing one thing with another. Conclusion; To look at our results and explain what we have found out. Investigation – to find something out Measure- to find out the quantity of something. Observe – to look at something closely Pattern seeking- To look for a pattern in your results. Record- to write down what we found out. Table- a way of organising your findings.

Character opportunities	Possible STEM careers linked to topic
Curiosity about the world around responsibility - recognising that other's may not have the same sound tolerance	Audio technician (responsible for using sound recording equipment) Physicist (studies physics and how particles interact with each other) Sound engineer (deals with sound for broadcast or musical performances)

Useful resources

https://www.hamilton-trust.org.uk/science/year-4-science/sound-listen/ for lots of different and further activities

https://www.noisyplanet.nidcd.nih.gov/kids-preteens/listen-up-infographic for online demo of soundmeter in different situations

download class 'noise meters' (various online options)

Download decibel app

Possible trips – Centre for life workshop

http://www.bbc.co.uk/education/topics/zgffr82/videos/1 for sound video clips as starters/ resources

100 (new curriculum) science lessons

Other activities and ideas:

https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/30511-Soundslikescience_FULL.pdf

Contact KEVI to work with oscilloscope ??

Link with vision express/boots hearing aid shops – visit??

If you video sound activities on ipad and play it back in slow motion you can see vibrations more clearly

Objectives	Lesson Objectives	Working Scientifically	Suggested Main activity
● To recognise that vibrations from sounds travel through a medium to the ear ● To recognise that sounds get fainter as the distance increases	● To recognise that sounds get fainter as the distance increases ● To explore existing ideas about sounds asking relevant questions	● Asking relevant questions	● Listen to and discuss sounds outdoors ● Children create sound concept map (refer to this at end of unit for assessment Begin by playing a game. Children sit silently, head resting on their desk, eyes shut. Explain that if they are tapped on the shoulder they should knock gently on the table. The rest of the class should then, without looking, point in the direction of the source of the knocking sound. Chn hold their 'points' and open their eyes, are they all pointing in the same direction? Repeat a few more times. Are chn always pointing in the same direction? Repeat with a softer sound, child tapped on the shoulder should gently tap the table with one finger How did we know where the sound was coming from?. How did the sound travel from the source to our ears? Assess chn's prior To know this, we first have to learn what sound is.
● To identify how sounds are made identifying them with vibrations	● To identify how a variety of sounds are made ● To identify similarities and differences and changes in sound and how they are made	● Identifying differences, similarities and changes related to simple scientific processes	● Create sounds from a variety of materials ● Select 1 child from each table to strike the tuning fork against the side of the desk and gently place the vibrating end on the water in the centre of the bowl. The others around the table should watch and explain what they could see. Repeat until each child has had a turn with the tuning fork. Explain that the tuning fork is vibrating and the ripples move outwards from the sound source (the fork). This is how sound travels, by causing the particles around the vibrating source to vibrate, which in turn vibrate other particles, sending a ripple away from the vibrating sound source (more details in Teacher Notes). We usually hear sound that has travelled through the medium of air, but it can also travel through solids and liquids. See BBC video clips
● To identify how sounds are made identifying them with vibrations	● To understand that sound travels in all directions ● To set up a simple practical enquiry to model sound ● To record ideas and annotate drawings	● Setting up scientific test	● Model how sounds travel using springs and ripples in water. Explore how sounds travel in all directions
● To identify how sounds are made associating some of them with something vibrating	● To understand that sounds can be made in a variety of ways ● To understand that different things vibrate differently and this makes different sounds	● Gather, record, classify and present information	● Use a variety of different instruments to see how they make sound eg banging, scraping etc. Sort in different ways ● Make vibrations visible eg tuning fork on ping pong balls, rice on drums, cymbals, vibrating springs (film with ipad and watch in slow time)

● To identify how sounds are made associating some of them with something vibrating	● To identify the vibrating parts of sources of sounds	Observing closely	● Spot the vibrating part by eg looking at or feeling the throat when talking
● To identify how sounds are made associating some of them with something vibrating	● To understand that vibrations can travel through solids ● To know that sounds can be reflected by solids	● Setting up simple comparative enquiries comparative and fair tests	● Make and use string telephones. Explain how they work ● Explore echoes and echo location by bats and whales. Use books or web based information to find out how sound travels underwater (during swimming lesson?)
● To find patterns between the volume of the sound and the strength of the vibrations that produced it	● To relate the volume of sound to the strength of the vibration ● To see the value of presenting information in a bar chart ● To understand that the volume of sound can be changed with a cone shape ● To set up a fair test to find patterns between how sound is spread out and its volume ● Use datalogger to measure	● Record findings using simple scientific language. Drawings, labelled diagrams keys, bar charts and tables ● Make systematic observations and where appropriate take accurate measurements ● Use results to draw simple conclusions make predictions for new values suggest improvements and ask further questions	● Devise a way to test and record how far away we can hear a pin drop ● Experiment with sounds of different volume at different distances ● Investigate changing the volume of sound using megaphones and ear trumpets
● To find patterns between the volume of sound and the strength of the vibration that produced it	● To consider how the volume of sound can be reduced by insulating materials ● To make accurate measurements of sound using dataloggers	● Make systematic observations and where appropriate take accurate measurements ● Use results to draw simple conclusions make predictions for new values suggest improvements and ask further questions	● Investigate the soundproofing effect of different materials
● To find patterns between the pitch of a sound and features of the object which produces it	● To recognise that the pitch of a sound is related to the length of the vibrating part ● To make generalisations about patterns and changing pitch	Make predictions and draw conclusions	● Make elastic band guitars, straw pan pipes, bottle xylophones ● (See primary resources/ internet for further ideas) and explain to others how they work ● Invite orchestra members to play instruments
●	●		● Review mind map and add extra information as method of assessment

•	•		• Information on how the ear works • https://www.outstandingscience.co.uk/index.php?action=view_page&page=view_unit&unit=4d

Y4 Sound

Rice Drum Investigation

You will need: Drum

Rice

1. Place one hand on the drum and strike it with the other. How does it feel?
2. Pour a little rice onto the drum.
3. Strike the drum gently.
4. Can you see what happens?
5. Strike the drum a little harder?
6. Do you notice a difference?

Bottle Organ Investigation

You will need: Five bottles

Pencil

Water

1. Half fill one bottle of water and blow gently across the top.
2. Fill the other 4 bottles to different levels and blow across the top of them also.
3. Repeat the experiment by tapping the Bottles.
4. What do you notice?

Twanging rulers Investigation

You will need: 30cm plastic ruler

Table

1. Hold one end of the ruler firmly near the edge of a table and 'twang' the other .
2. Change the length of the ruler, by making it longer or shorter.
3. Listen to the change of the 'twang.'

Tapping Spoons Investigation

You will need: Jug

Two spoons

Water

1. Tap the 2 spoons together above the water. What type of noise do they make?
2. Tap the 2 spoons together under the water.
3. Can you hear anything>
4. Is the sound the same?

Clapping Investigation

You will need: Chair

Partner

1. Work with a partner
2. Sit on a chair with your eyes closed tight
3. Your partner must choose to stand somewhere in the room
4. Your partner should clap
5. You must point to where you think the noise is coming from
6. Practise a few times, before swapping with your partner

Balloon Voices Investigation

You will need: Balloon
Scissors
Cardboard tube

1. Carefully cut off the neck of the balloon using scissors and throw it away.
2. Stretch the rest of the balloon over one end of a cardboard tube
3. Gently place one finger on the balloon, and talk down the cardboard tube. Can you feel what is happening?

Sound assessment(ARE)

What happens to the drum skin when the boy hits it?

_____

_____

What happens to the sound if he hits it harder?

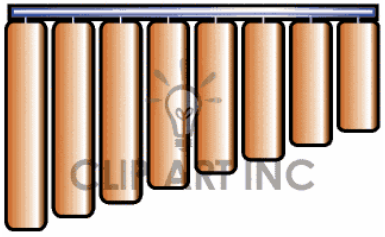
_____

_____

If I move further away from the drum, what will I hear? Explain your answer.

_____

_____



The picture shows some wind chimes. Put a X on the one which you think will have the lowest pitch.

Sound Assessment (above ARE)

Choose a musical instrument. Can you explain how it makes sound?

The musical instrument I chose is a _____

It makes sound
by..____

_____

How do you change the pitch of the sound on the instrument?

_____

_____

Choose a different instrument. How does the way the sound is produced different from the first instrument you chose?

_____

_____