



Topic Title: Sound
(Scandalous Scoundrels)

Year Group: 4

Academic Year: 2022-2023

Science Intent:

The children will learn about how sounds are made, carrying out demonstrations of vibrations, explore pitch, and will use their understanding of how high and low sounds are made.

<p>Prior Scientific Learning/Linked Topics:</p> <p>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)</p>	<p>Literacy Links (including texts/media used):</p> <p>N/A</p>	<p>Maths Links:</p> <p>Data handling</p>
<p>Scientific Knowledge</p>	<p>Working Scientifically</p>	
<p>Objective from NC:</p> <p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p>	<p>Ask relevant questions and use different types of scientific enquiries to answer them. Raise their own questions about the world around them. Make some decisions about which types of enquiry will be the best way of answering questions. Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. Learn to use new equipment appropriately (eg data loggers). Can see a pattern in my results. Can choose from a selection of equipment. 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. Report on findings from enquiries, including oral and written explanations, displays or presentations of</p>	



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<p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p>results and conclusions. Use notes, simple tables and standard units and help to decide how to record and analyse their data. Can record results in tables and bar charts.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Use straightforward scientific evidence to answer questions or to support their findings.</p> <p>With help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Recognise when a simple fair test is necessary and help to decide how to set it up. Can think of more than one variable factor.</p>
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Content:

Lesson 1: To find out that sounds are made when objects and materials vibrate.

Show children the pictures of different musical instruments on the slides. Do you know what these instruments are called? How could you get each of the instruments to make a sound? Children to discuss their ideas. If possible, have some instruments for children to look at and investigate (e.g. violin, flute, recorder, percussion instruments, etc.). How is sound made? Children think, pair, share their ideas then go through the description on the slides. How can we test if this is correct? How can we verify whether sounds are caused by vibrations? Invite children to share their ideas. To demonstrate that sound is made by vibrations, ask the class to hum quietly and feel their throat. What can you feel? What happens when you make louder, softer, higher, lower sounds? Children to share their observations. Organise the classroom into different work stations. On each table, set up one of the sounds to investigate: tuning fork in water; rice on a drum skin; ruler clamped to a desk; elastic bands to twang; stereo speakers to feel. Place the correct Question Cards next to each activity. In groups, children to work their way around each work station, discussing the answers to the questions on the Question Cards as they go round. When children have investigated all the activities, challenge them to create a poster to demonstrate how vibrations cause sound and how this can be seen and felt. **Research – Problem solving**

Lesson 2: To investigate whether sounds can travel through different materials.

Ask children to listen very carefully to all the sounds they can hear from their classroom. Create a list on the slides of children’s observations. Choose a child to go outside the classroom and make a loud noise e.g. banging on a drum or a cymbal. Child to ask the rest of the class whether they could hear the noise he/she made. What different materials did the sound have to travel through the reach our ears (brick, wood, glass, air, etc.)? Do you think sound can travel through these different materials? Why? Why not? Invite children to share their ideas. Encourage them to think about their experiences, e.g. can you hear when you are underwater at a swimming pool? Sound can travel through lots of different materials but which materials is it easier for sound to pass through? Which materials do not allow sound to pass through them easily? Look at the scenarios on the slides and ask children to discuss which material would allow most sound through. Children to walk around the school and listen to the sounds they can hear. Children to discuss in pairs to note down on worksheet 2A the sounds they can hear and the materials that the sound had to pass through to reach their ears.



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Have some 'string telephones' ready for the children to test out (two empty yoghurt pots joined by a long piece of string). Children to have a go at speaking and listening through the telephone, making sure the string is pulled tight. Can you hear the other person? What does this tell you about how sound travels? [Comparative / Fair Test.](#)

Lesson 3: To explore the relationship between distance and volume.

What happens to a sound the further away it gets? Why? Invite children to think, pair, share their ideas. Invite a child to come to the front of the class and roll a dice onto a hard surface, e.g. a mini-whiteboard. How far away do you think you would have to be before you couldn't hear this sound anymore? Children to offer their suggestions. How do you think we could test this? Invite children to share their ideas. Tell children that they will be creating their own tests today to see what happens to sound the further away it gets. Go through the questions on the slides to encourage children to think about how they could conduct these tests and how they could overcome difficulties.

Pattern Seeking

Lesson 4: To find out that some materials are effective in preventing vibrations from sound sources reaching the ear.

Show children the picture of the construction worker wearing ear protectors. Why is this necessary? Children to discuss their ideas. Explain that sometimes it is necessary to prevent sounds from travelling, either for safety or for convenience. Can you think of any other examples when it is necessary or desirable to muffle sounds? Children to think, pair, share their ideas. How many different ways can you think of to stop sounds from reaching the ears? Again, children to think, pair, share their ideas. Where are sounds loudest and quietest in our school? Lead children around the school or send them off in small groups to observe, e.g. where footsteps are loudest and quietest, and then return to the classroom to discuss their observations. From what we have observed, what kinds of materials are best for muffling sound (e.g. carpet)? Children to discuss ideas. If we wanted to conduct an experiment for testing which materials were best at soundproofing, how could we do this? What materials do you think we could test? How would we make it a fair test? Invite children to share their ideas. Tell children that today they will be working in groups to see which materials are best for soundproofing. Ask children to get into groups and assign a particular material to each group (e.g. clingfilm, tin foil, cotton wool, paper towel, kitchen roll, bubble wrap). Tell children that they will be wrapping a rattle (e.g. by shaking rice, paperclips or lentils in a small container) and see how many layers of their material being wrapped around the object it takes before the rattle can no longer be heard. How can we make this experiment a fair test? All children will need to have the same object to rattle and use the same size sheets of their material to wrap their rattle in. Children to carry out their experiment and see how many layers of their material it took before the rattle could not be heard any more. Record the results in a table as a class. Which material was the best at soundproofing? Which was worst? [Comparative / Fair Test.](#)

Lesson 5: To investigate how sounds can be different pitches and volumes.

Listen to a recording or show children a video of an orchestra playing (e.g. http://www.youtube.com/watch?v=gaUBsN6K_38&feature=related). See if children can identify some of the instruments and challenge them to describe what they are like (e.g. do they make high or low sounds, are they loud or soft?). Complete the table on the slides. Explain that the term 'pitch' describes how high or low a sound is and 'volume' describes how loud or quiet a sound is. Use a glockenspiel to see if children can identify which note is higher than the other. Which of these two notes is higher? Play two notes. Children to put one hand up if they think the first note was higher and two hands up if they think the second note was higher. Repeat several times and then do the same for volume. Show children the pictures of drums on the slides. Which of these do you think will make the highest sound? Why? Which of these do you think would be loudest and why? Provide children with a glockenspiel and ask them to investigate



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which notes are the highest and which are the lowest. When children have identified that the smaller keys make higher sounds than the lower keys, ask them to describe what they have found out. Then decide which instrument will have a higher pitch from the pairs of instruments shown (e.g. will a flute or a piccolo have a higher pitch?) and explain their choice.

[Comparative / Fair Test.](#)

Lesson 6: To find out how the length, thickness and tightness of a string affects its pitch.

Show children the picture of a violin on the slides. How do musicians create sounds of different pitches on a violin? Go through the description on the slides of violins and how different sounds are made. Tell children that today they will be testing how the length, tightness and thickness of a string affects its sound. Display the questions: What happens to a string when you shorten it? What is the difference in pitch between a thick string and a thin string? How does the tightness of a string affect its pitch? How could we find the answers to these questions? Children to think, pair, share their ideas. Display the questions again. What do you predict the answers to these questions will be? Children to discuss their ideas and note on the slides. Provide children with a variety of stringed instruments (e.g. violins and/or guitars). In small groups, children to investigate the instruments and explore what happens to the pitch when the string is shortened (by pressing the string with fingers) and tightened (by twisting the tuning dials), and how the thickness of the strings affects the pitch. Children to record their observations [Comparative / Fair Test.](#)

Lesson 7: To find out how sounds can be made by air vibrating and how to change the pitch of notes produced by vibrating air.

Show children the pictures of some woodwind instruments and ask them to describe how they think the sound is made. Explain that some instruments produce sounds because of air vibrating. Look at the picture of the flute and explain how it works and how the pitch is changed. Do you think the sound produced would be higher or lower if more keys were covered? Why? Demonstrate how to blow across the top of a bottle to produce a sound. Show children the picture of an empty bottle on the slides and explain that the air inside the bottle is vibrating. How do you think we could change the pitch of the sound produced? Children to think, pair, share their ideas. Show the next pictures showing bottles with different levels on water in. How do you think the pitch of the sound produced would be different for each of these bottles? Can you order the bottles from the highest sound to the lowest sound? As a class, predict what order they will go in. Provide children with several bottles, each with different amounts of water. Children to either blow over the top or tap with e.g. a teaspoon (if the bottle is glass) to see how the different levels of water affect the pitch of the note. Children to predict what they think will happen, describe how they carried out their experiment, record their results and write a conclusion. [Comparative / Fair Test.](#)

Key Vocabulary:

Vibrate, vibration, vibrating, air, medium, ear, hear, sound, volume, pitch, faint, fainter, loud, louder, string, percussion, woodwind, brass, insulate

Stunning Start/Marvellous Middle/Fabulous Finish:

A discovery afternoon of different sounds -

<https://www.youtube.com/watch?v=uTNL3WXEexA>

OAA/Trips/Visits/Visitors:

Visit from range of instrumentalists talking about their instruments