

KS3 Physics – Waves: What is sound?

<p>Subject curriculum intent:</p>	<p>To develop in our students:</p> <ul style="list-style-type: none"> • An enjoyment of Science by providing relevant, interesting and challenging experiences and activities. • Observational skills, by looking for patterns and contrasts. • An inquiring mind and a logical approach to problem solving. • The ability to draw conclusions from simple experiments and, where appropriate, to devise suitable experiments for further investigations. • Communication skills in speaking and listening, written, diagrammatic and symbolic forms. • Co-operation and a respect for others by being able to work as part of a team – the development of appropriate social skills. • Confidence in their own abilities. • A respect for the environment and a careful use of resources. • An interest in the world about them and a greater understanding of it. 		
<p>End of KS3 intent/outcome</p>	<p>End of KS4 intent/outcome</p>	<p>End of KS5 intent/outcome</p>	
<p>Students will build on their knowledge of science through the different areas – biology chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter.</p>	<p>Students will continue to develop their scientific knowledge through the different areas – biology, chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter. Students will be able to relate their scientific experiences to everyday life and have an understanding that science is all around them.</p>	<p style="text-align: center;">N/A</p>	
<p>Intent for this topic:</p>	<p>Students will be learn about how sounds are made and how sounds change. They will learn that sounds are made by vibrations and that these vibrations travels in waves in all directions and through objects. Students will also learn the difference between pitch and volume and be able to demonstrate how to change the pitch and volume on an instrument. Students will also understand that sound has to enter the ear and ears are used to hear sound. Students will learn about parts of the ear and how we hear.</p> <p>Students will ‘work scientifically’ to achieve these goals, learning the key features of scientific enquiry; observing over time, pattern seeking, identifying, classifying, investigating (fair tests) and researching.</p>		
<p>Core vocabulary needed for this subject/topic:</p>	<p>Subject: Biology, Chemistry, Physics Observe, pattern, identifying, classifying, investigating, fair test, researching</p>		

	Topic: Vibration, air, sound, sound wave, travel, materials, absorb, reflect. Pitch – high, low Volume – loud, quiet Parts of the ear – outer ear, ear drum, ear bones, cochlea, auditory nerve			
Vocabulary pupils will have accessed in other topics or subject areas:	Pitch, high, low, volume, loud, quiet, hear, ear, travel, waves, instruments			
Key vocabulary taught within this topic:	Vibration, air, sound, sound wave, travel, materials, absorb, reflect. Pitch – high, low Volume – loud, quiet Parts of the ear – outer ear, ear drum, ear bones, cochlea, auditory nerve			
Prior knowledge: what pupils may already have studied				
Key stage	Subject	Topic title	Term/year taught	Content/What might pupils already know?
KS3	Science	Properties of Materials	Year 1/Spring 1	Students may have learnt about the properties of materials and may be able to name different materials and identify some of their properties.
KS3	Music	All Areas	Every term/Every year	Students will have been given an opportunity to play different instruments. They may have explored how to change the pitch and volume of different instruments as part of their music lessons.
Links to other subjects: Music				
Equality, Diversity and Inclusion: Alexander Graham Bell – inventor of the telephone				

	<u>OU P Steps 5-6</u>	<u>OU P Steps P7-8</u>	<u>OU Step 1</u>	<u>OU Step 2</u>	<u>OU Step 3</u>
<u>Subject specific knowledge</u>	Names sounds in the environment from a choice of 2 e.g. birds, cards. Knows that sounds can be loud or quiet.	Names source of some environmental sounds e.g. birds, cars Knows that sound is caused by vibrations.	Understands the term vibration. Can describe how sounds are made.	Explains that a sound is made when an object vibrates. Understands that vibrations make air “wobble” and our ears can detect this.	Can explain how sound is caused by vibrations. Understands that vibrations can't always be seen.

	<p>Understands that sounds are quieter when further away.</p> <p>Understands how to make instruments make a noise e.g. drum, guitar</p> <p>Identifies sounds as high or low.</p> <p>Knows that we hear sounds through our ears.</p> <p>Knows that sound travels in waves.</p>	<p>Knows that sounds can be loud or quiet.</p> <p>Knows that volume is how loud or quiet something is.</p> <p>Understands that sounds are quieter when further away.</p> <p>Identifies sounds as high or low.</p> <p>Knows that pitch is how loud or quiet something is.</p> <p>Knows how to change the pitch and volume on different instruments.</p> <p>Explains the difference between high and low sounds.</p> <p>Knows sounds travel in waves from the source to our ear.</p> <p>Can label the parts of the ear.</p> <p>Can sequence how we hear sounds.</p>	<p>Knows the different between pitch and volume.</p> <p>Knows how you make sounds on different instruments.</p> <p>Knows how to change the pitch and volume on different instruments.</p> <p>Explains that sound travels away from a source.</p> <p>Understands that sounds are quieter when they are further away and sounds are louder the closer you are to the sound.</p> <p>Know that sounds can be absorbed.</p> <p>Knows sounds travel in waves from the source to our ear.</p> <p>Knows the parts of the ear.</p> <p>Can explain how sound travels from the source to the ear.</p>	<p>Names different sources of sound and recognise differences between sounds.</p> <p>Knows the different between pitch and volume.</p> <p>Can explain how to change the pitch and volume on different instruments.</p> <p>Explains that sound travels away from a source.</p> <p>Can label sound waves according to pitch and volume.</p> <p>Explains that loud sounds can damage their ears.</p> <p>Knows that sounds can be absorbed or reflected.</p> <p>Knows that sound travels in all directions.</p> <p>Explains that sound travels from its source to our ears.</p>	<p>Understands that vibrations make air "wobble" and our ears can detect this.</p> <p>Explains loudness simply in terms of vibrations.</p> <p>Names some objects that sound can travel through.</p> <p>Explains that sound travels better through some things than others ("sound conductors").</p> <p>Can explain how sound is reflected or absorbed by different materials.</p> <p>Explains simply how sound travels in all directions.</p> <p>Describes how to change the pitch of a sound.</p> <p>Describes how to change the volume of a sound.</p> <p>Can draw and label sound waves according to pitch and volume.</p>
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<p><u>Subject specific skills</u></p>	<p>Makes sounds using instruments by copying.</p> <p>Changes pitch and volume of sound by choice.</p> <p>Matches sound to source from choice of 2.</p> <p>Identifies vibrations when a string is plucked or drum is banged.</p> <p>Sorts pictures of sounds into loud and quiet.</p> <p>Demonstrates how to play an unfamiliar instrument after trial and error.</p>	<p>Differentiates between sounds e.g. can identify a loud or soft sound, can make a loud or soft sound.</p> <p>Produces a variety of sounds with own body or an instrument.</p> <p>Experiments how to change the pitch and volume using a simple object e.g. Ruler.</p> <p>Makes a simple observation regarding volume and length or size of object making the sound.</p> <p>Makes a sound higher/lower on an instrument they have made.</p>	<p>Recognise sounds in their immediate environment.</p> <p>Describes the observations of vibrations e.g. tuning forks in water.</p> <p>Makes a high/low/loud/quiet sounds using a range of different instruments.</p> <p>Makes predictions regarding volume and pitch when using an instrument they have made e.g rubber band guitar or straw whistle.</p> <p>Labels the parts of the ear.</p> <p>Is able to label diagrams using a word bank.</p>	<p>Gives two examples of where they can see or feel vibrations from instruments.</p> <p>Makes a high/low/loud/quiet sounds using a range of different instruments.</p> <p>Selects materials to reduce sounds entering our ears.</p> <p>Indicates patterns e.g. the thicker the band the lower the note - with help.</p> <p>Investigates how different sounds can be heard through solid objects.</p> <p>Links sound to vibrations and predicts how the vibration</p>	<p>Plans an investigation into how different sounds can be heard through solid objects.</p> <p>Makes a high/low/loud/quiet sounds using a range of different instruments and identifies the sounds.</p> <p>Labels the part of an ear and identifies their function.</p> <p>Matches changes to sound to the change in vibrations.</p> <p>Labels and draws. a sound wave.</p> <p>Draws and labels diagrams.</p>

	<p>Is able to follow a set of demonstrations to make models.</p> <p>Is able to follow a set of demonstrations to carry out a simple investigation.</p>	<p>Is able to label diagrams using symbols.</p> <p>Is able to make models following a picture method.</p> <p>Is able to make a prediction from a choice of 3 using symbols.</p> <p>Is able to follow a picture method to carry out a simple investigation.</p> <p>Is able to identify one thing that has changed when completing a fair test.</p> <p>Identifies the correct result in a table.</p>	<p>Is able to make models following a word and picture method.</p> <p>Is able to link their model to a concept.</p> <p>Is able to select an appropriate prediction from a given choice.</p> <p>Is able to follow a word and picture method to carry out a simple investigation.</p> <p>Is able to suggest what to change when completing a fair test.</p> <p>Is able to record results in a simple table.</p> <p>Analyses results in the form of tables, simple bar graphs and a brief descriptions using key words or sentence blanks.</p>	<p>changes with a change in volume.</p> <p>Labels sound waves.</p> <p>Labels the part of an ear.</p> <p>Is beginning to draw and label diagrams.</p> <p>Is able to make models following a written set of instructions.</p> <p>Is able to use their model to explain a concept.</p> <p>Is able to make a prediction linked to their investigation.</p> <p>Is able to follow a written set of instructions to carry out a simple investigation.</p> <p>Is able to explain why their investigation included a fair test.</p> <p>Is able to record results in a suitable table.</p>	<p>Is able to make models following a written set of instructions.</p> <p>Is able to suggest improvements to their model.</p> <p>Is able to use their model to explain a concept.</p> <p>Is able to make predictions.</p> <p>Is able to follow a written set of instructions to carry out a simple investigation.</p> <p>Is able to design an experiment to include a fair test.</p> <p>Is able to record results in a suitable table.</p> <p>Analyses results in the form of tables, simple bar graphs and a brief description.</p> <p>Is able to draw conclusions from their results.</p>
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<p><u>Suggested Activities</u></p>	<ul style="list-style-type: none"> • Listen for sounds in other parts of school and out of doors (explore echoes if available, no need for detailed explanations) • Using a simple object, explore range of sounds that can be made with it (could be musical instrument). • What happens when you cover your ears? • Explore how to make sounds softer or louder e.g. put radio, ticking clock, wind-up music box in container (e.g. bucket, metal box, wooden box) add different materials as padding. • Explore how sound is used in everyday life to carry a message or warning e.g. sirens, telephone, doorbell. • Make a “telephone” with string and cups/yoghurt pots (could locate ends of string out of sight round corners) – draw a diagram and explain how the sound travels between the 2 cups/yoghurt pots. • Make a collection of objects that can make sounds (not just musical instruments) e.g. musical instruments, wind chimes, objects in containers, radios Make up a story with sound effects. • Sort and group instruments by the way they are played (shaken, plucked, blown etc) • Make instruments using every day materials or different sandpapers e.g. foil, bubble wrap, corrugated card, sandpaper. • Play ‘Pass the Instrument’ – each child has to make a different sound with it. • Explore and explain how you make sound and how you change pitch and volume on different instruments from different sections of the orchestra – brass, strings, percussion, woodwind • Ring a bell from different parts of the classroom – what do they notice? • Make children to a road to listen to traffic. Describe what happens to the sound. Can they still hear when a car is out of sight? • Discuss what happens if sounds are too loud for too long. • One child talks against a balloon whilst a second touches the other side. Change the amount of water in a bottle and observe the sound made as they blow over the top. What is vibrating? • Play notes on a piano, recorder or other instruments and discuss if high or low. • Stretch a rubber band over a block or box. Make the sound louder or quieter. • Use art straws to make pipes. Flatten about 3cm at one end and cut some of each side of flattened section. Alter lengths of unflattened straw – explore how the pitch changes on the different sized straws. • Label a diagram of the ear. • Explain how we hear sound by explaining how it travels from the source to the ear. • Use a model of an ear to show the pathway of sound. 				

<p><u>Possible Investigations/ Working Scientifically</u></p>	<ul style="list-style-type: none"> • Sound walk – what sounds can you hear around school? • Investigation – which material insulations sound the best for music studio? – put an ipad playing music in a box, fill the box with different materials and see which one is the quietest. • Investigation – is sound louder when you are closer? • Observe different ways to make vibrations – rice on a drum, tuning fork in water, touching throat, holding a ruler on the edge of a table and hitting it, plucking a guitar string, feel a speaker while it is making sound. • Research – do other animals have ears? How do other animals hear? • Investigation - Can sound travel through materials? e.g. tie string to a coat-hanger and hold string to ear whilst coat hanger is being tapped; put ear to ground or on desk; hold a watch on a balloon; ring a bell in the swimming pool (bell and pupils under water).
<p><u>Personal development</u></p>	<p><u>Problem solving</u> Investigations and matching exercises</p> <p><u>Communication skills</u> Working as pairs in investigations, asking and answering questions</p> <p><u>Self-belief</u> Learning new skills, practising them and demonstrating them.</p> <p><u>Self-management</u> Working with new equipment</p> <p><u>Teamwork</u> Working as groups to solve problems or find out new information</p>
<p><u>Resources</u> https://www.bbc.co.uk/bitesize/subjects/z2pfb9q https://www.purplemash.com/#tab/pm-home/science https://central.espresso.co.uk/espresso/modules/subject/index.html?subject=862674&grade=ks1&&source=espresso-home-mixedtopnav-menu-key-stage-1 Twinkl Youtube Resource folder on the shared area.</p>	
<p><u>Evidencing Work</u> All work / evidence sheets need to be printed off (where appropriate levelled in accordance with the rubric), students need to self-assess and work needs to be put in student folders.</p>	

RRS Articles:

This unit of work is linked to Articles of the UN Convention on the Rights of the Child.

Article 13 (freedom of expression)

Article 24 (health and health services)

Article 29 (goals of education)