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| Subject: Science Year: UKS2 Year 4 - SoundNC/PoS: * 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 produced it
* 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.
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| Prior Learning (what pupils already know and can do)Know that the sense of hearing is linked to the ear. Know that there are loud and quiet sounds. Know sounds can be high or low. Know that there are many different sources of sounds. |
| End Goals (what pupils MUST know and remember)* Know that sounds are made by continuous vibrations and the vibrations sends waves into the ear
* Know that sound can travel through varied materials and give examples – solid (metal, stone wood), liquid (water) and gas (air)
* Know that the louder the sound (the stronger the vibrations) and sounds become fainter as the distance increases
* Know that high pitch means fast vibrations and low pitch is slower vibrations
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| Key Vocabulary: sound, energy, vibrations, vibrate, vibrating, ear drum, cochlea, stirrup, hammer, anvil, auditory nerve, medium, solids, liquids, gases, pitch, higher, lower, frequency, volume, louder, quieter, strength, feint, distance |
| Session 1: Recap: hearing sense linked to ear. type of sounds – high/low, loud/quietChildren learn that sound is a form of energy that can be heard by living things and is produced when something vibrates. A vibrating object makes the air or material next to it vibrate as well, so the vibrations travel through the air in a waveSuggested activities:Watch <https://www.youtube.com/watch?v=aWieHpsZ7ik> What is sound? BBC TeachUse of tuning forks – hit on a solid object and place in a bowl of waterUse of rice/ seeds on a drum to see vibrationsPlace hands on vocal cords, say aargh and feel the vibrationsVocabulary: sound, energy, vibrations, vibrate, vibrating, wave, bang, blow, shake, and pluck |
| Session 2: Recap: How are sounds made? How does sound travel?Children learn that the ear drum passes vibrations to the middle ear bones which are the hammer, anvil and stirrup. The stirrup pushes against the cochlea which contains thousands of tiny hair cells which change the vibrations to electrical signals. The auditory nerve sends electrical signals to the brain.Suggested activities:<https://www.youtube.com/watch?v=r-c5GpoD8wI> how the ear worksVocabulary: ear drum, cochlea, stirrup, hammer, anvil, auditory nerve |
| Session 3: Recap: how does the ear work?Children learn that sound can travel through a variety of materials (wood, brick, water and glass) but not through a vacuumSuggested activities:<https://www.youtube.com/watch?v=0PlBNOCOAuk> How does sound travel?* *Can sound energy travel through solids?* Students place their ears on a desk or table as they tap or scratch on the top. They compare that to the same sound made when their ear is not pressed to the table.
* *Can sound energy travel through liquids?* Fill a large bowl or bucket (metal works best) with water. One student taps two spoons together under the water. Two other students observe and compare the tapping sound they hear, as heard through the air and as heard by placing an ear against the bowl.

Sound travels faster through solids as the molecules are closer together.Vocabulary: medium, solids, liquids, gases |
| Session 4: Recap: Name mediums sound travels throughChildren learn the pitch is the highness or lowness of a note. The pitch of the sound is due to the frequency of the vibration. Frequency is the number of vibrations per second. If the particles vibrate quickly the sound produced will be highThe shorter the vibrating object, the higher the pitch of the note. The larger the vibrating object, the lower the pitch of the note - it’s deeper. The tighter the string or elastic band, the higher the pitch of the note.Suggested activities:* <https://www.youtube.com/watch?v=_wHx_tBfu5c> changing pitch using a ruler
* Make a set of pan pipes using paper straws (shorter straw, higher pitch)
* Use a set of 4 small bottles with differing heights of water in and blow across the top (in bottles with more air, vibrations are slower, so the pitch is lower)
* Stretch different length elastic bands over a margarine tub
* (The shorter bands will vibrate faster, producing a higher pitch)

Vocabulary: pitch, higher, lower, frequency |
| Session 5: How might the pitch be altered?Children learn the harder you hit something, the more energy the vibrations have so the louder the soundSuggested activities:Using a drum, cymbal (range of instruments) compareMeasure decibels using a data logger around the schoolVocabulary: volume, louder, quieter, strength |
| Session 6: Recap: How do you make a sound louder?Children learn vibrations lose energy as they travel further and further and that sounds get fainter as the distance from the sound source increases Suggested activities:Carry out an investigation to explore what happens to sound as it gets further awayVocabulary: feint, distance |
| Link to careers: Audio engineer<https://www.youtube.com/watch?v=S9WnYUUBl84> What does a sound engineer do? |
| Scientists who have helped develop understanding in this field: The modern study of waves and acoustics is said to have originated with **Galileo Galilei** (1564–1642), who elevated to the level of science the study of vibrations and the correlation between pitch and frequency of the sound source. |