

<b>Subject: Science</b>		<b>Year Group: 4</b>			<b>Unit: A local history study – the battle of Edgehill</b>	
<b>First- hand experience:</b>						
<b>NC Objectives to be addressed:</b>				<b>Prior Learning required:</b>		
<p style="text-align: center;"><b>Sound</b></p> <ul style="list-style-type: none"> <li>• Identify how sounds are made, associating some of them with something vibrating.</li> <li>• Recognise that vibrations from sounds travel through a medium to the ear.</li> <li>• Find patterns between the pitch of a sound and features of the object that produced it.</li> <li>• Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>• Recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>				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)		
Biology		Chemistry		Physics		
Working scientifically				Where next?		
Comparative and fair testing	Pattern seeking	Observing over time	Secondary sources	Classifying and grouping		
<b>Key Vocabulary:</b>						
<b>sound</b>	vibrations that travel through the air or another medium and can be heard when they reach a person's or animal's ear			<b>amplify</b>	to make louder	
<b>source</b>	a place from which something originates or can be obtained			<b>redirect</b>	direct (something) to a new or different place	
<b>vibrate</b>	move continuously and rapidly to and fro					
<b>vibration</b>	As above					
<b>travel</b>	go from one place to another					
<b>pitch (high/low)</b>	how high or low a sound is					
<b>volume</b>	quantity or power of sound					
<b>faint</b>	barely perceptible sound					
<b>loud</b>	a great deal of volume					

insulation	A material that doesn't allow sound through		
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### Sequence of learning:

#### Lesson 1

##### Forces are pushes and pulls (from Magnets and forces unit)

Rubbing two things together to make a sound, like in violins, creates **friction** which causes vibrations. (Friction, key word revised from year 3)

To vibrate means to move quickly back and forth

To make an object vibrate, you need to apply a **force** to it.

Sound cannot travel in space, because there is no air for it to travel through (it is a vacuum)

Sounds are vibrations that can travel through solids, liquids and gases

Plucking or strumming the strings make them vibrate

Striking the skin of the drum causes it to vibrate

When struck, the body of the bell vibrates

When blown, a reed in the mouthpiece vibrates

Drawing a bow over the strings makes them vibrate (Violin)

Blowing across a hole makes the air inside vibrate (flute)

Small hammers strike strings to create vibrations (piano)

The player's lips buzz to make the air inside vibrate (trumpet)

#### Lesson 2

##### Revision on states of matter

Solids keep their shape and can be held

- do not flow or spread out

- keep the same volume

- can be cut or shaped

Liquids will take the shape of a container

- can be poured and will flow

- keep the same volume

- can not be held easily

Gases will spread out and fill a container

- volume can increase or decrease

- can flow through pipes

- are often invisible

When a sound is created, the vibrations will travel in all directions (including up and down) through the air

Sound travels in waves

(a bit like ripples in a pond)

Vibrations travel through the air by pushing against the particle next to it creating a wave

When the vibrations enter our ears, we hear the sound

Sound can travel through other mediums such as liquids (like water) and solids (like wood, stone & metal)

Therefore, you can hear sounds through windows, walls or the floor

Sound travels faster and further through a metal pipe (solid) and string

Whale song can travel for thousands of miles through the ocean (water)

### **Lesson 3**

Pitch is how high or low a sound is.

A thick string creates a lower sound than a thin string

A short string will create a higher sound than a long string

Tightening a string or drum skin will make the pitch higher

Loosening a string or drum skin will make the pitch lower

Blowing across the top of a bottle makes the air inside vibrate and create a sound.

Filling it gradually with water will start to raise the pitch of the sound heard because the column of air becomes shorter

### **Lesson 4**

The further the vibrations travel the weaker they become (the sound gets quieter)

The louder a sound, the further the vibrations will travel

Volume (or loudness) is how loud or soft a sound is (strong or weak vibrations)

You can pluck a harp string strongly or gently to change the volume

A drum can be struck hard to make a loud sound or softly for a quiet sound

A recorder can be blown hard for a loud sound or gently for a soft sound

Changing the volume of a sound does not usually change the pitch

The inner ear should be protected from loud noises to prevent damage to your hearing

### **Lesson 5**

Test

## Possible lessons ideas

### Lesson 1 –Identify how sounds are made

- Have a look at some modern-day instruments. Allow children to explore what sounds they make, and **how** they make sounds.
- Explain that throughout history – all the way back to the Stone Age and Iron Age – humans have used sounds to communicate, to enjoy as music, as battle cries, and to warn of incoming danger.
- Teach how sounds are made - Sounds are made when objects vibrate. The vibration makes the air around the object vibrate and the air vibrations enter your ear. You hear them as sounds.
- Have a look at the ancient instruments below, used at times before, and during the times of the Anglo-Saxons, Vikings, and the Norman Conquest.
- Discuss as a class, **how** each of the instruments make sound, and what modern day instruments resemble them.
- Make a list of the vocabulary that emanates from the discussion, and add to a display board.

Historical link to the Anglo-Saxon Lyre (plucked), Viking Bukkehorn (blown), Bone flutes (blown), Bodhran drum (struck) and the ancient Bullroarer (spun around and caused to vibrate)



Lyre



Bukkehorn



Bone flute



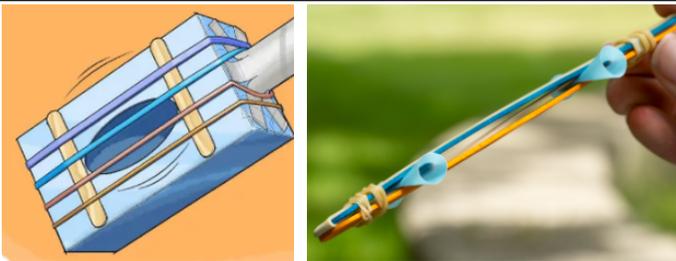
Bodhran drum



Bullroarer

(<https://www.youtube.com/watch?v=2ODGE2f7gLQ>)

Make your own instrument – tissue box lyre or lolly stick accordion (below)



## Lesson 2 – Understand sound travels through a medium to the ear.

- Ask children to consider why we can hear these vibrations as sounds.
- Explain that sounds waves can travel through air (gas) to reach the ear.
- Ask children to consider whether sound waves can travel through solids and liquids also, and ask them to provide examples, e.g. noise from next door, swimming pool etc.
- Investigation as a class.
- Make paper cup telephones of different lengths and see if the distance has an impact on the volume of the sound.

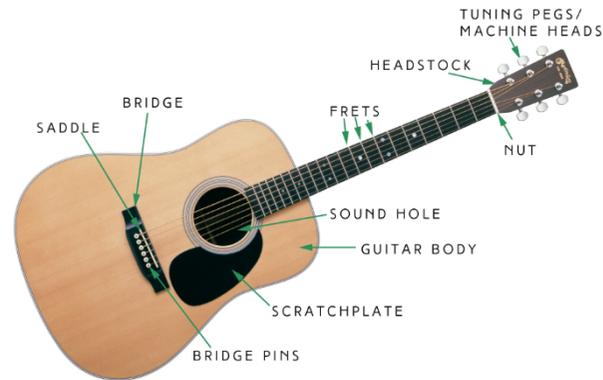
## Lesson 3 –Patterns between pitch and string length/ pluck strength and volume.

- Recap learning from previous two lessons
- Introduce the concept of pitch – children who have music lessons will probably have a good prior knowledge, so can be used as experts in the room.
- Introduce the concepts of **high pitched sounds**, and **low pitched sounds**, providing examples of both, on different instruments, and voices.

### Guitar sting length investigation

Children to seek patterns between length of guitar string (from bridge to finger on the fret board) and see what effect that has on the pitch. First start by using only one string, before seeing if the pattern continues on the others also.

Children to write a brief write up of their findings and draw images to support what they have found.



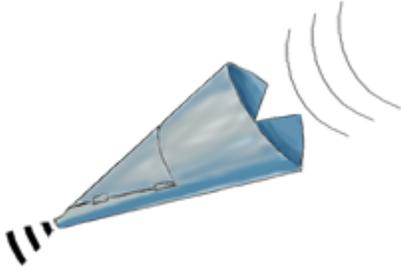
**Lesson 4 – Seek patterns between distance and volume**

- Children record their 1066 battle cry on an iPad or recorded, and get further and further away, to a point where they can't hear it. Compare with the rest of the group.
- Children to give a rating between 0-10 as to the volume at the point in which they are, before moving back a few metres, and recording again. Repeat until no sound from iPad.
- Record results in a table.

Distance from battle cry	Volume (on a scale from 0-10)

**Lesson 5 – Investigate strategies to direct sound.**

- Ask children to discuss ideas about how to amplify/redirect sound.
- Place a phone in a pringles tube/glass/cup, and compare the volume between the phone inside and outside the vessel.
- A hard surface like a metal, ceramic or glass bowl will reflect more **sound** than it absorbs or transmits. Therefore more of the phone's **sound** output **is** reflected towards the listener. There's no real amplification of **sound**, only a redirection of otherwise wasted **sound** energy
- Children create a sound cone



- Repeat investigation from yesterday, but with sound cone.
- Write a comparison of the two investigations to see if the cone was successful at amplifying sound.