Year 4 - Sound Reading Booklet

1. What is sound?
2. Speed of sound
3. Qualities of sound—Pitch and Volume
4. Human Voice
5. Ears– How we Hear
6. Assessment

Name: _____

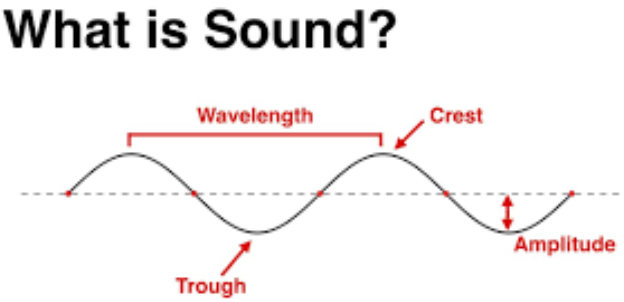
Class: _____

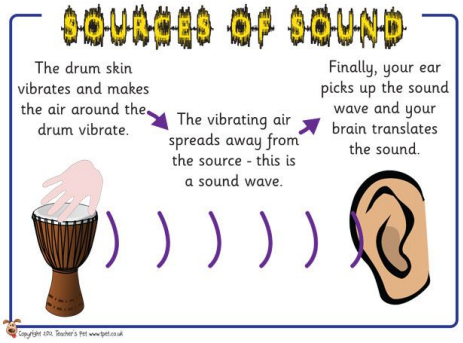
Lesson 1 - What is sound

Sound is caused by a fast back-and-forth movement: a vibration spreading outwards. A vibrating object will make the particles of air around it vibrate too, although air particles are too small to see. The air particles, pushed one way and then the other, push their neighbours in the same way, so the vibration spreads outwards. This vibration spreading outwards is what we call sound.

Sound travels in waves. Sound can travel through all kinds of matter: through gases, liquids and solids. Every time you speak, you prove that sound travels through gases, since the sound of your voice travels through the air, which is made of gases like oxygen. Some animals, like whales and dolphins, depend upon sound travelling through water. Whales sing underwater and can hear each other from as far away as 500km.

Useful link:
https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/zstr2nb





Lesson 2 - Speed of Sound

Sound travels much more slowly than light. In warm air, sound travels at about 340 metres per second, or about 770 miles per hour. Sound travels about 4 times faster in water than in air. Since water is denser than air, sound travels more easily.

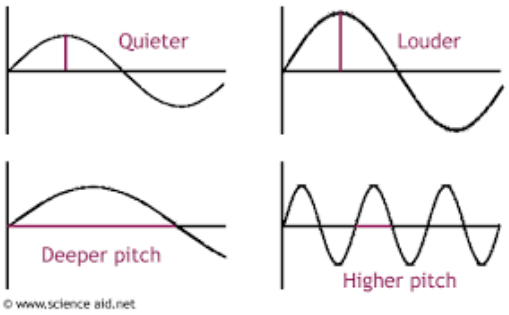
Amazingly, in 2012 Felix Baumgartner jumped to earth from a helium balloon and became the first man to fall faster than the speed of sound. There are jet aeroplanes that can travel at the same speed as sound! In 1962, British and French designers built a plane to take people as fast as possible around the world. They chose to build a supersonic airliner, which they called the Concorde. Supersonic means that it travels faster than the speed of sound.

Lesson 3 - Qualities of Sound

Sound is a form of energy. The volume of a sound describes how loud or quiet it is. To make sounds of louder volume, more energy needs to be put into the creation. A quiet sound, like a whisper, doesn't travel very far. But a really loud sound can travel for hundreds of miles.

Scientists think the loudest sound people have ever heard was a volcano erupting on an Indonesian island called Krakatoa (remember back to The Firework Maker's Daughter) and the eruption tore the island apart. The sound from the volcano could be heard in Australia, over two thousand miles away!

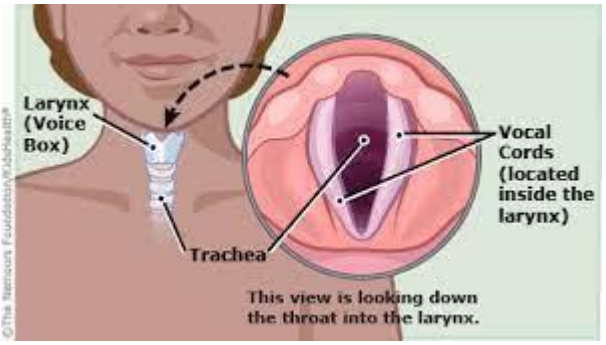
When we describe how high or low sound is, we are talking about the sound's pitch. A bird singing makes a high-pitch sound. A dog growling makes a low-pitched sound. The pitch depends on how many vibrations every second produce the sound. A longer string on a guitar makes a lower pitch sound.



Useful links:
https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/z3j3jty
https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/zqtdpbk
https://www.youtube.com/watch?v=PQydRIxoAU0
(Aircraft going supersonic to hear the boom in YT clip)

Lesson 4 - Human Voice

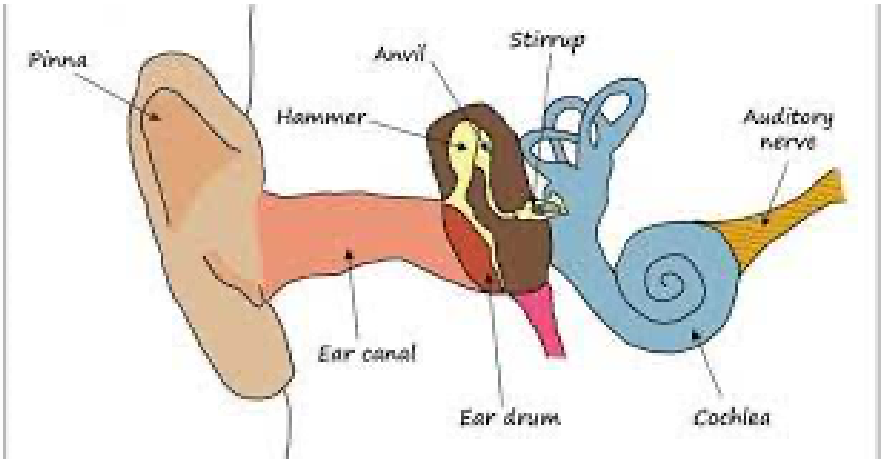
Your voice box is an organ that creates sound, while also preventing food from blocking your airway. The voice box is known as the larynx. The larynx is a hollow, tubular structure made of cartilage that is connected to the top of your windpipe. Inside your larynx, there are two bands of tissue that form your vocal cords. When you speak, muscles in your larynx pull the vocal cords together. As air travels to your windpipe (trachea), the vocal cords vibrate. These vibrations are what we hear as sound. When you sing a high note, your vocal cords vibrate very fast, hundreds of times a second. When you sing a low note, your vocal cords vibrate more slowly. Video - https://www.youtube.com/watch?v=iYpDwhpILkQ



Lesson 5 - Hearing - How we hear

Sound enters our ears through the outer ear and travels through the air inside the ear canal to the eardrum. This is a flap of skin between the outer and inner ear. The eardrum vibrates, pushed by the vibrating air molecules hitting it. The eardrum passes the vibrations through three small bones called the hammer, anvil and stirrup, to the cochlea. The cochlea is a snail shaped tube filled with liquid right inside our ears. Very small sensitive hairs inside the cochlea are moved by the bones' vibrations. These hairs are connected to nerves that carry the signals about the movement to the brain. When the liquid in the cochlea moves, it tells your brain that you are no longer upright, so the cochlea is vital for balance as well as hearing.

Useful links:
https://www.bbc.co.uk/bitesize/topics/zgdmsbk/articles/zkdkmfr
https://www.bbc.co.uk/bitesize/topics/zgffr82/articles/zx9hcj6



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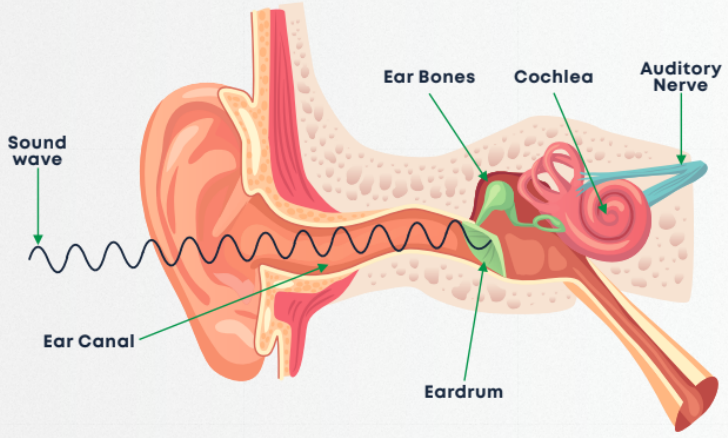
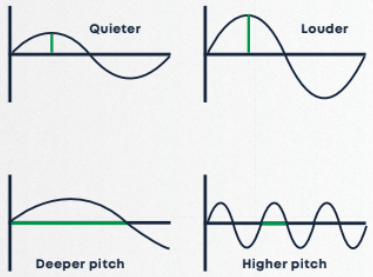
KEY VOCABULARY

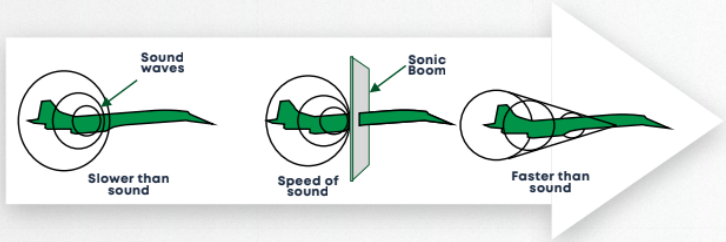
Vibration	A **back-and-forth movement**. Vibrations are essential for us to hear sound
Sound waves	A **wave of vibrations** that move through the air when a sound is made, carrying the sound to our ears
Pitch	How **high or low** a sound is
Volume	How **loud or quiet** a sound is
Larynx	The larynx, or **voice box,** is in our throat. The larynx vibrates to make sound
Ear drum	**Skin barrier** between your outer and inner ear
Break the sound barrier	When an object **begins to travel faster than sound**
Supersonic	**Travelling faster than sound**

A cross-section of the ear



Sound waves





The sound barrier; if an object travels faster than sound we would see it, then hear it afterwards.

Concorde

A supersonic aeroplane which travelled faster than sound. It was discontinued in 2003.