SCIENCE · Y4

Sound

Knowledge Organiser — Year 4 Science

Key vocabulary

1. **Sound**
   A type of energy made by vibrations. Travels through materials as waves.
2. **Vibration**
   Tiny back-and-forth movements. All sounds are made by vibrations.
3. **Sound wave**
   How sound travels through air or other materials.
4. **Pitch**
   How high or low a sound is.
5. **Volume**
   How loud or quiet a sound is.
6. **Decibel (dB)**
   The unit volume is measured in. Higher dB = louder.
7. **Frequency**
   How fast something vibrates. Faster = higher pitch.
8. **Eardrum**
   Thin skin inside the ear that vibrates when sound waves hit it.

9	**Echo** When sound bounces off a hard surface and comes back to you.

sound is made

Always vibrations

■	All sounds start with a VIBRATION.
●	Drums vibrate when hit. Strings vibrate when plucked. Vocal cords vibrate when we speak.
■	The vibration makes air particles bump into each other — this travels as a sound wave.
●	Sound waves spread out in all directions from the source.
■	When the wave reaches your ear, your eardrum vibrates — and you hear the sound.
●	Sound CANNOT travel through a vacuum — there are no particles to vibrate. Space is silent.
■	Sound travels FASTEST through solids, slower through liquids, slowest through gases (air).

n — high vs low

What makes a sound high o

■	PITCH depends on how FAST something vibrates.
●	FAST vibrations = HIGH pitch (a whistle, a small bird, a soprano)
■	SLOW vibrations = LOW pitch (a drum, a lion's roar, a deep voice)
●	On a guitar: tight strings vibrate faster (high notes); loose strings vibrate slower (low notes).
■	On a recorder: short tubes vibrate faster (high notes); long tubes slower (low notes).
●	Humans hear pitches from about 20 Hz (very low) to 20,000 Hz (very high).
■	Dogs and bats can hear MUCH higher pitches than humans (ultrasound).
●	Some animals (like elephants) make sounds TOO LOW for humans to hear.

e — loud vs quiet

What makes a sound loud or

- VOLUME depends on the SIZE of the vibration.
- Big vibration = loud sound. Small vibration = quiet sound.
- Hit a drum harder = louder. Pluck a string gently = quieter.
- Whisper: about 20 dB. Normal talk: 60 dB. Lawnmower: 90 dB. Rock concert: 110 dB. Plane taking off: 130 dB.
- Sounds over 85 dB can damage your hearing if you listen for too long.
- Sound gets QUIETER as you move further away from the source.

v the ear works

From sound wave to brai

- 1. Sound waves enter the OUTER EAR (the part you can see).
- 2. Waves travel down the EAR CANAL.
- 3. They hit the EARDRUM — a thin piece of skin that vibrates.
- 4. Three tiny BONES (the smallest in your body) pass the vibration on.
- 5. Vibrations enter the COCHLEA — a snail-shaped tube full of liquid.
- 6. Tiny hairs in the cochlea send signals to the BRAIN through the AUDITORY NERVE.
- 7. The brain interprets the signals as sound.
- Loud noises can damage the tiny hairs — once damaged, they don't grow back.
- That's why protecting your hearing matters!