11 Sound

Sound is what we hear when a pencil drops or a door closes.

Sound fills our days with excitement and meaning. When people talk to us, when we listen to music, or when we hear interesting programs on the radio and TV it is sound all around us. Sound may be the last thing we hear at night including our heartbeat while we drift gradually into the soundless world of sleep.

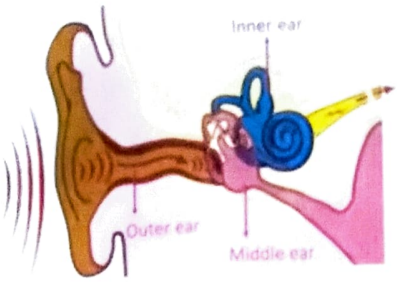
Sound

How Sound Works

Sound travels through the air in the form of waves. When we clap our hands, we hear a sound, because clapping shook the air molecules between the hands and made them vibrate or move back and forth. This vibration, in turn, shook the air molecules a little further away from our hands, and they shook the air molecules next to the ears, and so on, until the air molecules inside the ear began vibrating too (and inside the ears of the people sitting near us too).

- Wave – It is the disturbance in air or water that transfers energy from one point to another.
- Vibration – Movement of molecules in back and forth direction.

Clapping vibrates the air molecules



When the air molecules inside the ears begin to shake, they wobble tiny hair inside the ear that are connected to nerves. These nerves then send messages to the brain to tell us that we have heard a sound.

Characteristics of Sound

- Sound moves from one point to another. It is like when we are sitting on the last bench and we pass a notebook to our friend sitting on the first bench.
- Sound ~~therefore~~, requires a medium like air or water to travel for example to pass a notebook to a friend on the first bench, you need other friends in between. Likewise sound travels from one air molecule to another. It cannot travel through a vacuum.

Sound energy moves through air:

Things you will need:

1. A piece of clear plastic film
2. A rubber band
3. A spoon
4. Some rice grains
5. An empty glass jar
6. A tin tray

Instructions:

1. Stretch the plastic tightly over the open end of the jar. Use the rubber band to keep the plastic in position.
2. Sprinkle a few rice grains over the plastic.
3. Hold the tin tray close to the jar and bang it with the spoon. You will see the rice grains dance about on the plastic. This shows that the sound energy from the tray has travelled through the air, making the rice grains move.

- Sound moves much slower than light. For this reason, during lightning or on burning a cracker you see the light being given out first and then you hear the sound.

- **Pitch :** The pitch of a sound is how high or low the sound is. A high sound has a high pitch and a low sound has a low pitch.

  A tight drum skin gives a higher-pitched sound than a loose drum skin.

High pitch

Low pitch

- **Loudness of a sound :**

  The loudness of a sound is how loud or soft the sound is.

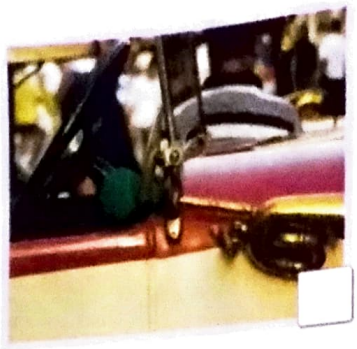
  A guitar string plucked strongly makes a loud sound. A guitar string plucked gently makes a soft sound.

  A drum skin hit hard makes a loud sound. A drum skin hit gently makes a soft sound.

Echo

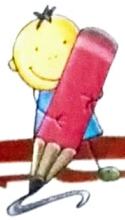
Echos happen because sound bounces off things. When you stand and shout atop a hill, sound travels a long distance and probably hits another hill and comes back to you as the echo. However the sound does not echo when you are sitting in a closed room. This is because:

- The sound must travel a long distance to bounce back.
- The sound must hit a surface to be able to bounce back. Smooth surfaces like the curtains absorb most of the sound.
- All other sounds must be absorbed.



C-4

Any man made sound that produces a disturbance in the environment causes noise pollution. Noise pollution can be caused by highway traffic, factories, concerts etc. It can interfere with the natural cycles of animals. The birds change their migratory path to avoid sound. The noise given out by the military submarines brings abo the rupturing of various tissues and organs of the marine mamma leading to their death. Noise caused by crackers, stone crushers et is harmful for the ear drums of the new borns.



Fact File

Whales in the ocean "sing" to each other. The sound of their song can travel a distance of 800km.

New Words

C-5

- *Pitch* – It tells us how high or low the sound is.
- *Loudness* – It measures the softness of sound.
- *Noise Pollution* – Pollution caused by loud disturbing noises.

Let's Revise

1. Sound vibrates air molecules around it.
2. It requires a medium to travel.
3. Echos happen due to bouncing of sound.
4. Sound travels slower than light.

Ans-1. If the skin is tight, the drum makes a high note. If it is loose, it makes a low note

Let's Answer

A. Rewrite the following statements correctly:

1. Sound can travel on its own.
   Sound requires a medium like air or water to travel.
2. Sound travels faster than light.
   Sound travels slower than light.
3. Pitch tells us how loud or soft the sound is.
   Pitch tells us how high or low the sound is.
4. Echos happen in a closed room.
   Echos happen in a open room.
5. Sound does not cause vibration in air.
   Sound causes vibration in air

B. Fill in the blanks:

1. Sound must travel a long distance to bounce back.
2. Smooth surfaces absorbed sound.
3. Sound travels in the form of waves.
4. Traffic and factories are sources of noise pollution.
5. Noise of submarines causes death of marine animals.
6. Wave is the disturbance in air that transfers energy.

C. Answer these:

1. How does tightness of the skin of a drum affect the sound it produces?
2. What is an echo? What are the conditions required for an echo?
3. Explain any one characteristic of sound with example.
4. What is noise pollution? How is it caused?
5. Differentiate between loudness and pitch of sound.

D. Find the words given in the word grid below:

W	P	L	M	N	O	P	G	S	M
A	I	J	K	O	L	M	E	A	E
V	T	C	L	S	O	U	N	D	D
E	C	H	O	T	U	P	Y	R	I
Q	H	M	J	T	D	S	R	D	U
V	I	B	R	A	T	I	O	N	M

Sound
Echo
Loud
Pitch
Wave
Vibration
Medium