8 Sound and Noise

We'll cover the following key points:

- Sound & Sounds Around Us
- Types of Sound
- Noise Pollution, Its Impact and Prevention

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Learning Outcomes

By the end of this chapter, students will be able to:

- Understand the concept of sound and noise in our surroundings and their unique characteristics.
- Identify and differentiate between pleasant sounds and unpleasant sounds (noise) based on key features such as volume, pitch, and tone.
- Explore examples of pleasant sounds like music, bird songs, and soft conversation, and examples of noise like traffic, loud horns, and shouting.
- Learn how excessive noise can be harmful to humans and animals and discover ways to reduce noise pollution in daily life.

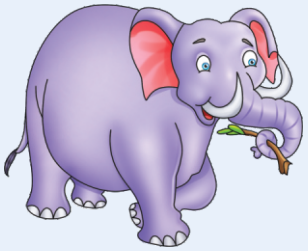
Guidelines for Teachers

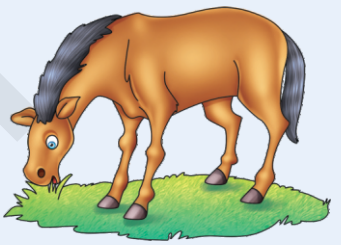
The teacher can start the chapter by introducing the concept of sound and noise, encouraging students to share examples of sounds they hear in their surroundings. Discussions can focus on the differences between pleasant sounds and noise, emphasizing the effects of noise on health and the environment. The teacher can also highlight the importance of reducing noise pollution and maintaining a peaceful environment through practical examples and activities.

Warm Up

Recognise the sounds that these animals make. Write in the space given below.



Fun Fact

Sound travels nearly four times faster in water than in air, making marine life particularly attuned to it. The loudest animal on Earth is the sperm whale, whose clicks can reach 230 decibels, louder than a jet engine! On the flip side, noise pollution can cause stress in both humans and animals. Bats use echolocation, a form of sound navigation, to "see" in the dark.

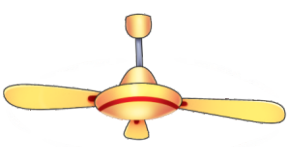
Sound and Sounds Around Us

Common Sounds Around Us

There are various sounds around us. If we remain silent and try to concentrate on the sounds in our immediate environment, we will be surprised by the various sounds that we come across, we can hear the sound of moving traffic, the sound of the clock ticking, the sound of the ceiling fan, the sound of the tap running, the laughing sound, the coughing sound, sound of the TV and that of the mobile phone and many others. We hear these sounds from the time we wake up in the morning till the time we go to bed at night.

Take a Task

Watch Remedial





What is Sound

Sound is a form of energy. It is caused by vibration and travels through matter (solid, liquid or gas) until it reaches the ear of the listener and can be heard. A sound is produced by some mechanical movement, like plucking the strings of a guitar. This creates a vibration that is then transferred through the air molecules. This transfer from molecule to molecule causes sound to travel. Some sounds are pleasant and desirable, such as speech and music, while others are unwanted and annoying, such as loudspeakers and roadside noises.

Did you know ?

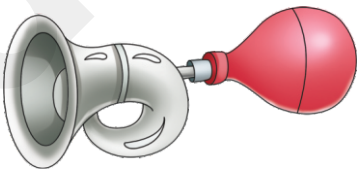
1. Since particles are closer together in water than air, sound can travel four times faster in water.
2. Sound can't travel through space because there aren't any molecules to vibrate in space since it's a vacuum.
3. The loud noise you create by cracking a whip occurs because the tip is moving so fast that it breaks the speed of sound.

Sound Made by Inanimate Objects

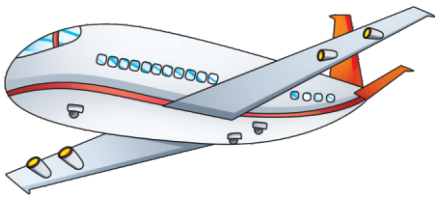
We have noticed that apart from living objects, many non-living or inanimate objects also produce a variety of sounds. The variety of sounds produced by these objects are the buzzing of the telephone, ringing of bells, honking of horns, rustling of leaves, zooming of aeroplanes to name a few.

Telephone

Bell



Horn



Aeroplane

Did you know ?

1. The scientific study of sound waves is known as acoustics.
2. The sound of thunder is produced by rapidly heated air surrounding lightning which expands faster than the speed of sound.
3. The loudest natural sound on earth is caused by an erupting volcano.

Sound Made by Living Things

Living things make numerous sounds for various reasons either to communicate, to express their joys and sorrows, to express hunger, to call out to their partners etc. Human beings are also

capable of producing various sounds like stomping of feet, clapping of hands, snapping of our fingers, whistling, singing, shouting, sneezing, coughing etc.

The sounds made by animals are not as structured those as human beings and also lack creativity and flexibility. However, they have very specific ways of communication indicating hunger, warnings of a coming danger etc. Some male animals and birds produce special sounds to attract the females. We can easily recognise a particular animal with distinct cry. For example, the mew of a cat, screeching of a bat, howling of a wolf, bellow of an ox, roar of a lion etc.


Cat


Wolf


Oxen


Lion

Did you know ?

1. Flies are not able to hear any sound at all.
2. Dolphins are capable of hearing sounds underwater from as far as 15 miles away.
3. Whale's voices can travel 479 miles through the water of the ocean. Thus they have the ability to communicate from long distances.

Sounds that are Important to Us (Warning Sounds)

Warning sounds have the ability to produce noises that allow us to instantly respond to a warning or alarm with our sense of hearing. These can sometimes be more effective than visual warning signals. They alert us to either get out or stay away from different situations that may risk our lives. Some of the warning signs are as follows:

- **Horns of Vehicles:** Horns are commonly used in vehicles which allow the driver to warn any unsuspecting motorist or pedestrian and help to avoid accidents.
- **Alarms:** Alarms are mostly found in industries or noisy areas to alert individuals if attention is required.
- **Sirens:** Sirens produce a very loud sound and are commonly used as an alarm or warning for an incoming storm/tsunami or any natural phenomenon in the location. Sirens may also be of the following types:

- **Siren of the Ambulance:** This kind of siren is used when the Ambulance is on its way to pick up a patient or to drop the patient at the hospital. In either case, the purpose of the siren is to clear the road of all vehicles so that medical help can be made available to the patient at the earliest.
- **Siren of the Police Vehicle:** Its aim is also to clear the road of other vehicles so that police help can reach the public at the earliest.
- **Siren of the Fire Engine:** The purpose of using a siren by a fire engine is to reach its destination at the earliest to extinguish a fire.

Police van


Ambulance


Fire engine

Did you know ?

The energy in a sound wave can be measured using Decibels (dB). The Decibel meter shows examples of things that make noise and measurements in decibels. Amplitude measures how forceful the wave is. It is measured in decibels (dB) .

Types of Sound

As we have studied so far, sound is a form of energy that created when something vibrates and in turn causes the medium around it (e.g. air, water etc.) to vibrate. The sound thus produced may either be of a pleasant or unpleasant nature.

Pleasant Sounds: When we listen to soft music, it has a capacity to make us feel relaxed and happy. These sounds are periodic and regular and are pleasing to our ears and minds. Following are a few examples of pleasant sounds:

- The sound made by waves of the ocean.
- Sounds of musical instruments.
- Sound of birds chirping or the call of a cuckoo.
- Sound of water droplets.
- Sound of the gentle breeze.

Unpleasant Sounds: These sounds make us feel irritated, uncomfortable and even have the ability to make us feel unwell.

These sounds are non-periodic and irregular. Unpleasant sounds are also called noise. Following are the examples of unpleasant sounds:

- Honking of horns.
- Sound of a drilling machine.
- Sound of an explosion.
- Noise from factories or a construction site.
- Sound made by an aircraft while taking off or landing.

Check 'N' Mate

Critical Thinking

Write 'T' for true and 'F' for false statements.

1. Sound is caused by vibration and travels through matter. ☐
2. Some male animals and birds produce special sounds to attract the females. ☐
3. Alarms are mostly found in industries or noisy areas to alert individuals. ☐
4. Sounds that are pleasing to our ears and minds are unpleasant sounds. ☐

Noise

A sound that is loud, unpleasant or frightening and that can cause physical, mental or emotional disturbance is called noise. Very long exposure to loud noise can be harmful and can damage our hearing power.

Did you know ?

1. A human beings ear hears an audible sound wave, if its frequency ranges from 20 to 20,000 vibrations/second. Subsonic has a frequency that is less than the audible sound waves. Ultrasonic has a frequency higher than the audible sound waves.
2. Animals like dogs have a sense of higher frequency of hearing sounds. This allows them to hear sounds that humans can't. It also makes animals able to sense oncoming danger.
3. Therefore, sound serves as a warning and prepares the animals for defence and attacks.

Noise Pollution, Its Impact and Prevention

Continuous exposure to excessive noise is called noise pollution. Various causes can be associated with high levels of noise pollution in today's world. Some of them are industrialization, construction activities, vehicles on road, noise of aircraft (for people living near airports), social events, household appliances etc.

Take a Task

Watch Remedial

Noise pollution can have adverse effects in our lives especially the elderly and sick people along with children and animals. Some of the adverse effects of noise pollution are:

- Headaches, ear aches, dizziness.
- Health issues such as stress, fatigue, hypertension.
- Sleep disturbance.
- Loss of hearing.

Noise pollution also has adverse effect on wildlife as animals have a better sense of hearing than humans. Pets react more aggressively to loud noise produced at home. They become disoriented and behave abnormally. Excessive noise pollution may cause loss of hearing in animals too.

Preventing Noise Pollution

There are various practical ways to reduce noise pollution. Some of them are:

- Unnecessary honking by vehicles should be controlled especially near hospitals, schools and residential areas.
- Planting trees in our neighbourhood is another way to control noise pollution as trees absorb a lot of noise.
- Use of earplugs is a cost-effective way to protect ourselves from noise pollution.
- Loudspeakers, loud volume of Television etc. should be avoided.

Activity Creative Learning

To Make A Cardboard Guitar

Things Needed

Thick cardboard shoe box, 4 rubber bands of different width, Wooden scale, Pencil, knife, A cold drink can, Glue

Procedure

- Trace a circle at the middle of the shoe box lid with the help of the cold drink can. Carefully cut out the circle.
- Arrange the rubber bands around the shoe box in order from thickest to thinnest so that they are positioned above the hole in the lid.
- Cut six evenly spaced notches across one side of the pencil using an art knife. Each notch should be just wide enough to fit a rubber band. Make sure not to make the notches farther apart than the width of the hole in the box lid.
- Slide the pencil under the rubber bands on one end of the shoebox. Fit one rubber band into each notch. The pencil will elevate the strings and hold them in place, acting as a guitar

bridge.

- Glue the ruler lengthwise on the back of the shoe box, the side without the lid. Allow the ruler to hang off the side of the shoe box, acting as the neck and fretboard of the guitar.
- Decorate the guitar using your own imagination.

In a Nutshell

- Sound is a form of energy caused by vibrations and travels through matter.
- Sounds may be created by inanimate objects or by living things.
- Some sounds are very important to us as they act as warning signs against various dangers.
- Sounds may be either pleasant or unpleasant to our ears.
- A sound that is loud, unpleasant or frightening and that can cause physical, mental or emotional disturbance is called a noise.
- Continuous exposure to excessive noise is called noise pollution.
- Noise pollution may have adverse effects on our lives and hence should be prevented.

Key Words

Improving Vocabulary

Pedestrians	:	People on foot
Decibel (dB)	:	Unit for measuring sound intensity
Amplitude	:	The measurement of the maximum extent of a vibration
Disoriented	:	Confused state of mind

EXERCISE

That turn curiosity into confidence—let's begin!

Gap Analyzer™
Take a Test

A. Objective Type Questions.

1. What causes sound:
   a. Molecules moving through air
   b. Vibration of an object
   c. Molecules moving through space
   d. Wave of light

2. This unit is used to measure sound:

a. A richter scale ☐ b. Decibel ☐

c. Joule ☐ d. A wave ☐

3. Noise pollution may result in:

a. Obesity ☐ b. Asthma ☐

c. Headache and earache ☐ d. Vitamin deficiency ☐

4. Sound is a:

a. Form of movement ☐ b. Form of energy ☐

c. Form of loudness ☐ d. None of these ☐

5. Which of these is a pleasant sound?

a. Sound of a loud speaker ☐ b. Sound of a drilling machine ☐

c. Sound of a mixer grinder ☐ d. Sound of wind chimes ☐

6. Which of these is an example of a musical sound:

a. A vacuum cleaner ☐ b. A piano ☐

c. A drilling machine ☐ d. A mixer grinder ☐

7. How is sound made?

a. By vibration of molecules ☐ b. By heat of the Sun ☐

c. By an amplifier ☐ d. None of these ☐

B. Fill in the blanks.

1. Sound is a form of _____ caused due to _____ .
2. Sound cannot travel through _____ .
3. _____ is the unit for measuring sound.
4. Sounds made by animals lack _____ and _____ unlike humans.
5. Sound can travel _____ in water than in air.
6. The audible range of sound wave is _____ .
7. Sounds may be either _____ or _____ to our ears.

C. Very Short Answer Questions.

Name them.

1. Sound made by an oxen _____ .
2. A pleasant sound _____ .
3. An unpleasant sound _____ .
4. A way of reducing noise pollution _____ .

5. People walking on foot _____ .
6. An example of unpleasant sound _____ .
7. Sounds that have frequency less than the audible range _____ .
8. Sounds that have frequency higher than the audible range _____ .

D. Short Answer Questions.

1. What is sound ? How is it produced?
2. Give three examples each of sounds produced by living and non-living things.
3. What is noise? How can noise be harmful to us?

Custom Learning Path

Scan to Create Your Own Learning Path

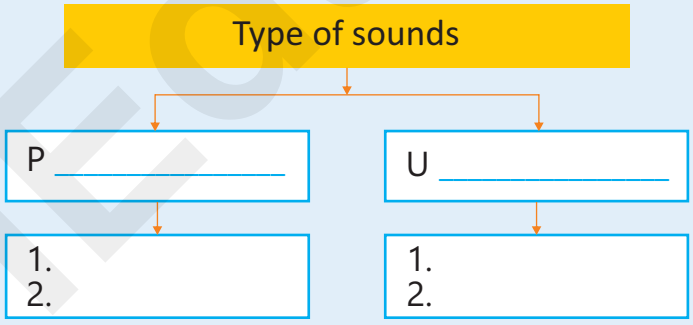
E. Long Answer Questions.

1. How can noise pollution have adverse effects in our lives? Suggest some ways to prevent noise pollution.
2. What are pleasant and unpleasant sounds? Explain with examples.
3. With the help of suitable examples, explain how warning sounds are helpful to us.

Time to Recall

Remembering and Analysing

Recall and complete the concept map given below.



Time to Apply

Applying and Creating

Prabhas wants to buy a house. He has two options, *i.e.*, one is near a busy road and other is in clean and peaceful area. His mother suggested him to buy a house in clean and peaceful area.

1. Why did his mother suggest him to buy a house in clean and peaceful area?
2. What can be the harmful effects of having it near a busy road?
3. What suggestions to do you have to reduce noise pollution?

Time to Discuss

Pondering and Communicating

1. Why can we not hear any sound on the surface of the moon?
2. What would happen if there were no voice boxes in our throat?

Time to Observe

Observing, Critical Thinking, Analysing

Classify the sounds listed in the box below as pleasant or unpleasant (noise). Also, give a reason for your classification.

Sound	Pleasant/Unpleasant	Reason for Classification
Bird chirping		
Car horn		
Guitar melody		
Thunder		
Ambulance siren		

Time to Create

Creating and Collaborating

Creating a Paper Cup Phone

Materials Needed:

- 2 paper cups
- 20 feet of yarn
- Sharpened Pencil (or any other sharp object to make holes in the cups)
- Paper clips (if required)

To make your own cup phones, use the tip of a pencil to poke a small hole at the bottom of each of your two cups.

Next, thread the string through the hole of one cup. We just tied a knot in the yarn on the inside of the cup to keep it in place. If the string keeps slipping through the hole you can tie it to a paper clip to help keep it in place.

Pull the string through the bottom of your second cup, securing it with a knot on the inside, too.

To use your cup phones the string must be kept taut. When one person whispers in their cup, the other should be able to hear their voice through their own cup.