

# Introduction to Physics and Everyday Life

Physics is the study of nature and the universe, encompassing various events that occur around us regularly. The goal is to understand the "how" and "why" of these events. This session explores how physics explains many aspects of our everyday lives.

## Sound

- Sound is an experience we can hear but not see.
- It's used in important medical equipment like ultrasound scanners and by ships to estimate the depth of the ocean.
- Physics studies the origin, propagation, and properties of sound.
- Example: The annoying yet important sound of an alarm clock, which wakes us up in the morning.

## Heat

- Heat is a gradual rise in temperature that causes a substance to change state, like water boiling into steam.
- It is used in industry to melt metal and make machinery, like automobiles and generators.
- Heat is also used in household appliances like electric or steam irons.
- Physics explores the properties of heat.
- Example: Boiling water to make coffee, where the water changes from liquid to steam.

## Friction

- Friction is a resistance between surfaces.
- It allows us to have a good grip and walk without slipping.
- Reduced friction can cause us to fall.
- Friction is an important factor in making tires.
- Example: Slipping on a banana peel due to reduced friction between shoes and the road.

# Gravity

- Gravity is a force that draws objects to the Earth's surface.
- It's why apples fall from trees and why objects on the Earth's surface do not float away.
- Objects lighter than air can defy gravity, like helium-filled balloons.
- Gravity is studied by astronauts to mimic conditions in outer space.
- Sir Isaac Newton, a father of physics, studied gravity extensively.
- Example: Apples falling to the ground, and balloons floating away.

# Magnetism

- Magnetism is a force of attraction between oppositely charged ends.
- Materials that follow magnetism are magnets.
- The Earth itself is a giant magnet, with its geographic North Pole (Arctic region) acting as a magnetic South Pole.
- This is why a compass always points North.
- Magnetism is used in modes of transport like metro trains and in electronic speakers.
- Example: The constant direction of a compass needle.

# Inertia

- Inertia is a body's unwillingness to change its state of rest or motion.
- A body in motion prefers to stay in motion unless acted upon by an outside force.
- A body at rest prefers to stay at rest unless acted upon by an outside force.
- Inertia is important in the automobile industry for designing safer cars.
- Example: An object's resistance to starting or stopping movement.

# Force

- Force is the pressure exerted by one body on another.

- It's used in daily tasks like opening doors, brushing teeth, and pushing buttons.
- Force is also involved in bodily processes like coughing, sneezing, and blood flow.
- Sports like swimming and running also employ force.
- Example: The strength used to open a heavy door.

## Electricity

- Electricity is an essential part of our daily lives, powering various devices and systems.
- It's used for transportation, household appliances, and even for watching videos.
- Our bodies also produce electricity called bioelectricity.
- Physics explains the mechanisms of electricity production.
- Example: Cell phones function due to electricity supplied by the battery.

## Light

- Light can be white light, which is actually a mixture of different colors.
- Rainbows are formed by the splitting of sunlight through raindrops.
- The study of light is important in physics because of its various uses, such as in decorations and lasers.
- Example: The appearance of a rainbow after it rains.

## Atoms and Molecules

- Everything in the universe is made up of atoms, which are very small particles.
- Two or more atoms combine to form a molecule.
- Many molecules come together to form visible matter.
- The theory of atoms and molecules is related to the origin of the universe, life on Earth, and everything around us.
- Even things that we can't see, like dust particles, are made of atoms.
- Example: The building blocks of cells and everything in the universe.