# Sound

## Oscillations

#### OSCILLATIONS

In sound producing objects, the vibrations take place very fast...so fast, in fact, that they cannot be seen very clearly with the unaided human eye (slow-motion video is one practical solution that is routinely used in scientific and industrial applications). We can produce slower vibrations, which are also called oscillations, by an arrangement called a simple pendulum.

It consists of a ball or any weight, such as a stone, wooden top, steel bolt, etc. which is here called a bob, and which hangs down vertically.



Figures show a oscillating simple pendulum and a vibrating string depicting the mean position and amplitude. By means of a thread. It hangs vertically because of the force of gravity acting upon it. When the bob is given a small push, it performs a to-and-fro motion for some time and ultimately stops. The position where the bob stops is called the mean position (A) or the equilibrium position.

#### ✤ AMPLITUDE

The maximum displacement of the bob from the mean position during oscilations is called amplitude of the oscillation. In the case of a simple pendulum, as show in the figure, the amplitude is AB (or AC).

## ✤ FREQUENCY

The number of oscillations produced by the vibrating body in one second is called its frequency. It is denoted by the letter 'f'.

The unit of frequency in SI system is Hertz (Hz or s–1).

When a vibrating body produces 10 vibrations (oscillations) in one second, its frequency is said to be 10 hertz.

If the frequency of a tuning fork is written as 200 Hz, it means that it produces 200 vibrations in one second.

### ✤ TIME PERIOD

When a bob moves from one position and returns to the same position, such that it repeats the motion, it is said to complete on oscillation.

The time taken by a vibrating body to complete one oscillation is called the time period.

