BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT: -SCIENCE

CHAPTER: - Motion and Time

Week -14th to 18th December, 2020. **Number of Blocks: 2**

GUIDELINES FOR STUDENTS

Dear Students,

- There is only **1 Assignment**.
- Assignment: Based on Sub topics given below.
- Attempt the assignment in Science notebook.
- **Video links** have been provided for better understanding of the concept through visuals. Watch the videos carefully as these will help you in doing the assignment.
- Read the lesson from **NCERT textbook** also.

SUB TOPICS:

- Measurement of time
- Units of time and speed
- Measuring speed

INSTRUCTIONAL AIDS:

- You-tube links: https://www.youtube.com/watch?v=NZnLzg_UprQ
- https://www.youtube.com/watch?v=RB_KVmBssdM
- https://www.youtube.com/watch?v=bdUF3x-FkZM
- NCERT Link: http://ncertbooks.prashanthellina.com/7_Science.html

LEARNING OUTCOMES:

By the end of this lesson ***each learner will be able to***

- Measure and calculate speed of moving objects; time period of a simple pendulum
- Calculate speed or distance or time taken if any two of these three quantities are provided

LESSON DEVELOPMENT:

Measuring Time

In order to measure the time, ancient people used some natural events which repeated regularly after fix time intervals.

There are many events in nature that repeat after a time interval:

- Morning – The rising of the sun.
- Day and Night – The time between the sunrise and sunset.

- Month – The time between two new moons.
- Year – The time the earth takes to complete its one revolution around the sun.

Time measuring devices or clocks - **Clocks** use the concept of **periodic motion** to measure time. It means that it uses motion that repeats itself in equal amounts of time. There are different types of time measuring devices.

Sundial – It uses the position of the sun to depict time A sundial measures time by the position of the shadow cast by the sun.	
Sand Clock (hourglass) – The device which uses the flow of sand from one glass bulb to another in order to measure time is known as a sand clock.	
Water Clock – A device which uses the rate at which water drips from one vessel to another to measure time interval is known as a water clock.	
Pendulum Clock – It uses a pendulum to measure time.	
Quartz Clocks – They have an electric circuit that works with the help of cells. They provide accurate time.	

Periodic Motion of a Simple Pendulum

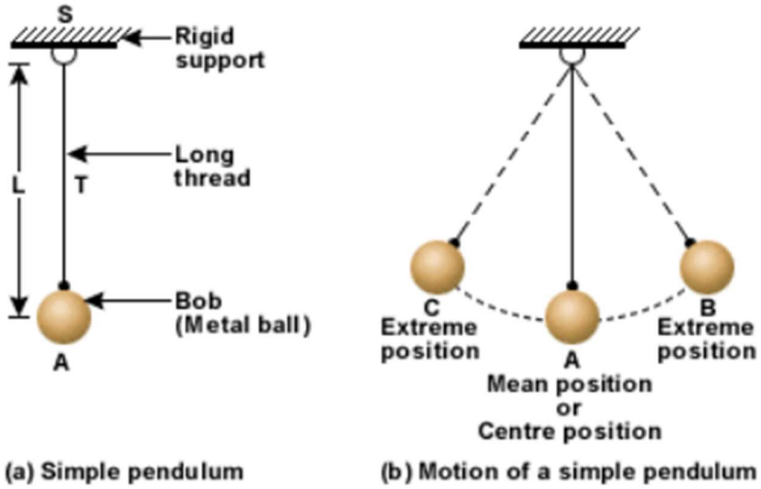


Figure: Simple Pendulum

- A simple pendulum consists of a **Bob (**a metallic ball or a stone) which is suspended from a rigid stand with the help of a thread.
- **Oscillatory motion** - The to and fro motion of the pendulum is called **Oscillatory Motion**.
- **Oscillation** - The pendulum is said to have completed one oscillation when its bob starting from its mean position A, moves to B, to C and back to A. The pendulum also completes one oscillation when its bob moves from one extreme position B to the other extreme position C and come back to B.
- **Time Period of a pendulum** - The time taken by the pendulum bob to complete one oscillation is called its **Time Period**.
- **Note:** Galileo experimented with various pendulums and found that a pendulum of a given length takes always the same time to complete one oscillation. This observation led to the development of pendulum clocks. Winding clocks and wristwatches were refinements of the pendulum clocks.

Units to Measure Time and Speed

Time	Second (s)- standard unit Minutes (min) Hours (h)
Speed = Distance/time **Note -** Units are always written in singular, that is, km/h and not kms/hrs.	Meter/Second (m/s)- standard unit Meter/minute (m/min) Kilometre/hour (km/h)

To convert between m/s and km/h:

$$\frac{1\text{ km}}{1\text{ h}} = \frac{1000\text{ m}}{1\text{ h}} = \frac{1000\text{ m}}{60\text{ min}} = \frac{1000\text{ m}}{3600\text{ s}} = \frac{1}{3.6}$$

Divide by 3.6

Km/h ⟶ m/s

⟵ Multiply by 3.6

Figure: Conversion between km/hr and m/s

Speedometer - It is a device which is used in vehicles such as cars and trucks which measures the speed in kilometre per hour.

Odometer - It is a device which measures the distance travelled by a vehicle in meters or kilometres.

The dashboard of a car

Figure: Measure of Distance and Speed of a car

ASSIGNMENT-1

Q1 Fill in the blanks:

a. The S.I unit of speed is _____
b. The resting position of a bob of pendulum is called ____position.
c. When a body does not change its position with respect to its surrounding it is said to be at_____.
d. Speed of a motor vehicle is measured by an instrument called_____.
e. Distance travelled by a vehicle is measured by an instrument called_____.
f. Time taken by a pendulum to complete one oscillation is called_____.
g. The metallic ball used in the pendulum is called_____.

h. An instrument showing the time by the shadow of a pointer cast by the sun on to a graduated plate is called_____.

Q2 Convert 54 km/hr. into m/s.

Q3 Calculate Time-period of a simple pendulum if it takes 72 seconds to complete 24 oscillations.

Q4 A train is travelling at a speed of 100 km/hr. How long will it take to complete a journey of 500 km without stopping in between?

Q5 Ramesh takes 15 minutes to reach the market from his house on his cycle. If the speed of his cycle is 4 m/s, calculate the distance between his house and market.

Q6 A student wants to measure the speed of a ball rolling down a ramp. He found a few instruments which are listed in the table.

1. Hourglass
2. Thermometer
3. Measuring tape
4. Stopwatch
5. Balance scale

Which of these are required to measure the speed of the ball?

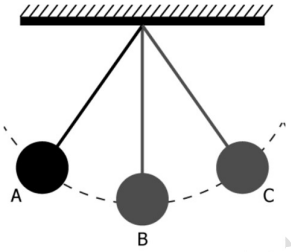
(a) Hourglass and thermometer

(b) Balance scale and stopwatch

(c) Measuring tape and stopwatch

(d) Measuring tape and thermometer

Q7 A student notices the swing of a pendulum as shown in the image. She notices that the bob of the pendulum starts from position A to C and then back to A in 2 seconds. What is the time period of the pendulum?



(a)0.5 second

(b)1 second

(c)2 seconds

(d)4 seconds

Q8 The school organised an educational tour for the students. They arranged a bus scheduled to
leave for the trip at around 8:00 am. The odometer reading of the bus at the start and end of the trip
is provided in the table.

	Time	**Odometer Reading**
Start	08:00 am	247344
End	11:00 am	247554

What was the average speed of the bus during the trip?

(a)30 km/hr

(b)70 km/hr

(c)90 km/hr

(d)210 km/hr