GIRLS' HIGH SCHOOL & COLLEGE- PRAYAGRAJ

SESSION 2020-2021

CLASS- 7 A,B,C,D,E,F

SUBJECT- PHYSICS

WORKSHEET NO-3

NOTE- Parents are expected to ensure that the child reads scientific description about the topic from the book or the internet and thereafter answer the given questions.

Link- https://www.youtube.com/watch?v=8qh--3X6E5w&t=72s

https://www.youtube.com/watch?v=7J_Pi4Xuk7Y

CHAPTER- PHYSICAL QUANTITIES AND MEASUREMENT

TOPIC – MASS AND WEIGHT

Mass is a basic property of all material objects or of all things made of matter. The mass of a body is the amount of matter in the body. To take an example, a ball of candyfloss made from a spoonful of sugar takes up much more space than the sugar. However, the two have the same mass because they contain the same amount of matter. Similarly, if you compress some loose cotton, it takes up less space, but its mass remains the same.

The weight of a body is its property of being heavy or light. It depends on the mass of the body. A body of greater mass appears heavier than a body with less mass. You know that the earth attracts all objects towards itself. This pull, called the force of gravity, depends on the mass of the object. And it is this force that we call the weight of an object. Thus, the weight of a body is the force with which it is attracted by gravity.

Comparing Mass and Weight

We can now compare the two quantities, mass and weight.

1. Both mass and weight are physical quantities, with magnitudes that can be measured and expressed in terms of number and units. Although they are closely related to each other, the two are different physical quantities, and not two names for the same physical quantity.

2. The SI unit of mass is the kilogram (kg). The SI unit of weight is the newton (N).
3. The weight and mass of a body are related.

Weight= constant * mass.

You will learn about this constant later. It is called acceleration due to gravity and is written as 'g'. It may be different at different places. For example, it is different on the earth and on the moon. Thus, though the mass of a body remains constant, its weight may be different at different places.

4. Ordinarily, when we speak of weighing an object, we mean measuring its mass. Thus, when we say that an object weighs 1 kg, we mean that its mass is 1 kg. The weight of an object of mass 1 kg is 9.8 N.

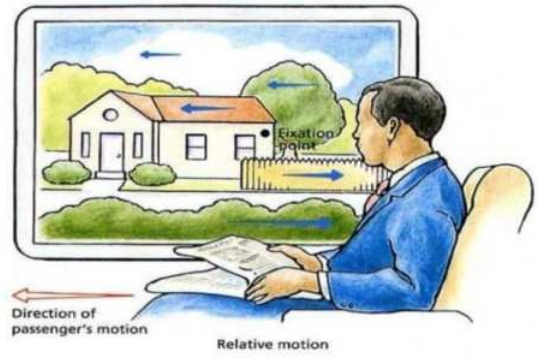
CHAPTER 2- MOTION

TOPIC- MOTION AND ITS TYPES

Everything that we see around us is either in motion or at rest. Thus, while roads, buses, trees, etc., are stationary, vehicles and people on the road are usually moving. All this is so common that we never stop to think about the exact nature of what we call motion.

MOTION IS RELATIVE

How do we judge whether something is in motion or at rest? We usually figure out whether an object is at rest or in motion by comparing its position with respect to stationary landmarks in its surroundings. When the position of an object with respect to the other objects around it does not change with time, we say that it is at rest. For example, the distance of your study table from the walls of the room, or from the roof or floor does not keep changing. Therefore, you conclude that it is at rest. On the other hand, when the position of an object relative to its surroundings changes with time, we say that it is in motion. For example, when you walk about in your room, your position relative to the things in the room keeps changing. You are thus in motion.



To take this idea a little further, think of a man sitting in a moving bus. Is he in motion or at rest? His position relative to the bus does not change. He is, therefore, stationary relative to the bus. On the other hand, his position relative to the road, and to the houses along the road, changes continuously. He is in motion relative to these landmarks. In general, we can say that all motion is relative.

Let us look at it from the boy's point of view. To him, the trees and buildings outside seem to be moving in the opposite direction. This is because an observer judges his surroundings assuming that he himself is at rest. Thus, when he moves in a certain direction, he feels that everything around him is moving in the opposite direction. This is precisely why the sun appears to move from the east to the west when, in reality, it is the earth that rotates from the west to the east.

TYPES OF MOTION

Things can move in many different ways, or motion can be of many different types. When the motion of a body does not have any pattern, e.g., the motion of a kite or of a mosquito, we call it random motion. On the other hand, any motion that follows some sort of pattern is called regular motion. Regular motion can be of many types.

TRANSLATORY MOTION

When an object moves from one point to another along a straight line or a smooth curve, its motion is called translatory. Translatory motion can be of two types- rectilinear and curvilinear, depending on the path followed.

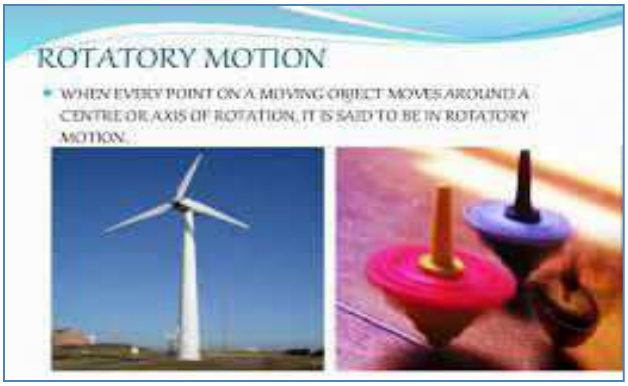
Rectilinear Motion

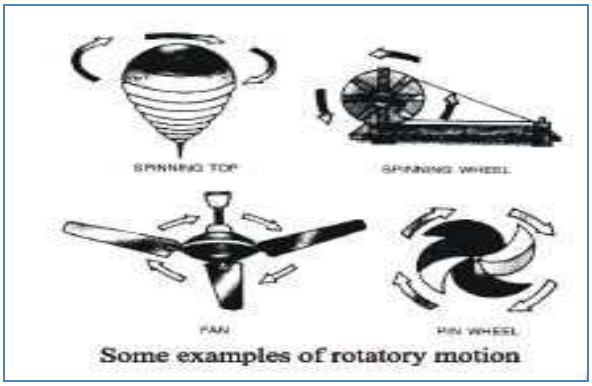
Curvilinear Motion

The motion of a body along a straight line is called rectilinear motion. Some examples of this are vehicles moving on a straight road, athletes running on a straight track, and any object thrown straight up or falling vertically down under gravity. The motion of a body along a curved path is called curvilinear motion. Whenever a vehicle turns from one road into another, it follows a short curved path.

ROTATORY MOTION

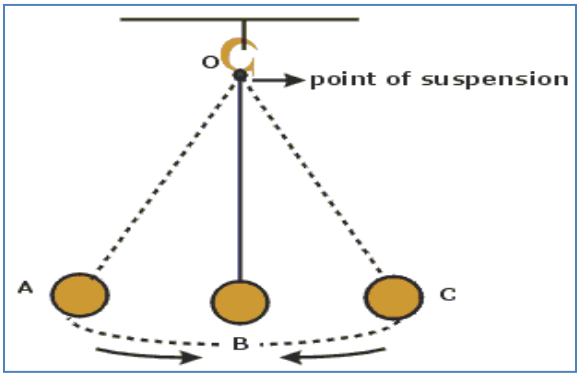
When an object turns or rotates or spins about an axis passing through itself, its motion is called rotatory. The rotation of the earth about its own axis is of this nature. Electrical fans, food processors, wheels, pulleys and Ferris wheel are some things that show rotatory motion.





Many things around us have two different types of motion at the same time. For example, the wheels of a moving car have the same translatory motion as the car. In addition, each wheel has a rotatory motion about its own axis. Other common examples of a body showing more than one type of motion at the same time are a spinning top and a drill.

OSCILLATORY MOTION



The motion of a pendulum, a swing or a bell hanging by a cord is called oscillatory. However, any swinging motion is not oscillatory. For example, the swinging of our arms while walking or marching cannot be called oscillatory. What characterises oscillatory motion? First, it is repetitive, unlike the motion of a car, for example. Second, it is a to-and-fro motion about a point, which is the middle position or mean position. Third, it is periodic, which means that it repeats itself after a fixed interval of time. We can now define oscillatory motion as the periodic motion of a body about its mean position. The meaning of 'periodic' and 'mean position' will become clearer when we discuss the simple pendulum.

The vibrations of the strings of a string instrument (e.g., sitar and guitar) or of the membrane of a percussion instrument (e.g., tabla and drums) are somewhat like oscillations. The difference is that unlike a pendulum, they are not free to swing. The strings are fixed at the two ends, while the membranes are fixed around the circumference.

CIRCULAR MOTION

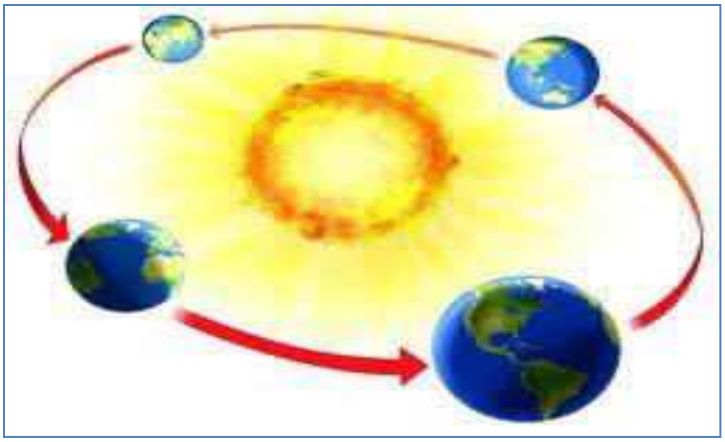
When a body moves around a circular path, its motion is called circular motion. For example, if you tie a string around an object and whirl it around, the motion of the object will be circular. In this kind of motion, the position

of the object keeps changing with time, but its distance from the centre of the path remains the same.

How to differentiate between rotatory motion and circular motion? In rotatory motion, the position of the body does not change, whereas in circular motion, the position of the body changes continuously with time. However, parts of a rotating body may be said to be in circular motion. For example, when a Ferris wheel rotates, its cars follow a circular path.

PERIODIC MOTION

Any motion that is repeated after a fixed interval of time is periodic. Thus, the motion of the hands of a clock is periodic, as are the motion of the earth around the sun and the rotation of the earth about its axis. Just as any periodic motion is not oscillatory, any repetitive motion is not periodic. For example, when a carpenter saws a piece of wood, the motion of the saw is repetitive, but not periodic. To be periodic, a repetitive motion must be repeated at a fixed interval of time.



Answer the following questions:-

SECTION-A (MASS AND WEIGHT)

Answer in short:

Q1. What do you understand by mass?

Q2. Define the term weight.

Q3.What is the relation between mass and weight?

Q4. The mass of an object is 2.2 kg. Find its weight.

Q5. State an example to explain mass of a body.

Q6. Which quantity: mass or weight, does not change by change of place?

Q7. State which of the quantities, mass or weight is always directed vertically downwards.

Fill in the blanks:-

a) A body of greater mass appears __ than a body with less mass.
b) Both mass and weight are____ quantities.
c) The weight of a body depends on the___ of the body.
d) The earth ____all objects towards itself.
e) The SI unit of mass is ____.

SECTION-B (MOTION)

Q1:- Define the following types of motion with examples -

a) Translatory motion
b) Rotatory motion
c) Oscillatory motion
d) Circular motion

Q2) What characterises oscillatory motion?

Q3) How would you distinguish between rotatory motion and circular motion?

Q4) Can a body have more than one type of motion at the same time? Explain with an example.

Q5) How can you say that all motion is relative?

Q6) Explain the meaning of the terms rest and motion.

Fill in the blanks:-

a) The motion of a body along a straight line is called____.
b) The motion of a body along a curved path is called____.
c) Any motion that is repeated after a fixed interval of time is____.
d) When a Ferris wheel rotates, its cars follow a____ path.
e) When the motion of a body does not have any pattern, we call it____ motion.
f) A person walking in a compartment of a stationary train is in _____ relative to the compartment and is in _____relative to the platform.
g) A person sitting in a compartment of a moving train is at ____ relative to the other person sitting by his side and is in _____ relative to the platform.

State true or false:-

a) Rectilinear and curvilinear motions are both examples of translatory motion.

b) All repetitive motions are periodic.

c) Any object thrown in any direction other than the vertical follows a curvilinear path.

d) The swinging of our arms while walking or marching is an oscillatory motion.

e) Any motion that follows some sort of pattern is called regular motion.

Activity:-

S.No.	Example of motion	State the type of motion rectilinear / circular/ periodic/ oscillatory/ rotatory
1.	Soldiers in a march past	
2.	Bullock cart moving on a straight road	
3.	Hands of an athlete in a race	
4.	Pedal of a bicycle in motion	
5.	Motion of the earth around the sun	
6.	Motion of a swing	
7.	Motion of a pendulum	
8.	Motion of a train on a straight bridge	
9.	Motion of a child in a merry-go-round	

THE END