TERM 1

PHYSICS MONTH—APRIL

LESSON PLAN-1

CLASS-9

TOPIC: Motion

OBJECTIVES:

1.To explain the concept of motion and various terms related with it.

2.To explain graphical representation of motion.

3.To give explanation of equations of motion and uniform circular motion.

P.K. Testing: Teacher will ask the students:

1.What causes phenomena of sunrise, sunset?

2.How do we perceive an object when its position changes with time?

3.What is motion?

IMPORTANT SPELLINGS:rest,motion,scalar,vector,distance,displacement,speed,velocity,acceleration.

EXPLANATION WITH INNOVATING METHODS:

1.To explain concept of rest and motion with an activity.

2.To explain concept of distance,displacement,speed and acceleration with various activities.

3.Graphical representation of motion and equations of motion will be explained with help of smart board and also by using white board of zoom app.

4.To explain uniform circular motion with help of examples and activities.

5. to explain various tricks and formulas for solving numericals.

PROCEDURE: Teacher will explain concept of rest and motion through activities. Distance, displacement, speed, acceleration will be explained through activities. Teacher will draw various graphs will be shown in online classes through zoom app and will be explained . Equations of motion will be explained through ncert book online material More activities related to various concepts of motion will be shown . Uniform circular motion will be explained with activities and examples. Numerical Problems will be simplified by using various tricks and formulas to solve them.The above procedure will be adopted through online zoom app

PARTICIPATION OF STUDENTS:

1.Students will take part in various activities.

2.Students will take notes given by teacher in online classroom.

3.Students will solve various numerical problems given by teacher.

RECAPITULATION: The teacher will ask:

1.What is uniform motion.

2.Define speed.

3.Give three equations of motion.

ASSIGNMENTS:

1.Discuss in class" Uniform circular motion is an accelerated motion"

2.A project will be given' to calculate speed of three friends running on a straight racing track of known length'

ART INTEGRATION WITH OTHER DOMAIN:

Students will be able to make a chart on 'graphical representation of motion'

LEARNING OUTCOMES:

Students will know and understand:

1.Concept of rest and motion.

2.Concept of distance, displacement, speed,velocity and acceleration.

3.Graphical representation of motion and equations of motion.

4.Concept of uniform circular motion.

RESOURCES:

1.LIVING SCIENCE(PHYSICS)
BY DHIREN M DOSHI

2.NCERT(SCIENCE)

3.) **SUPER SIMPLIFIED PHYSICS (DINESH**
BY SK SHARMA

4**.Diksha app and shiksha modules**

CO-SCHOLASTIC ACTIVITIES:

Critical thinking, communication, collaboration skills will be developed in students by various activities.

ASSESSMENT: Assessment will be done on basis of following parameters:

1.ORAL TEST

2.WRITTEN TEST IN GOOGLE FORM

3.QUIZ

4.GROUP DISCUSSION

LESSON PLAN-2 MONTH—MAYAND JULY
CLASS 9

TOPIC: Force and Laws of Motion

OBJECTIVES:

1.To explain the concept of force in detail

2.To explain the concept of mass and inertia.

3.To explain various laws of motion.

4.To explain in detail ‘Conservation of momentum’

P.K. TESTING: Teacher will ask the students:

1.How can we bring a stationary object into motion?

2.How can we change state of motion of an object?

3.What is Force?

IMPORTANT SPELLINGS: force, inertia, mass, impulse, momentum.

EXPLANATION WITH INNOVATING METHODS:

1.To explain concept of force with various examples and activities.

2.To explain First Law of Motion with various activities.

3.To explain concept of inertia and mass with help of examples and activities.

4.To explain Second and Third Law of Motion with various activities and giving real life examples to the students.

5.To explain “Conservation of momentum” with help of activities and examples.

6. Mathematical Formulation of various concepts will be explained on blackboard.

PROCEDURE: Teacher will explain concept of force, inertia and mass with examples and activities. The three laws of motion will be explained by taking real life examples and by performing various activities on olabs online by amrita vishwavidhalaya. Conservation of momentum will be explained through examples and activities. Teacher will do important derivations on the white board of zoom app. Teacher will explain various numerical problem.Interesting activities will be shown on smart board to make the students enjoy the concept.The above procedure will explained through zoom app ie in online classes.

PARTICIPATION OF STUDENTS:

1.Students will take part in various activities through online labs.

2.Students will take notes given by teacher during online classes.

3.Students will solve various numerical problems given by teacher.

RECAPITULATION: The teacher will ask:

1.Define First Law of Motion.

2.Define momentum.

3.What is force?

ASSIGNMENTS:

1.Discuss in class ”Applications of Newton’s laws of motion in daily life”

2.A project will be given ”Perform an activity to demonstrate Newton’s third law of motion”

LEARNING OUTCOMES: Students will know and understand:

1.Concept of force, inertia and mass.

2.Laws of Motion.

3.Conservation of Momentum.

4. Will be able to calculate numericals from the given data.

RESOURCES:

1.LIVING SCIENCE(PHYSICS)
BY DHIREN M DOSHI
2.NCERT(SCIENCE)
3.SUPER SIMPLIFIED PHYSICS (DINESH)
BY SK SHARMA

4.ONLINE LABS

CO-SCHOLASTIC ACTIVITIES:

Critical thinking, communication, collaboration skills will be developed in students by various activities.

ASSESSMENT: Assessment will be done on basis of following parameters:

1.ORAL TEST

2.WRITTEN TEST THROUGH GOOGLE APP AND FUTURISTIC APP OF SCHOOL

3.QUIZ

4.GROUP DISCUSSION DURING ONLINE CLASSES

ASSIGNMENT

Question 1.
During the game of table tennis, if the ball hits a player it does not hurt him. On the other hand when a fast moving cricket ball hits a spectator it may hurt him. State reason.
Answer
It is because of the Momentum. Table tennis ball is light than cricket ball and hence less momentum. So it hurts less to the player

Question 2.
Define the first law of motion.
Question 3.
Why do a back seater moves forward when a fast moving bike is stopped suddenly?
Answer
It is because of the inertia of motion. The body is in motion so when the bike stops , back seater move forward.

Question 4.
When a carpet is beaten with a stick it releases dust. Explain why.
Answer
It is because of the inertia of rest of the dust particles .Dust particle tend to remain at rest whereas the carpet comes into motion,this causes the dust particles to fall down

Question 5.
Name the physical quantity that measures inertia. State its SI unit.
Answer
Mass is the physical quantity that measures inertia. Its unit is Kg

Question 6.
Name the property of bodies by virtue of which they resist a change in their state of rest or of uniform motion.
Answer
Mass

Question 7.
What is the momentum of a body of mass 5 kg moving with a velocity of 0.20 m/s.
Answer
$p=mv=5\times.20=1kgm/s$p=mv=5×.20=1kgm/s

Question 8.
Write the net force acting on a bus, of mass 2000 kg, moving with a uniform velocity of 60 km/h.
Answer
As acceleration is zero, Force is zero

Question 9.
State the relation between the momentum of a body and the force acting on it.
Answer
Force is equal to rate of change of momentum
$F=_{\Delta pt}$F=Δpt

Question 10.
A body of mass 25 kg has a momentum of 125 kg m/s. calculate the velocity of the body.
Answer
Given m=25 kg ,p=125 kg m/s
Momentum is given by
$p=mv$p=mv
or
$v=_{pm}=5m/s$v=pm=5m/s

Question 11.
Name the physical quantity which is measured/ determined by the rate of change of momentum.
Answer
Force

Question 12.
What is the mathematical formula and SI unit of momentum?
Answer
$p=mv$p=mv
SI unit of Momentum is kg m/s

Question 13.
What force would be needed to produce an acceleration of 4 m/s^2 on a ball of mass 6 kg?
Answer
Given m= 6 kg , a=4 m/s^2
$F=ma=6\times4=24N$F=ma=6×4=24N

Question 14.
State Newton's third law of motion.
Question 15.
In the collision between a heavier body and a lighter body, if the force experienced by the heavier body is F_1F1 and that by the lighter body is F_2F2, write the relation between F_1F1 and F_2F2.
Answer
F_1F1 = F_2F2

Question 16.
Explain why same of the leaves may get detached from a tree if we vigorously shake its branch?
Answer
It is because of the inertia of rest of the leaves .Leaves tend to remain at rest whereas the branch comes into motion,this causes the leaves to fall down

Question 17.
An object of mass 100 kg is accelerated uniformly from a velocity of 5 m/s to 8 m/s in 6 s. Calculates the initial and final momentum of the object. Also find the magnitude of force exerted on the object.
Answer
Given u =5 m/s , v=8 m/s ,t=6 s ,m=100 kg
Momentum is given by
$p=mv$p=mv
Initial Momentum (p_1p1)
$p_1=mu=100\times5=500kgm/s$p1=mu=100×5=500kgm/s
Final Momentum (p_2p2)
$p_2=mv=100\times8=800kgm/s$p2=mv=100×8=800kgm/s
Now Force can be calculated as
$f=\Delta pt=800-5006=50N$f=Δpt=800−5006=50N

Question 18.
Out of the four physical quantities associated with the motion of an object viz force, velocity, acceleration and momentum which one remains constant for all bodies large or small, undergoing a free fall?
Answer
We know that formula for these quantities in Free fall
Acceleration gg. Acceleration in free fall is constant and it is given by g= 9.8 m/s^2
Force $F=ma$F=ma .So it will be different for large or small bodies
Velocity $v=u+at$v=u+at . This will keep changing with time
Momentum $p=mv$p=mv. This will also keep on changing

We can easily see that Force,velocity ,momentum will be different. The only thing which is constant is acceleration

Question 19.
A runner presses the ground with his feet before he starts his run. Identify action and reaction in this situation.
Answer
Action- when the runner presses the ground with his feet before starting to run
Reaction- when the runner moves forward due to the forward force applied by the ground on him

Question 20.
An athlete always runs some distance before taking a jump. Why?
Answer
An athlete runs before jumping to gain momentum. Because it helps in jumping higher and longer because of inertia of motion gained due to the motion.
When the athletes Jump they already have a forward motion that would be greater than that of a jump made from standing in one spot.

Question 21.
How are action – reaction forces related in magnitude and direction?
Answer
Action and reaction forces are equal in magnitude and opposite in direction

Question 22.
State the relation between the momentum of a body and the force acting on it.
Answer
$F=_{\Delta t}F=\Delta t$

Question 23.
(i) A heavy and a light object have same momentum. Which of these is travelling faster?
(ii) State the law of conservation of momentum. Give examples.
Answer
$p=mvp=mv$
$v=_{pm}v=pm$
We can easily see that with same momentum, light object will be travelling faster

Short Answer Type questions

Question 1.
There are three solids made up of aluminium, steel and wood, of the same shape and same volume. Which of them would have highest inertia?
Answer
Since steel has greatest density and greatest mass, therefore, it has highest inertia.

Question 2.

Two friends on roller – skates are standing 5 m apart facing each other. One of them throws a ball of 2 kg towards the other, who catches it. How will this activity affect the position of the two? Explain your answer.

Answer

Distance between them will increase. Initially the momentum of both the friends are zero as they are at rest. In order to conserve the momentum the one who throws the ball would move backward. The second will experience a net force after catching the ball and therefore will move backwards that is in the direction of the force

Question 3.

Give reason and give the law related to these statements:
(a) It is easier to push an empty box than to push the box full of books.
(b) It is difficult for a fireman to hold a hose which ejects large amount of water with high velocity.

Answer

a.Friction forces depends on the roughness of the surface and mass of the box.So it is easier to push an empty box than to push the box full of books
b. When large amount of water is ejected from a hose at a high velocity, according to Newton's Third Law of Motion, water pushes the hose in backward direction with the same force. Hence, it is difficult for a fireman to hold a hose in which ejects large amount of water at a high velocity

Question 4.

(a) Name the force that keeps the object moving in a circular path with constant acceleration.
(b) What would happen if this force is absent?

Answer

a. Centripetal Force
b. The object will move at tangent to the circular path

Question 5.

It is necessary to run along with the moving bus in the same direction of the bus, while alighting from the bus. Give reasons.

Answer

This is because of the inertia of the body. If we just get it down, our feet will be at rest while the body is still in motion and we will fall down and get injuries. If we run while getting down, we give the body the time to slowly come to rest

Question 6.

Which of the following has more inertia? Give reason for your answer:
(i) A bicycle and a train
(ii) A rubber ball and a stone of the size.
(iii) A five rupee coin and a one rupee coin.
(iv) A bicycle or a truck.

Answer

i. Train
ii. Stone
iii. Five rupee coin
iv. Truck

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LESSON PLAN-3 MONTH—JULY AND AUGUST

CLASS 9

TOPIC: Gravitation

OBJECTIVES:

1.To explain the concept of gravitation and universal law of gravitation.

2.To explain the concept of free fall, acceleration due to gravity and its variation.

3.To explain equations of motion for freely falling bodies.

4.To explain concept of mass and weight.

PK TESTING: Teacher will ask the students:

1.What is needed to change direction of motion of object?

2.Why does an object dropped from a height falls towards the earth?

3.What is responsible for motion of planets around the sun?

4.What is gravitational force?

IMPORTANT SPELLINGS:

Gravitation, centripetal force, acceleration due to gravity, mass, weight, free fall.

EXPLANATION WITH INNOVATING METHODS:

1.To explain the concept of gravitation with examples and activities.

2.To explain universal law of gravitation and its importance with help of examples and by using blackboard.

3.To explain the concept of free fall, acceleration due to gravity and its variation by using activities IN ONLINE LABS.

4.To explain equations of motion for freely falling bodies by ZOOM APP

5.To explain the concept of mass and weight with activities and examples.

PROCEDURE: Teacher will explain the concept of gravitation with examples and activities. Concept of universal law of gravitation, freefall, acceleration due

to gravity will be explained through activities and examples .Equations of motion for freely falling bodies will be explained Concept of mass and weight will be made clear through various examples and activities. Interesting activities related to various concepts will be shown to students on the ZOOM APP. Teacher will explain numerical problems IN ONLINE CLASSES.

PARTICIPATION OF STUDENTS:

1.Students will take part in various activities. IN SIMULATED ONLINE LAB.

2.Students will take notes given by teacher.

3.Students will solve various numerical problems given by teacher.

RECAPITULATION: The teacher will ask:

1.What is free fall?

2.What is weight?

3.What is acceleration due to gravity?

LEARNING OUTCOMES

Students will know and understand:

1.Concept of gravitation, universal law of gravitation.

2.Concept of free fall, acceleration due to gravity.

3.Equation of motion for freely falling bodies.

4.Concept of mass and weight.

RESOURCES:/LINKS

1.LIVING SCIENCE(PHYSICS)
BY DHIREN M DOSHI
2.NCERT(SCIENCE)

3.SUPER SIMPLIFIED PHYSICS (DINESH)
BY SK SHARMA

4.DIKSHA APP AND SHIKSHA MODULES

CO-SCHOLASTIC ACTIVITIES:

Critical thinking, communication, collaboration skills will be developed in students by various activities.

ASSESSMENT: Assessment will be done on basis of following parameters:

1.ORAL TEST

2.WRITTEN TEST ON GOOGLE FORM

3.QUIZ

4.GROUP DISCUSSION IIN ONLINE CLASSES.

ASSIGNMENT

Multiple choice Questions

Question 1.
Which of the following is true?
a. The acceleration due to gravity acting on a freely falling body is directly proportional to the mass of the body
b. Mass of the object is same on Moon and Earth
c. G value is always constant
d. The weight of an object at the center of earth will be zero
Solution (b), (d), (c)

Question 2.
A big stone and small are dropped from the roof of the house at the same time. Which one will reach the ground first?
a. Big Stone
b. Small stone
c. Both at the same time
d. Not able to determine with the given data
Solution (c)

Question 3.
The value of acceleration due to gravity of earth

a. Same on equator and poles
b. Is the least at equator
c. Is the least on poles
d. Increase from pole to equator
Solution (c)

Question 4.
An object is thrown vertically upwards and rises to a height of 10 m. Calculate the velocity with which the object was thrown upwards? Take g=9.8 m/s^2
a. 14m/s
b. 16m/s
c. 10m/s
d. 9.8 m/s
Solution
Distance traveled, s = 10 m
Final velocity, v = 0 m/s
Acceleration due to gravity, g = 9.8 $m\ s^2$
Acceleration of the object, a = -9.8 $m\ s^2$
$v^2=u^2+2asv2=u2+2as$
$0=u^2+2\times(-9.8)\times100=u2+2\times(-9.8)\times10$
$u^2=2\times9.8\times10u2=2\times9.8\times10$
u = 14 m/s

Question 5.
The time taken by the object to reach the highest point in the above question
a. 1.42s
b. 1.5 s
c. 1 s
d. 1.43 s

Solution
$v=u+atv=u+at$
$0=14-9.8\times t0=14-9.8\times t$
t = 1.43 s.

Question 6.
Which of the them is true for two bodies separated by some distance?
a. When the distance between them is halved, Gravitational force becomes 4 times

b. When one of the mass becomes halved, Gravitational force becomes halved
c. When the distance between them is increased four times, Gravitational force becomes 1/16 times
d. None of the above
Solution (a) (b) (c)
The above can be simply calculated from the below formula
$F=Gm_1m_2r_2F=Gm1m2r2$

Question 7.

The Weight of the body at a certain place is 30 N. The acceleration due to gravity at that point is 10 m/s^2. Find out the mass and weight of the object at the place where acceleration due to gravity is zero?
a. 3 kg ,0 N
b. 3 Kg,30 N
c. 3 Kg,3 N
d. None of these
Solution:
Mass of the body=3010=3Kg3010=3Kg
Since Mass remains same everywhere, Weight varies as per acceleration due to gravity which is zero at g=0
Hence (a)

Question 8. The acceleration due to gravity at three point A,B and C are 9.8 m/s^2 ,10m/s^2 and 5 m/s^2 on the earth surface?
Which of the following is true?
a. B is at least distance out of three point from the center of the earth
b. C is at farthest distance out of three point from the center of the earthv c. Weight of the object is lowest at point C out of three point
d. The weight of the object varies as
$W_B > W_A > W_C$WB>WA>WC
Solution : All are correct and self-explanatory.

Class IX

CHAPTER - WORK AND ENERGY

TERM - II

MONTH - OCTOBER

LEARNING OBJECTIVES :

- Learners will be able to define work and energy.
- Learners will be able to understand and analyze the various life examples under different types of work.
- They will be able to identify different forms of energy.
- Students will be able to write the expression for kinetic and Potential energy.
- Learners will be able to comprehend the laws of conservation of energy.
- Learners will be able to write the units of work, power and energy.

PREVIOUS KNOWLEDGE TESTING :

Q1. What is force ?
Q2. Define energy.
Q3. Why do we get tired when we do some work ?
Q4. Why do we need energy ?

INTRODUCTION TO THE TOPIC :

Today, we will learn about work and energy.

EXPLANATION :

All topics will be explained using various innovative methods like showing visuals, performing virtual activities, analyzing daily life examples, group discussion etc.

Procedure :

- Definition of work and its SI units will be given via zoom app.
- Many examples will be discussed to explain the type of work done, i.e, positive, negative or zero using the videos from You Tube.
- Numerical will be discussed (W=F x s)
- Definition of Kinetic Energy and Potential Energy will be given.
- Derivation of expression of kinetic Energy and Potential Energy.
- Factors on which K.E.depends :
  (a) mass of the body.
  (b) velocity of the body.
- Law of conservation of energy will be discussed.
- The same law will be illustrated with the help of activity (the link mentioned in resources) in case of freely falling body.
- Definition, formula and SI unit of power will be introduced.
- Commercial units of electrical energy
  1 kilo - watt - hour = 1 unit.
- Learners will be given a numerical to find the cost of electricity bill.

STUDENT'S PARTICIPATION :

- Students will collect many examples of work done from their surroundings.
- They will perform an activity (individually) to identify the form of energy in various appliances and will make a collage of the same.
- Solving various numerical and comprehending cost of the electricity bill will help them INTEGRATE their knowledge with MATHEMATICS.

RECAPITULATION :

- Write 3 examples of 3 types of work.
- Write the expression of power in terms of velocity.
- Derive an expression for kinetic energy.
- Numericals from NCERT.

LEARNING OUTCOMES :

Students will know and understand :
(a) different type of work done.
(b) formula for K.E. and P.E.
(c) law of conservation of energy.

RESOURCES :

1. NCERT (SCIENCE)
2. LIVING SCIENCE (PHYSICS)
3. SUPER SIMPLIFIED PHYSICS (DINESH)

YouTube links :

- https://youtu.be/zaceSCDATjg
- https://youtu.be/BcZfRSlaw7s

ASSESSMENT : Assessment will be done an the basis of following parameters.

(a) Questionnaire
(b) MCQ
(c) Assignment