

**LESSON PLAN 1 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd1	April 2019	Motion	State of rest and motion
Expected Learning Outcome: Students will be able to ⇒ Define state of rest. ⇒ Define state of motion. ⇒ Identify state of rest in daily life examples. ⇒ Identify state of motion in daily life examples. ⇒ Understand the concept of reference point. ⇒ Differentiate between Relative nature of state of rest and motion. ⇒ Define state of absolute rest and absolute motion.						
Expected skill development: Comprehension, critical thinking, analysis, visual thinking (Look around)						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Will review the previous knowledge with the following questions:
(5min)

- What do you mean by motion of a body?
- How many states of a body are possible?

CONTENT (Discussion and questionnaire method)
(20 min)

- ⇒ Define state of rest with examples.
- ⇒ Define state of motion with examples.
- ⇒ Define and understand the concept of reference point.
- ⇒ Identify state of rest in daily life examples.
- ⇒ Identify state of motion in daily life examples.
- ⇒ Relative nature of state of rest and motion.

- ⇒ Define state of absolute rest and absolute motion.
 THINK-LINE: The states of rest and motion are relative.

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- What do you mean by state of rest of a body?
- What do you mean by state of motion of a body?
- Is the state of anybody fixed?
- On which factor the state of rest and motion of a body depends?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ Define state of rest. ⇒ Give 2 examples in daily life of a body in the state of rest. ⇒ Define state of motion. ⇒ Give 2 examples in daily life of a body in the state of motion. ⇒ Define reference point. ⇒ How state of rest and motion are relative in nature. ⇒ Define state of absolute rest. ⇒ Define state of absolute motion.
Evaluation/Assessment: Oral Questionnaire- Difference between state of rest and state of motion.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
⇒ Define state of rest. ⇒ Give 2 examples in daily life of a body in the state of rest. ⇒ Define state of motion. ⇒ Give 2 examples in daily life of a body in the state of motion.	Do you think state of absolute rest is practically in existence? If so, give examples and if not, why?
Materials needed/Resources:	

Chalk, duster, ncert book.

Common Misconceptions:

Students confuses between state of rest and motion specially because of their relative nature .

Addressing the misconceptions:

By giving them daily life examples showing their relative nature.

Home assignments:

(2 min)

- ⇒ Define state of rest.
- ⇒ Give 2 examples in daily life of a body in the state of rest.
- ⇒ Define state of motion.
- ⇒ Give 2 examples in daily life of a body in the state of motion.
- ⇒ Define reference point.
- ⇒ Elaborate “state of rest and motion are relative in nature”.
- ⇒ Define state of absolute rest.
- ⇒ Define state of absolute motion.



LESSON PLAN 2 [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd2	April 2019	Motion	Different types of motion of a body and concept of Scalar and vector quantities

Expected Learning Outcome:

Students will be able to

- ⇒ Classify the three different types of motion of a body.
- ⇒ Define physical quantity.
- ⇒ Define scalar and vector quantity.
- ⇒ Differentiate between scalars and vectors.
- ⇒ Identify scalars and vectors among the various physical quantities studied till date.

Expected skill development:

Comprehension, critical thinking, comparison, Look around.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What is the difference between state of rest and motion of a body?
- What is a physical quantity?

CONTENT (Discussion & Questionnaire method)

(20 min)

- ⇒ Define physical quantity.
- ⇒ Define scalar and vector quantity.
- ⇒ Define magnitude.
- ⇒ Differentiate between scalars and vectors.

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- ⇒ Identify scalars and vectors among the various physical quantities studied till date.
(Temperature, distance, speed, acceleration, mass and weight)

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- ⇒ Define physical quantity.
- ⇒ Define a scalar quantity.
- ⇒ Give 2 examples of a scalar quantity
- ⇒ Define vector quantity.
- ⇒ Give 2 examples of a vector quantity
- ⇒ Write 3 differences between scalars and vectors.

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ Define physical quantity. ⇒ Define a scalar quantity. ⇒ Give 2 examples of a scalar quantity ⇒ Define vector quantity. ⇒ Give 2 examples of a vector quantity ⇒ Write 3 differences between scalars and vectors.
• Evaluation/Assessment: Written assignment- Differentiate between vector and scalar quantity.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
⇒ Define a scalar quantity. ⇒ Give 2 examples of a scalar quantity ⇒ Define vector quantity. ⇒ Give 2 examples of a vector quantity	What is theory of relativity.

Materials needed/Resources:	
Chalk, duster, ncert book.	
Common Misconceptions:	Addressing the misconceptions:
Students confused when vector and scalar quantity. In understanding of magnitude.	By giving different examples. Definition of magnitude.

Home assignments:

(2 min)

- ⇒ Write 3 differences between scalars and vectors.
- ⇒ Give 2 examples of each.

LESSON PLAN 3 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd3	April 2019	Motion	Distance and displacement
Expected Learning Outcome: Students will be able to ⇒ Define distance travelled by a body. ⇒ Define displacement travelled by a body. ⇒ Differentiate between distance and displacement travelled by a body. ⇒ Solve numerical based on them						
Expected skill development: Comprehension, critical thinking, problem solving, differentiating.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- ⇒ Define scalar and vector quantity.
- ⇒ Differentiate between scalars and vectors.

CONTENT (Discussion method and demonstration by students) (20 min)

- ⇒ Define distance travelled by a body.
- ⇒ Define displacement travelled by a body.
- ⇒ Differentiate between distance and displacement travelled by a body in terms of:
 - a) Definitions.
 - b) Types of physical quantity.
 - c) Value may be positive, negative or zero.
- ⇒ The following questions will be solved in the class by the students one by one:
 1. A particle moves (a) one-quarters (b) two quarters (c) three quarters of

radius 5cm. what is the magnitude of its distance and displacement?

2. A body moves towards east by a distance of 3km and turns towards north and moves a distance of 4km. what is the magnitude of its distance and displacement?
3. A farmer moves along the boundary of a square field of side 10m in 40s. What will be the magnitude of displacement of the farmer at the end of 2minutes 20seconds?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- What is difference between distance and displacement?
- In what case the distance and displacement travelled by an object become same?
- Is there any difference in their SI units?
- Write 3 situations where displacement travelled by a body is always zero?

THINK-LINE: An object has moved through a distance. Can it have zero displacement? If yes, support your answer with an example.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is difference between distance and displacement? ➤ In what case the distance and displacement travelled by an object become same? ➤ Is there any difference in their SI units? ➤ Write 3 situations where displacement travelled by a body is always zero?
Evaluation/Assessment: Differentiate between distance and displacement.
DIFFERENTIATED CLASSROOM

Learners on the way Write 3 situations where displacement	Advanced Learners Between two given position, distance travelled
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travelled by a body is always zero? What does the odometer of an automobile measure?	can never be less than the displacement. Justify with the help of examples.
Materials needed/Resources: Chalk, duster, ncert book and exemplar.	
Common Misconceptions: Students confuses in the calculation of distance and displacement in various situations.	Addressing the misconceptions: By giving them various different situations to practice.

Home assignments:

(2 min)

1. An athlete completes one round of a circular track of diameter 200m in 40s. What will be the distance covered and the displacement at the end of 2minutes 20s?
2. Which of the following is true for displacement?
 - (a) It cannot be zero.
 - (b) Its magnitude is greater than the distance travelled by the object.

**LESSON PLAN 4 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd4	April 2019	Motion	Uniform and non-uniform motion Speed and velocity
Expected Learning Outcome: Students will be able to ⇒ Define uniform and non-uniform motion. ⇒ Define speed and velocity. ⇒ Differentiate between speed and velocity of a body. ⇒ Solve numerical based on them						
Expected skill development: Comprehension, critical thinking, problem solving, Look around.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What is the difference between distance and displacement?
- What are their expressions?

CONTENT (discussion method and demonstration by students) (20 min)

- ⇒ Define speed and velocity along with their SI units and nature of the quantities.
- ⇒ Define a) uniform speed and velocity or uniform motion.
b) non-uniform speed and velocity or non-uniform motion.
- ⇒ Daily life examples for uniform speed and non-uniform speed.
- ⇒ The following questions will be solved in the class by the students one by one:-
 1. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station? The signal travels at the speed of light.
 2. If a cheetah which runs at the speed of 100km/h, spots his prey at a

distance of 20km, what is the minimum time it will take to get its prey?

THINK-LINE: In addition to speed, what else should be known to predict the position of a moving body from a given starting point?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- What is difference between speed and velocity?
- In what 2 cases the speed and velocity of an object become same?
- Is there any difference in their SI units?
- Define uniform and uniform motion ?

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is difference between speed and velocity? ➤ In what 2 cases the speed and velocity of an object become same? ➤ Is there any difference in their SI units? ➤ Define uniform and uniform motion?
• Evaluation/Assessment: Differentiate between (a) uniform and non-uniform motion. (b) Speed and velocity.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
Estimate the distance of the bus stop from your house if your average walking speed is 4 km/h and the bus stop is half an hour away?	Calculate the speed of tip of minutes hand of a clock, whose length is 7cm.
Materials needed/Resources: Chalk, duster, ncert.	

Common Misconceptions:	Addressing the misconceptions:
Students confuses uniform motion as motion of the body in straight line and non-uniform motion of the body in zig zag manner.	By giving them daily life examples.

Home assignments:

(2 min)

- ⇒ Write 3 differences between speed and velocity.
- ⇒ Give 2 examples of uniform motion and non-uniform motion each from your daily life.
- ⇒ What does the path of an object look like when it is in uniform motion?

LESSON PLAN 5 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd5	April 2019	Motion	Numerical on speed and velocity

Expected Learning Outcome:

Students will be able to

- ⇒ Convert km/h into m/s and vice versa.
- ⇒ Solve various problems related to speed.
- ⇒ Solve various problems related to velocity.
- ⇒ Acknowledge the difference between their expressions.

Expected skill development:

Comprehension, critical thinking, problem solving

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What do you understand by the terms uniform speed and velocity?
- What is the difference between the expressions for uniform speed and velocity?

CONTENT (Discussion method and Demonstration by students) (20 min)

- ⇒ Conversion of units for km/h to m/s and vice versa
- ⇒ Following questions will be done regarding conversion: -
 1. Convert 18km/h into m/s.
 2. Convert 5 m/s into km/h
- ⇒ The following questions will be solved in the class by the students one by one:-

3. Calculate the distance travelled by a car moving with a speed of 35km/h in 12 min?
4. Which of the following is moving faster?
 - a) A scooter moving with a speed of 300m/min.
 - b) A car moving with a speed of 36km/h.

THINKLINE: A 50 m long train passes over a 250 m long bridge at a velocity of 60km/h. how long will it take to pass completely over the bridge?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- How to convert km/h into m/s.
- How to convert m/s into km/h.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ How to convert km/h into m/s. ➤ How to convert m/s into km/h.
Evaluation/Assessment: Convert 56km/hr to m/s?
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
⇒ A train is moving with a speed of 72km/h. what is its speed in m/s? ⇒ Calculate speed and velocity of a truck when it covered 15km into 2hrs?	An artificial satellite completes three and a half rounds in an orbit of radius 500m in 110hrs. Calculate the speed and velocity of the satellite?
Materials needed/Resources: Chalk, duster, ncert.	
Common Misconceptions:	Addressing the misconceptions:
Students confuses in converting km/h into m/s	By letting them to perform lot of numerical in

and vice versa	which conversion is required.
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Home assignments:

(2 min)

⇒ Arrange the following speeds in increasing order:

- a) Bicycle moving with a speed of 18km/h.
- b) A fast runner running with a speed of 7m/s.
- c) A car moving with a speed of 2000m/min.

LESSON PLAN 6 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd 6	April 2019	Motion	Average speed & velocity.
Expected Learning Outcome: Students will be able to ⇒ Define average speed and average velocity ⇒ Solve the numerical for average speed and average velocity.						
Expected skill development: Comprehension, problem solving						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What do you mean by speed & velocity?
- What is the meaning of taking average of a no. of observations?

CONTENT (Discussion method and Demonstration by students) (20 min)

⇒ Define average speed

V_{av} = mean of all speeds V_{av} = total distance/total time

⇒ Define average velocity.

V_{av} = mean of all velocity V_{av} = total displacement/total time = initial velocity + final velocity / 2

⇒ The following numerical will be solved one by one in the class with the help of students:

(1) Joseph jogs from one end A to the other end B of a straight 300m road in 2minutes 30seconds and then turns around and jogs 100m back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging

(a) From A to B (b) From A to C?

THINK-LINE: Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?

CLOSURE:

Recapitulation of concept taught by asking them to write the formula for average speed and velocity and home assignment given.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is difference between speed and velocity? ➤ In what 2 cases the speed and velocity of an object become same? ➤ Is there any difference in their SI units? ➤ Define uniform and uniform motion? - Evaluation/Assessment: Rewriting the formula of average speed and velocity.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
A car travels a certain distance with a speed of 50km/h and returns with 20 km/h .calculate average velocity for the journey.	A car covers one third of the distance between 2 places at a speed of 10 km/h the two third with a speed of 20 km/h and the last third with aped of 30 km/h calculate the average speed and velocity of car?
Materials needed/Resources:	
Chalk, duster, ncert.	
Common Misconceptions:	Addressing the misconceptions:

Confusion in calculation of average speed and average velocity as the students always start taking the mean of all the speed given.

Their confusion can be resolved by explaining them this fact that distance travelled by bodies travelling with different speeds in same time is different. So we can't take the mean.

Home assignments:

(2 min)

- ⇒ Abdul, while driving to school, computes the average speed for his trip to be 20km/hr. On his return trip along the same route, there is less traffic and average speed is 30km/hr. What is the average speed for Abdul's trip?
- ⇒ A motorcyclist drives from A to B with uniform speed of 30km/hr and returns back with the speed of 20km/hr. Find the average speed.

LESSON PLAN 7+8[2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35+35 min Pd7&8	April 2019	Motion	Acceleration and its numerical

Expected Learning Outcome:

Students will be able to

- ⇒ Define acceleration. Write its SI unit and nature.
- ⇒ Acknowledge positive, negative and zero acceleration.
- ⇒ Solve numerical related to it.

Expected skill development:

Comprehension, understanding, critical thinking, problem solving

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What do you mean by velocity of an object?
- Have you ever heard about a vehicle getting accelerated? If yes, what do you perceive by the statement?

CONTENT (Discussion method and demonstration by students) (15 min)

- ⇒ Define acceleration along with its SI unit and its nature.
- ⇒ 3 types of acceleration:- positive, negative and zero acceleration with examples.
- ⇒ Its expression is $a=(v-u)/t$
- ⇒ The following questions will be solved in the class by the students one by one:-

(45 min)

5. A train starting from stationary position and moving with uniform acceleration attains a speed of 36km/h in 10 min. find its acceleration.
6. A moving train is brought to rest within 20s by applying brakes. Find the initial velocity of the train when the retardation due to brakes is 2m/s^2 .
7. A boy starting from rest travels a distance of 200m in 10s. Calculate the magnitude of his acceleration.
8. A racing car has a uniform acceleration of 4m/s^2 . What distance will it cover in 2s starting from rest?

THINK-LINE: What is the acceleration of a body moving with uniform motion?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- What is acceleration?
- How many types of acceleration are there?
- What is its SI unit?
- What is the expression for it?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is acceleration? ➤ How many types of acceleration are there? ➤ What is its SI unit? ➤ What is the expression for it? ➤ What is retardation?
Evaluation/Assessment: Differentiate between positive, negative, zero acceleration.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
A scooter acquires a speed of 36km/h in 5 s just after the start. Calculate the acceleration of the scooter?	A bus decreases its speed from 80km/h to 60km/h in 5s. find the acceleration of the bus?

Materials needed/Resources:	
Chalk, duster, ncert.	
Common Misconceptions:	Addressing the misconceptions:
Students generally solve the question without changing all the parameters into their SI units.	By telling them again and again, before doing every numerical to change the parameters to their SI units.

Home assignments:

(2 min)

- ⇒ A bus decreases its speed from 80km/hr to 60km/hr in 5s. Find the acceleration of the bus.
- ⇒ A train starting from a railway station and moving with uniform acceleration attains a speed of 40km/h in 10 min. find its acceleration?

LESSON PLAN 9 [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd9	April 2019	Motion	Graphical representation of motion.

Expected Learning Outcome:

Students will be able to

- ⇒ Draw x-t graph for the state of rest and motion.
- ⇒ Draw x-t graph for uniform & non-uniform motion.
- ⇒ Draw v-t graphs for positive, negative & zero acceleration.
- ⇒ Slope of (a) x-t graphs
(b) v-t graphs
- ⇒ Area of v-t graph

Expected skill development:

Comprehending & interpreting the groups.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Will review the previous knowledge with the following questions:

(2min)

- Define uniform motion and non-uniform motion.
- What are the types of acceleration?

CONTENT (Discussion method and Demonstration by students)

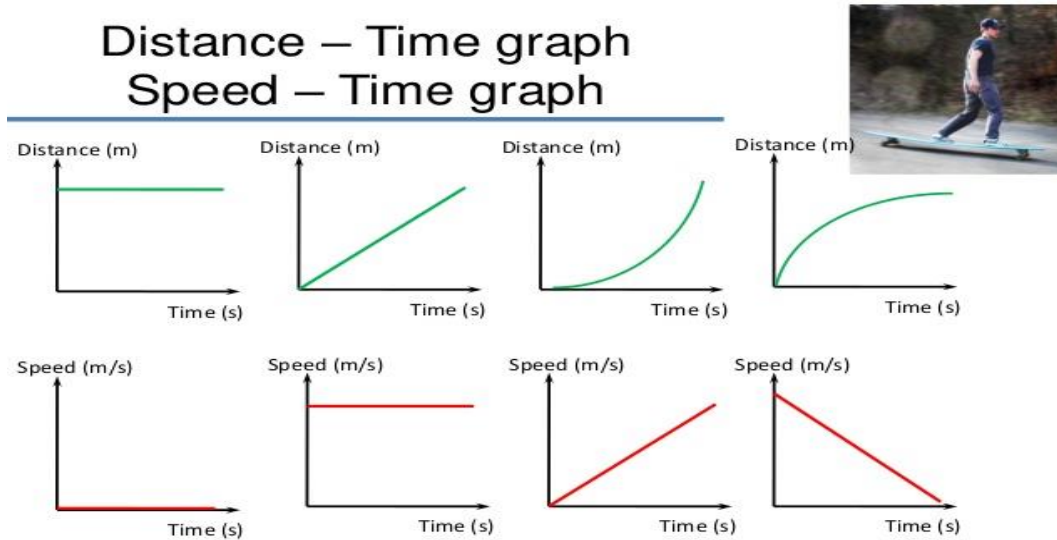
(20

min)

- ⇒ Distance time graph for
 - a) The body at rest
 - b) The body moving with uniform speed/velocity
 - c) The body moving with non-uniform speed/velocity

- ⇒ Velocity-time graph for-
- (a) the body moving with zero acceleration
 - (b) the body moving with +ve acceleration
 - (c) the body moving with -ve acceleration
- ⇒ slope of 1) distance time graph → velocity
2) velocity-time graph → acceleration

- ⇒ explain the difference and comment about the nature of graphs in the following cases:-



THINK-LINE: What can you say about the motion of an object whose distance-time graph is a straight line parallel to the time axis?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- What is the nature of distance time graphs for uniform and non-uniform motion of an object?
- What does the slope of (a) x-t graphs?
(b) v-t graphs indicates?
- What does the area of v-t graphs indicate?
- Draw the v-t graph for (a) zero acc. (b) Positive acc. (c) Negative acc.
- Draw the x-t graphs for uniform speeds and non-uniform speed.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What is the nature of distance time graphs for uniform and non-uniform motion of an object? ➤ What does the slope of (a) x-t graphs? (b)v-t graphs indicate? ➤ Draw the v-t graph for (a) zero acc. (b)Positive acc.?(c) negative acc. ➤ Draw the x-t graphs for uniform speeds and non-uniform speed. ➤ What does the area of v-t graph indicates?	
- Evaluation/Assessment: - What is the nature of distance time graphs for uniform and non-uniform motion of an object?	
DIFFERENTIATED CLASSROOM	

Learners on the way	Advanced Learners
What is the nature of distance time graphs for uniform and non-uniform motion of an object?	What does the slope of (a) x-t graphs (b)v-t graphs indicates?
Materials needed/Resources:	
Chalk, duster, ncert, daily life example	
Common Misconceptions:	Addressing the misconceptions:
Confusion in taking the slope of the given graphs	By making them to understand the slope = y-axis/x-axis

Home assignments:

(2 min)

- ⇒ Draw the v-t graph for (a) zero acc. (b) positive acc. ?(c) negative acc.
- ⇒ Draw the x-t graphs for uniform speeds and non-uniform speed.

- ⇒ What does area of a velocity-time graph represent?
- ⇒ What does area of displacement-time graph represent?
- ⇒ What does slope of a velocity-time graph represents?
- ⇒ The following table gives the data about motion of a car.

Time(h)	11:00	11:30	12:00	12:30	1:00
Distance	0	30	30	65	100

Plot the distance- time graph.

- (i) Find the speed of the car between 12:00h to 12:30h
- (ii) What is the average speed of the car?
- (iii) Is the car motion is example of uniform motion? Justify

⇒

LESSON PLAN 10+11 [2019-- 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	70 min Pd10, 11	May 2019	Motion	Graphical derivation of the 3 equations of motion
Expected Learning Outcome: Students will be able to ⇒ Derive the 1st equation of motion graphically. ⇒ Derive the 2nd equation of motion graphically. ⇒ Derive the 3rd equation of motion graphically.						
Expected skill development: Comprehension, interpretation, critical thinking, derivation						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

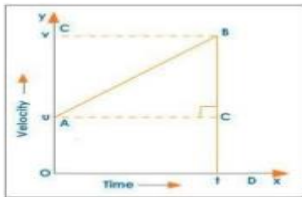
Will review the previous knowledge with the following questions: (5min)

- What does the area of velocity-time graph represent?
- What does the area of distance-time graph represent?
- What do you mean by trapezium?

CONTENT (discussion method and demonstration by students) (30 min)

- ⇒ Graphical derivation of 1st equation will be done by using the concept of slope of the x-t graph

Derivation of first equation of motion



Slope of the v - t graph gives the acceleration of the moving object.

Thus, acceleration = slope = $\text{At} \frac{BC}{AC} = \frac{v - u}{t - 0}$

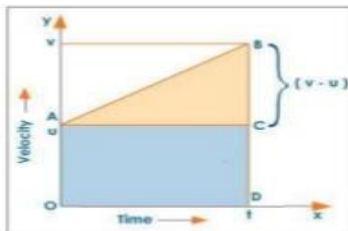
$$a = \frac{v - u}{t}$$

$$v - u = at$$

$$v = u + at$$

⇒ Graphical derivation of 2nd equation will be done by using the concept of area of the v-t graph

Derivation of second equation of motion



Distance = area of the trapezium ABDO
S = area of rectangle ACDO + area of DABC

$$= OD \times OA + \frac{1}{2} BC \times AC$$

$$= t \times u + \frac{1}{2} (v - u) \times t$$

$$= ut + \frac{1}{2} (v - u) \times t$$

$$= t \times u + \frac{1}{2} (v - u) \times t$$

$$= ut + \frac{1}{2} (v - u) \times t$$

$$S = ut + \frac{1}{2} at \times t$$

$$S = ut + \frac{1}{2} at^2$$

⇒ Graphical derivation of 3rd equation will be done by using the concept of area of the v-t graph.

c) Equation for position – velocity relation ($2as = v^2 - u^2$) :-

Consider a velocity – time graph for a body moving with uniform acceleration 'a' travelled a distance s in time t.

The distance travelled by the body between the points A and B is the area OABC.

s = area of trapezium OABC

$$(OA + BC) \times OC$$

$$s = \frac{(u + v) \times t}{2}$$

Substituting OA = u, BC = v and OC = t

$$(u + v) \times t$$

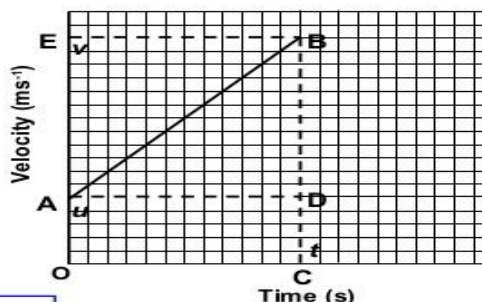
We get s =

From velocity – time relation

$$t = \frac{v - u}{a}$$

$$(v + u) \times \frac{(v - u)}{a}$$

$$s = \frac{(v + u)(v - u)}{2a} \text{ or } \boxed{2as = v^2 - u^2}$$



Velocity – time graph for a uniformly accelerated motion

CLOSURE:

(25

min)

Recapitulation of the concept by telling them to derive the equations of motion again in the class on their own and home assignment given.

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
 - What is the expression for area of a triangle and area of a rectangle?
 - What is the expression for area of a trapezium?
 - What does area of a velocity-time graph represent?
 - What does slope of a velocity-time graph represents?

- Evaluation/Assessment:
 - What is the expression for area of a triangle and area of a rectangle?
 - What is the expression for area of a trapezium?
 - What does area of a velocity-time graph represent?

DIFFERENTIATED CLASSROOM

Learners on the way What is the expression for area of a triangle and area of a rectangle?	Advanced Learners ⇒ What is the expression for area of a trapezium? ⇒ What does area of a velocity-time graph represents?
Materials needed/Resources: Chalk, duster, ncert	
Common Misconceptions: Confusion about the point “why we have not again break the area of graph into 2 parts” as we did in last derivation	Addressing the misconceptions: By making them understand this fact that in this case, we wanted the answer in a single term.

Home assignments:

(2 min)

⇒ Derive all the 3 equations of motion graphically.

LESSON PLAN 12 [2019-- 2020]



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd12	May 2019	Motion	Numerical on equations of motion (NCERT based)

Expected Learning Outcome:

Students will be able to

⇒ Solve the numerical related to all the 3 equations of motion.

Expected skill development:

Comprehension, understanding, critical thinking, problem solving

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What are the 3 equations of motion which are used to describe the motion of a body?

CONTENT (Discussion method and Demonstration by students) (20 min)

⇒ The following questions will be solved in the class by the students one by one :-

1. A moving train is brought to rest within 20s by applying brakes. Find initial velocity if the retardation due to brakes is 1.5m/s^2 ?
2. A wooden slab starting from rest, slides down an inclined plane of length 10m with an acceleration of 5 m/s^2 . What would be its speed at the bottom of the inclined plane?
3. A racing car has a uniform acceleration of 4m/s^2 . what distance will it cover in 2s starting from rest?

CLOSURE:

-
1. A train is travelling at a speed of 90km/hr. Brakes are applied so as to produce a uniform acceleration of -0.5 m/s^2 . Find how far the train will go before it is brought to rest.

Recapitulation of the concept by discussion of the above questions and home assignment given.

(5 min)

2. A bus starting from rest moves with a uniform acceleration of 0.1 m/s^2 for 2 minutes. Find speed acquires and distance travelled

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ When to use the first equation of motion in a given numerical? ➤ When to use the second equation of motion in a given numerical? ➤ When to use the third equation of motion in a given numerical? ➤ How to convert km/h into m/s? ➤ How to convert m/s into km/h?
➤ Evaluation/Assessment: How to convert km/h into m/s? • How to convert m/s into km/h?
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
A scooter acquires a speed of 36km/h in 5 s just after the start. Calculate the acceleration of the scooter?	A bus increases its speed from 30km/h to 90km/h in 5min. find the acceleration of the bus?
Materials needed/Resources:	
Chalk, duster, ncert	

Common Misconceptions:	Addressing the misconceptions:
Students confuses how to decide which equation should be used in any given situation.	By telling them again and again that the parameters given and asked in the situation will decide which equation will be used.

Home assignments:

(2 min)

1. A trolley, while going down an inclined plane, has an acceleration of 2cm/s^2 starting from rest. What will be its velocity 3s after the start?
2. A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of 3m/s^2 for 8s. How far does the boat travel during this time?
3. A ball is gently dropped from a height of 20m. If its velocity increases uniformly at the rate of 10m/s^2 , with what velocity will it strike the ground? After what time will it strike the ground?

LESSON PLAN 13 [2019 - 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd14	May 2019	Motion	Circular motion and numerical related to it.
Expected Learning Outcome: Students will be able to ⇒ Define uniform circular motion. ⇒ Quote examples of uniform circular motion. ⇒ Explanation of uniform motion as accelerated motion. ⇒ Solve numerical based on it.						
Expected skill development: Comprehension, understanding, critical thinking, problem solving						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

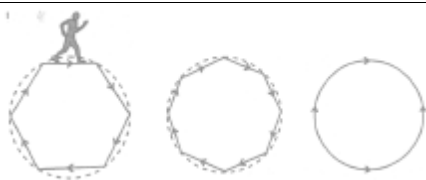
Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- Define circular motion.
- How it is different from straight line motion?

CONTENT (Discussion method and Demonstration by students) (20 min)

- ⇒ Define uniform circular motion and accelerated motion.
- ⇒ Example of uniform circular motion are:
 - (i) Motion of moon around the earth.
 - (ii) Motion of satellite around its planet.
- ⇒ Explanation of the fact that “uniform motion is an accelerated motion” by taking the example of a hexagonal path.



⇒ Expression for finding uniform speed of a body in circular motion.

Speed= total distance covered/ total time.

⇒ The following questions will be solved in the class by the students one by one:-

1. A artificial satellite takes 90 minutes to complete its revolution around the earth. Calculate the angular velocity of the satellite.
2. The wheel of a cycle of radius 50 cm is moving with a speed 14 ms^{-1} . Calculate the angular velocity of the wheel.
3. An artificial satellite takes 90 minutes to complete its revolution around the earth. Calculate the angular velocity of the satellite.

THINK-LINE: Observe the motion of tip of second's hand of a watch. Is it uniform or accelerated?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- Define uniform circular motion and accelerated motion.
- Give examples of uniform circular motion.

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Define uniform motion. ➤ Define uniform circular motion. ➤ Give examples of uniform circular motion.	
• Evaluation/Assessment: • Written assignment What changes continuously in uniform circular motion?	
DIFFERENTIATED CLASSROOM	

Learners on the way	Advanced Learners
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➤ Give examples of uniform circular motion.	➤ Why “uniform motion is an accelerated motion”? ➤ An artificial satellite takes 90 minutes to complete its revolution around the earth. Calculate the angular velocity of the satellite
Materials needed/Resources: Chalk, duster, NCERT	
Common Misconceptions: Students get confused that how uniform motion can be an accelerated motion.	Addressing the misconceptions: By explaining them the concept of change in direction of the body during circulation motion.

Home assignments:

(2 min)

1. What remains constant in uniform circular motion?
2. Is the motion of moon around earth uniform or accelerated?
3. An artificial satellite is moving in a circular orbit 42250km. Calculate its speed if it takes 24 hours to revolve around the earth.

LESSON PLAN [2019-- 2020]

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min Pd15	May 2019	motion	Revision test
Expected Learning Outcome: Students will be able to: ⇒ Realize and compute how much they understand, comprehend and solve questions based on the concepts studied in the chapter motion.						
Expected skill development: Comprehension, understanding, numerical ability, critical thinking						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

CONTENT (Assessment and Discussion method)

Students will do these questions in their notebook one by one and each question will be discussed in the class: (30min)

1) What is the slope of the body when it moves with uniform velocity?

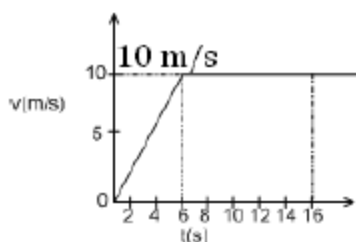
- (a) positive (c) negative
(b) zero (d) may be positive or negative

[1]

2) Derive the second equation of motion $S = ut + \frac{1}{2}at^2$ graphically?

[3]

3) The velocity time graph of runner is given in the graph.



(a) What is the total distance covered by the runner in 16s?

(b) What is the acceleration of the runner at $t = 11\text{s}$? [3]

4) A body starts from rest and moves with a uniform acceleration of 4m/s^2 until it travels a distance of 800m, find the final velocity?

(2)

5) Which of the following is the position time graph for a body at rest?

[1]

