



Week -21st to 25th December, 2020.

Number of Blocks: 1/2

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:

- Distance-time graph

INSTRUCTIONAL AIDS:

- You-tube links: <https://www.youtube.com/watch?v=Bf1EaJG3i50>
- <https://www.youtube.com/watch?v=Xq1Z3GcAQNo>
- NCERT Link: http://ncertbooks.prashanthellina.com/7_Science.html

LEARNING OUTCOMES:

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

- Plot and interpret graphs e.g., distance time graph
- Calculate speed of a body from the distance time graph

LESSON DEVELOPMENT:

Graphical Representation of Motion- A distance-time graph represents how the distance travelled by a moving object changes with time.

Method to Draw Distance-time Graph

To draw a distance-time graph, use a graph paper. For drawing the distance-time graph for a moving object, we require the readings of distances travelled by the object and the corresponding time values which have been obtained experimentally.

The distances travelled by car at various times are shown below:

Distance(km)	0	2	4	6	8	10
Time (min)	0	2	4	6	8	10

Making a distance-time graph:

1. Mark the x-axis and y-axis and divide them in equal quantities.

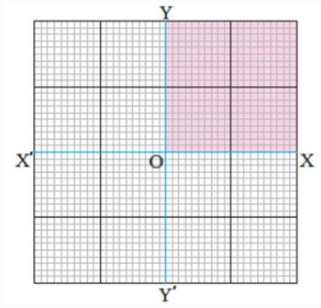


Figure 1: Take the first quadrant

2. Choose one scale to represent distance (for example, x-axis to represent distance where 1 km = 1 cm) and the other to represent time (for example, y-axis to represent the time where 1 min = 1 cm).

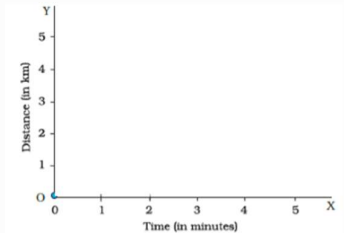


Figure 2: Choosing the scale

3. Mark the values of time and distance in the graph.
4. Mark the set of values of time taken and distance covered in that time by the object in the graph. For example, if 1 km is covered in 1 minute then mark 1 unit on both the x-axis and y-axis.

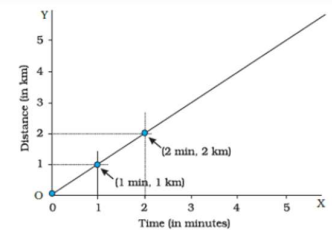


Figure 3: Marking the values for time and distance

5. Now draw lines parallel to x-axis and y-axis at the points that you have marked.
6. Mark the points where these lines intersect on the graph. These points show the position of the moving object.
7. Now join all the points of intersection and obtain a straight-line graph.
8. This is the distance-time graph of a moving object.

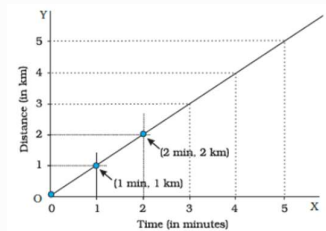


Figure 4: Obtaining a straight line graph

Since the distance-time graph for the motion of the car is a straight line, so from here we can conclude that the car is moving with a constant speed (or uniform speed).



The shape of the distance-time graph can be the following:

Shape of Graph	Interpretation
Straight line	The object has a uniform or constant speed
Parallel to time-axis	It is a stationary object
Curve shape	The object has a non-uniform speed

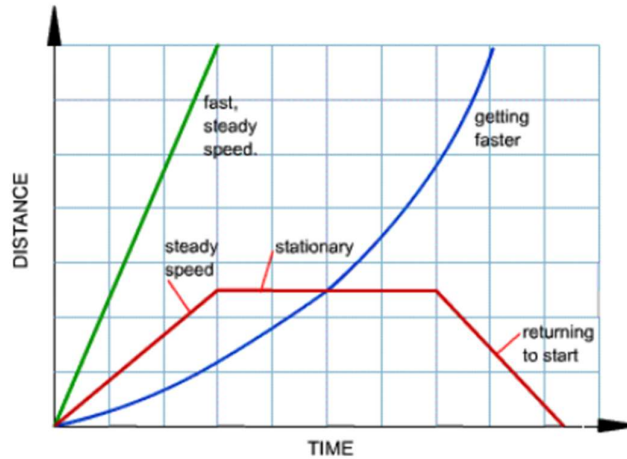


Figure : Distance-time Graphs

To find the speed of the distance-time graph

- Speed = distance/time = (final position of object – initial position of object)/time taken by object
- Also, the speed of the distance-time graph can be calculated by the **Slope** of a graph. The steeper the slope of the graph, the more is the speed of the object. For example, in the graph given below object A has a steeper slope. This means that object A is moving at a higher speed than object B.

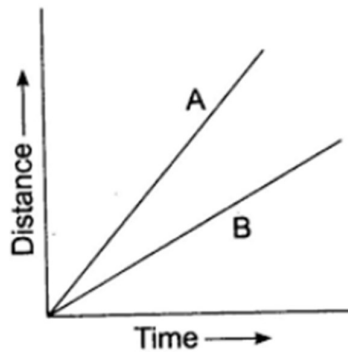
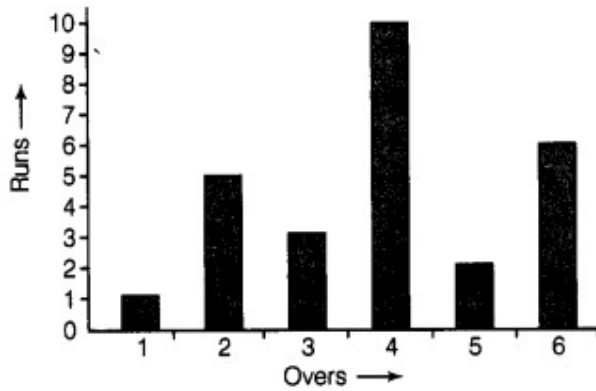


Figure: Distance-time graph of two objects

Other Types of Graph

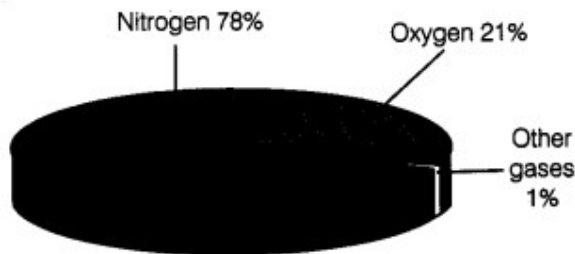
We generally see while reading newspapers, magazine, etc., that the present information is represented in various forms of graphs in order to make it interesting. These graphs generally bar graphs and pie chart as shown in the figure.

A diagram which shows information as thin rectangles (known as bars) of different heights is known as a bar graph. In this graph, the position and heights of the bars represent the values of the variable quantity about which information is being given.



A bar graph showing in the runs scored in six overs of a cricket match

A kind of graph or diagram which shows the percentage composition of something in the form of slices of a circle (the whole circle representing 100 per cent), is known as a pie chart.



A pie chart showing the composition of air

ASSIGNMENT-3

1. The table reads the distance-time data for a moving toy car.

Distance (in meters)	Time (in minutes)
20	2
40	4
60	6

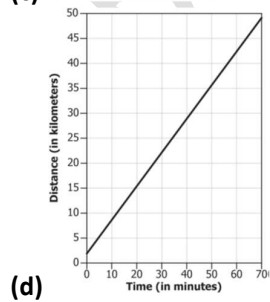
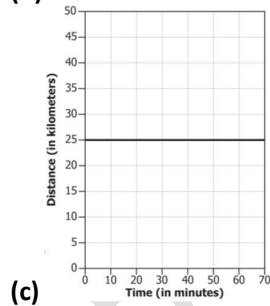
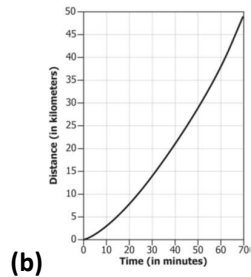
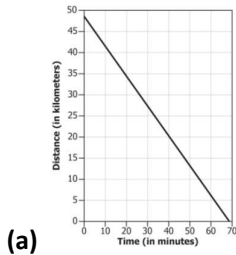
What is likely to be the shape of the plotted distance-time graph?

- (a) Circle
- (b) Square
- (c) Straight line
- (d) Triangle

2) The table represents the distance-time data of a cyclist participating in a race.

Time (in min)	Distance (in Km)
10	3
20	8
30	14
60	38

Which of these graphs would be similar to the plotted graph for the distance versus time data provided?

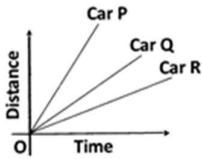


3. On which axis is dependent variable represented?

(a) x-axis

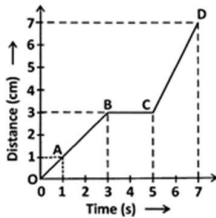
- (b) y-axis
- (c) On any axis
- (d) Depends on the data

4. Study the given distance-time graph for three cars P, Q and R in a race. Which of the three cars win the race?



- A) Car P
- B) Car Q
- C) Car R
- D) Both Q and R

5. The graph given below shows the position of an ant at different times. What is its average speed?



- A) 1.5m/s
- B) 3cm/s
- C) 1 cm/s
- D) 4.5 cm/s