Introduction

- An object can move in three types of motion straight line motion, circular motion or periodic motion.
- Some objects move fast while some object fast.

Slow or fast

- Same object can move slower or faster at different times.
- Covering the same distance in different times decides the speed of the speed of the objects.
- An object has higher speed which takes less time than that of another object covering same distance in comparatively more time.

Speed

- Total distance covered by an object in total time is called the speed of the object.
- Speed of an object is inversely proportional to the time taken by the object.
- Speed=total distance covered /total time taken
- If an object is moving along a straight line keeping a constant speed, then its motion will be uniform motion.
- If an object is moving along a straight line with a varying speed, then its motion will be non-uniform motion.

Measurement of time

- In ancient times, a day was the interval between two consecutive sun rises, a month was the interval between two consecutive two new moon and a year was the time taken by earth to complete one revolution of the sun.
- Common measuring devices are clocks or watches which gives measurement of time of much shorter interval than a day
- Working of clocks exerts periodic motion.
- Simple pendulum is the well-known example of periodic motions
- An object is said to have periodic or oscillatory motion when it complete its one oscillation that is when it starts from a mean position and get back to its mean position after completing its path.
- The bob of the pendulum completes its one oscillation when it starts from a mean position and get back to its original position. The total time taken by the bob of pendulum to complete one oscillation is its time period.
  - ➢ **Activity 1**
    1. Make a simple pendulum by a hanging a bob with a thread on a wall
    2. Mark the mean position of the bob on the wall when it is in rest.
    3. Now gently move the bob to one side that will be consider an end.
    4. Now release the bob from this end.
    5. Note that you should release the bob gently.

6. Now the time taken by the bob to come to its mean position with the help of a stopwatch.
7. Take the observation for 20 oscillations.
8. Now find the time period by dividing the number of oscillations i.e., 20 by time taken to complete these oscillations.
9. The obtained time will be the time period of the pendulum.
   - Quartz clocks or watches that have electric circuit with one or two cells give much more accurate time.

Units of time and speed

- Second (s) is the basic unit of time. Minutes(min), hours(h) are the lager unit of time.
- Speed is distance/time. Its unit is m/s or m/min or km/h

Measuring speed

- Knowing the distance and time taken to cover that distance you can calculate the speed.
  - ➢ **Activity2**
    1. On the ground draw a straight line with chalk.
    2. Now ask one of your friends to roll a ball in perpendicular direction to that line from some distance and mark a point there.
    3. Calculate the time ball takes from that point to cross that line. Also measure the distance between the straight line and the point your friend rolled that ball.
    4. Now calculate the speed by the formula speed= distance/ time.
    5. Now repeat the process with different groups and note down the time taken by the ball to cover that distance and out the speed.
- Just like the speed you can calculate the time and the distance an object covers with the same formula
    1. Distance= speed*time
    2. Time= distance/speed
- Microsecond and nanosecond are much smaller units of time used for scientific research.
    1. 1 nanosecond is one billionth of 1 second.
    2. 1 microsecond is one millionth of 1 second.
- Speedometer is used in automobiles to indicate the speed of vehicles.

Distance- time graph

- Through distance time graph we can calculate the distance of an object on an instant point.
- If an object is moving with a constant speed that is in uniform motion the distance-time bar graph will be a straight line.

distance time graph
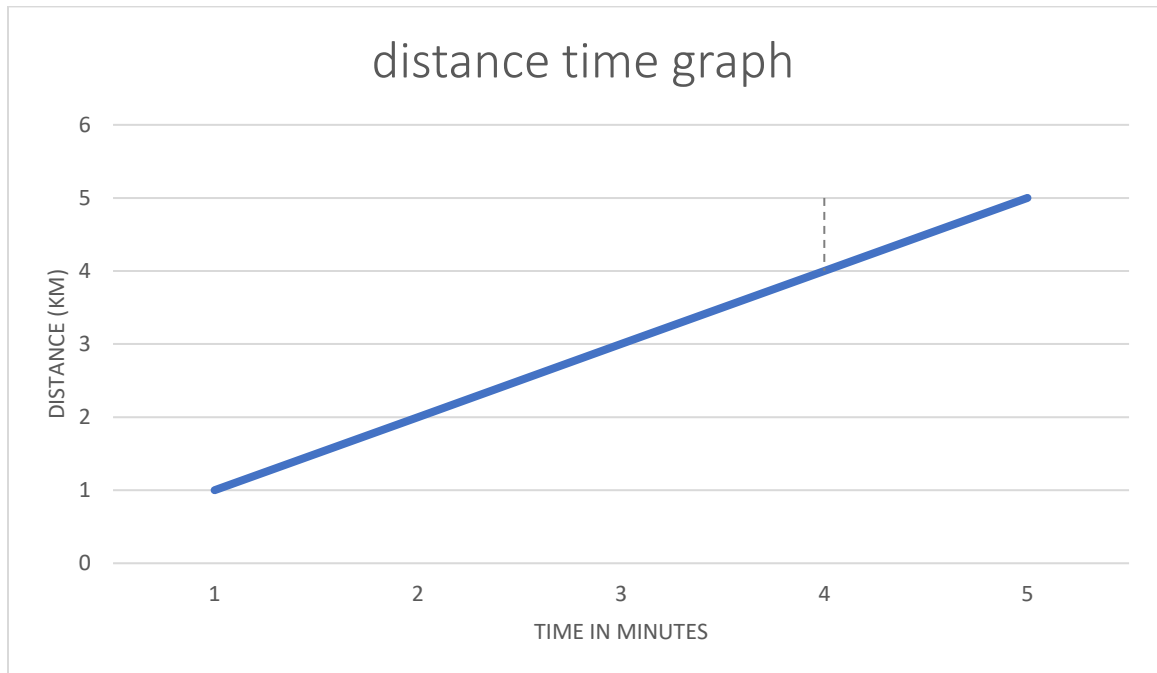
- The above graph shows a straight line that means the object is moving in uniform motion.
- In the above graph you can find the distance at any point of time.
  For example: in 2 minutes the distance covered by the objects is 2 km. and in 5 minutes 5 km is covered by the object.