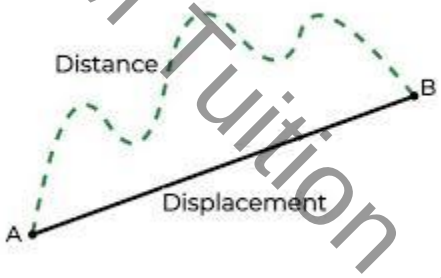
Distance, Displacement, speed and Velocity

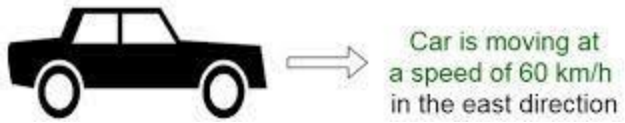
Distance and displacement are two quantities that may seem to mean the same thing yet have distinctly different definitions and meanings.

- **Distance** is a scalar quantity that refers to "how much ground an object has covered" during its motion.
- **Displacement** is a vector quantity that refers to "how far out of place an object is"; it is the object's overall change in position.



Speed and velocity are two quantities that may seem to mean the same thing yet have distinctly different definitions

- **Speed** is a scalar quantity that refers to "how fast an object is moving." Speed can be thought of as the rate at which an object covers distance. A fast-moving object has a high speed and covers a relatively large distance in a short amount of time.
- **Velocity** is a vector quantity that refers to "the rate at which an object changes its position."



- **Formula of measuring speed**

S= vt

Distance travelled (m)= speed (m/s) * Time (sec)

Some Typical Everyday Speeds

Activity	Speed (m/s)
Walking	1,5
Running	3
Cycling	6
Car	30
Train	80
Plane	500

Table 1. Speeds of Activities.

Factors affecting the speed of an object:

There are several factors that can affect the speed of an object, including the

- force acting on the object
- the mass of the object
- the surface it is moving on
- the presence of friction or other resistive forces.

- If we take an example of person walking then speed depend on age and Fitness of the person

Q1: A sprinter runs 200 m in 25 s. Calculate his speed.

Distance = Speed * Time

Speed= Distance/ time

Speed= 200/ 25= **8m/s**