

Unit 1 – Kinematics

Mechanics – the branch of physics that studies forces and motion.

Kinematics – the study of motion, without examining the forces which produce the motion.

Motion is relative to the observer. One person may see motion whereas another person may not see any motion for the same event. Motion is dependent on a person's frame of reference.

Frame of Reference – the coordinate system that someone perceives motion from. (Your frame of reference is different if you are standing on the side of the road vs. sitting in a moving automobile.)

Motion occurs if an object's position changes in relation to a reference point.

To accurately describe the motion of an object you must know:

- a.) point of reference
- b.) direction

What is the position of car A and car B?

Position (x) – the location of an object with respect to a reference point.

How far apart are the two objects?

Distance (d) – the separation between two objects.

Distance does not need a reference point.

Distance is a scalar quantity.

Scalar – measurement that does not have a direction.

If car A moves to -1 and then to +5, what is its (a.) distance traveled and (b.) displacement?

Displacement (Δd) – the change in an object's position.

Displacement is a vector quantity.

Vector – measurement that has a direction.

$$\Delta d = x_f - x_i$$