

Section A: Writing about Kinematics 1

Unit: One-Dimensional Kinematics

Level 1

Prerequisite: None

Points to:

Objectives:

- Be able to identify and write about each of these four main types of motion:

1. constant velocity motion
2. not moving
3. positive acceleration motion (speeding up)
4. negative acceleration motion (slowing down)

Also, be able to recognize and evaluate *motion maps* for each of these types of motion

**Part A: What is Kinematics****Kinematics**

The study of motion.

**Goal of Kinematics**

The goal of kinematics is to mathematically describe how things move, using precise terms, equations, quantities, graphs, and functions.

**Calculus**

The first math class taken in college that forms the basis for many fields in math and science.

Calculus is based upon the study of kinematics. It was discovered by Isaac Newton as he tried to solve kinematics problems.

**4 crucial types of motion:**

- moving a constant velocity
- accelerating (positive acceleration, increasing speed)
- decelerating (negative acceleration, decreasing speed)
- not moving

For each situation in questions **1 – 10**, say which of the four types of motion it represents:

- 1.** A person walking down the hallway
- 2.** A person sitting and watching TV all day.
- 3.** A car after a red light has turned green
- 4.** A car entering the highway
- 5.** A car driving on the highway at 55 mph.
- 6.** A parked car.
- 7.** A car stopping at a red light
- 8.** A sprinter just after a race begins.
- 9.** A horse that is slowing down.
- 10.** A marathon runner who runs every mile in exactly 6 minutes.

11. What word mean “The Study of Motion”?
12. What college math class is based on kinematics?
13. Come up with your own example of something moving at a *constant velocity*:
14. Come up with your own example of something with a *positive acceleration*:
15. Come up with your own example of something with a *negative acceleration* (slowing down):

### **Part B: Motion maps**

#### **Motion Map**

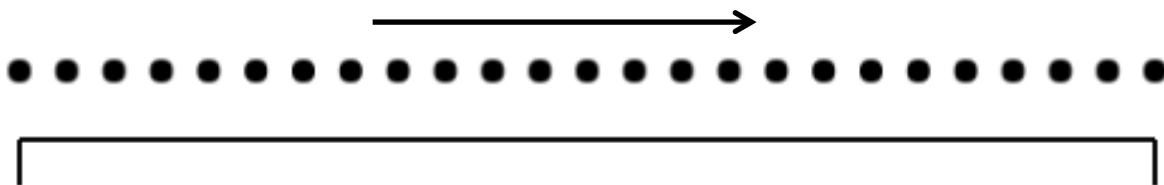
A motion map shows how something is moving with a series of dots.

Imagine that a single dot is made every second, showing where the object is moving.

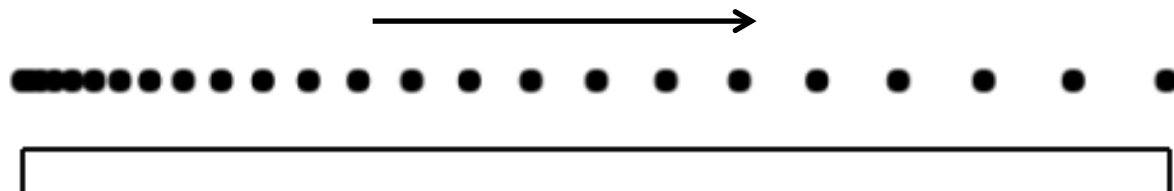
Motion maps are best understood *intuitively*, meaning that you should try to figure it out based on what makes sense to you easily.

Use these motion maps to answer three questions below:

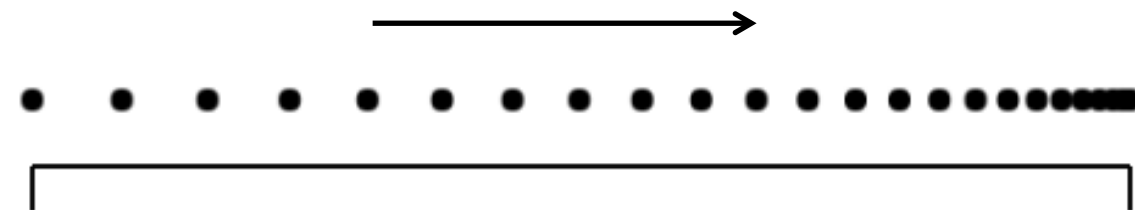
Motion Map A:



Motion Map B:



Motion Map C:



1. Which motion map shows something moving at a *constant velocity*? Why?
2. Which motion maps shows something *accelerating*? Why?
3. Which motion maps shows something slowing down? (negative acceleration) Why?