

Describing Motion with Position-Time Graphs

Read from **Lesson 3** of the **1-D Kinematics** chapter at **The Physics Classroom**:

- <http://www.physicsclassroom.com/Class/1DKin/U1L3a.html>
- <http://www.physicsclassroom.com/Class/1DKin/U1L3b.html>
- <http://www.physicsclassroom.com/Class/1DKin/U1L3c.html>

MOP Connection: Kinematic Graphing: sublevels 1-4 (and some of sublevels 9-11)

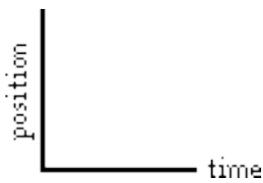
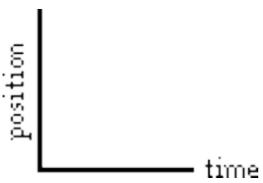
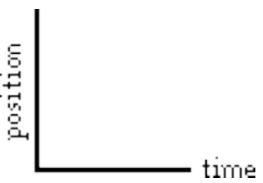
Motion can be described using words, diagrams, numerical information, equations, and graphs. Describing motion with graphs involves representing how a quantity such as the object's position can change with respect to the time. The key to using position-time graphs is knowing that the slope of a position-time graph reveals information about the object's velocity. By *detecting* the slope, one can infer about an object's velocity. "As the slope goes, so goes the velocity."

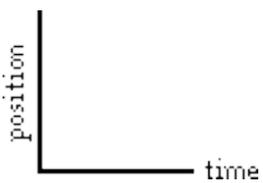
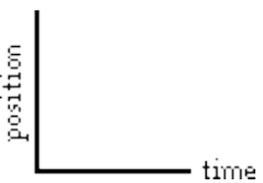
Review:

1. Categorize the following motions as being either examples of + or - acceleration.
 - a. Moving in the + direction and speeding up (getting faster) _____
 - b. Moving in the + direction and slowing down (getting slower) _____
 - c. Moving in the - direction and speeding up (getting faster) _____
 - d. Moving in the - direction and slowing down (getting slower) _____

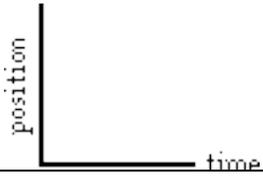
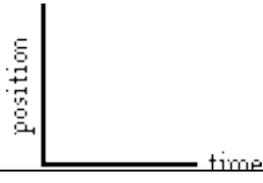
Interpreting Position-Graphs

2. On the graphs below, draw two lines/curves to represent the given verbal descriptions; label the lines/curves as A or B.

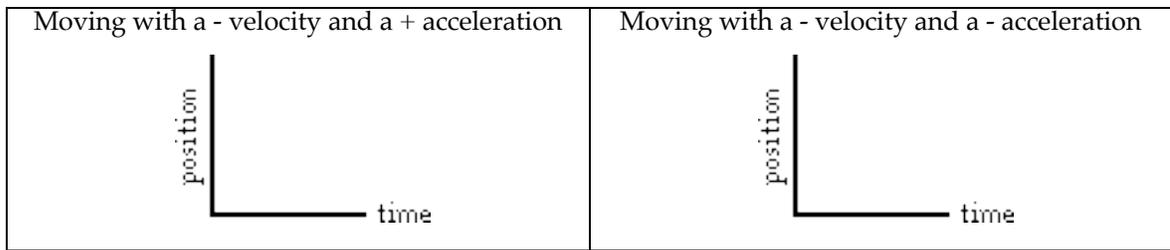
A Remaining at rest B Moving 	A Moving slow B Moving fast 	A Moving in + direction B Moving in - direction 
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A Moving at constant speed B Accelerating 	A Move in + dirn; speed up B Move in + dirn; slow dn 	A Move in - dirn; speed up B Move in - dirn; slow dn 
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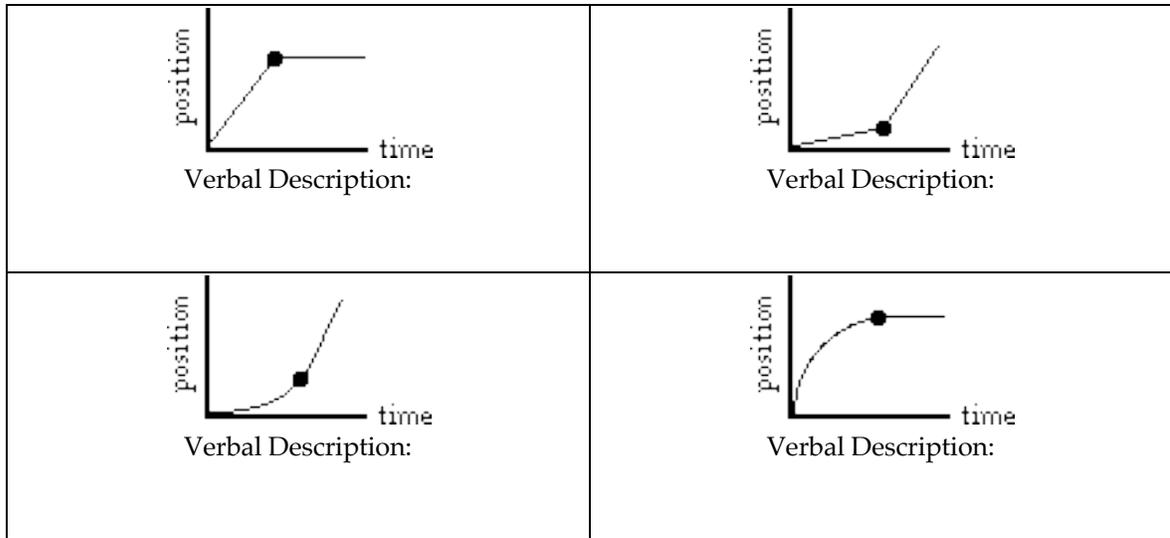
3. For each type of accelerated motion, construct the appropriate shape of a position-time graph.

Moving with a + velocity and a + acceleration 	Moving with a + velocity and a - acceleration 
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1-D Kinematics



4. Use your understanding of the meaning of slope and shape of position-time graphs to describe the motion depicted by each of the following graphs.



5. Use the position-time graphs below to determine the velocity. **PSYW**

