Kinematics

Kinematics is a branch of physics concerned with the description of the motion of objects. A moving object can be described by more than just words. Graphs, diagrams, and equations are among the other means of describing an object's motion. Consider a ball that is thrown upward from ground level. **Figure 1** depicts a diagram for the ball's motion. The position of the ball at 1 second intervals is represented by a dot. Each dot is labeled with a letter. The ball starts on the ground (**A**) rises upward to a peak position (**E**) and then falls back to the ground (**I**).

Figure 1

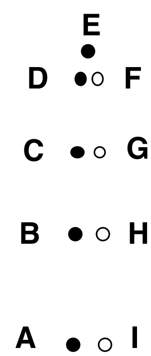

Figure 2 includes a graph that represents the position of the ball with respect to time. The position is measured relative to the ground. That is, ground level represents a position of 0 m.The graph represents the complete up and down motion of the ball.

Figure 2: Position vs. Time

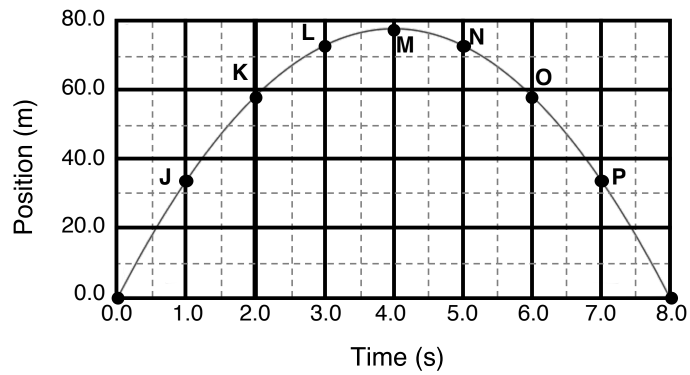

Figure 3 includes a graph that represents the velocity of the ball with respect to time. The **velocity** of an object describes how fast the object is moving and in what direction. When physicists represent the velocity of an object numerically, they often use a positive (+) or a negative (-) sign to describe the direction of the velocity. It is conventional to use a positive sign for an upward direction and a negative sign for a downward direction.

Figure 3: Velocity vs. Time