HOMEWORK FOR LAB 1:
INTRODUCTION TO MOTION

POSITION—TIME GRAPHS

Answer the following questions in the spaces provided.

1. What do you do to create a horizontal line on a position—time graph?
   In front of the motion sensor, remain at rest.

2. How do you walk to create a straight line that slopes up?
   You must walk away from the motion sensor at a constant speed.

3. How do you walk to create a straight line that slopes down?
   You must walk toward the motion sensor at a constant speed.

4. How do you move so the graph goes up steeply at first, and then continues up less steeply?
   Start quickly moving away from sensor, then continue moving at a slower speed away from sensor.

5. How do you walk to create a U-shaped graph?
   Begin at rest, walk back slowly for a time toward the sensor, then change direction, slowly and walk away from the sensor; then rest.
Analysis:

1. Explain the significance of the slope of a distance vs. time graph. Include a discussion of positive and negative slope.

   The slope of the line is directly related to motion. The steeper the motion, the steeper the slope. A positive slope occurred when the object moved away from the sensor and a negative slope occurred when moving toward the sensor.

2. What type of motion is occurring when the slope of a distance vs. time graph is zero?

   The object is standing still when the slope of a distance vs. time graph is zero. Yes

3. What type of motion is occurring when the slope of a distance vs. time graph is constant?

   When the slope of a distance vs. time graph was constant, the object was moving at a constant speed either forward or backward from the motion sensor.

4. What type of motion is occurring when the slope of a distance vs. time graph is changing?

   When the slope of a distance vs. time graph is changing, the object is moving. The amount of change is related to how slowly or quickly the object is moving.

5. Acceleration is the rate of change of speed. When speed is constant acceleration is zero (no change means the rate of change is zero). How does the slope of a distance vs. time graph change when there is acceleration?

   Acceleration is noted on the graph by peaks and valleys. Curved lines which have changing slopes

6. Describe how a person would have to move to create a distance vs. time graph as pictured.

   Starting at about 3 meters from the motion sensor, move quickly to 1.5 m; rest for 2 sec and move quickly to 0.5 m; rest for 2 sec; then move quickly away from the sensor to 3 meters (repeat).