

## Position-Time Graphs (p. 38 - 42)

### I. Using A Graph To Find Out Where & When

Position =  $\Delta$  displacement

1. Define the term position-time graph.

p. 38

Position-Time Graph - graph with data presented by plotting the time data on the horizontal axis and the position data on the vertical axis

2. What are two steps needed to create a position-time graph.

1. First plot the recorded positions.
2. Draw a line that best fits the recorded points.

3. The line on a position-time graph indicates exact positions of an object at all times.

Circle One :      True      False

↑ most likely positions

Can also be used to estimate beyond the graph.

4. Define the term instantaneous position.

Instantaneous Position - the position of an object at a particular instant

5. An instant of time lasts zero seconds.

Circle One :      True      False

What is the present?

6. List five ways to describe motion.

1. Words
2. Pictures
3. Motion Diagrams (Particle Models)
4. Data Tables
5. Position-Time Graphs

p. 40

7. What does the intersection of two lines on a position-time graph indicate?

Two objects have the same position.

8. If two objects occupy the same position, does that mean they are colliding? Explain.

No → Two objects could move the same distance or displacement over the same time and be in ~~the same~~ end positions.  
 (Track + Field runners in different lanes)

Interpolation  
- On the line.

Extrapolation  
- Beyond the line.

Velocity  
Acceleration

**II. Additional Problems** (p. 859 – 860) – Use a pencil!!!

- 1.
- What is the position of the bicycle at 1.00 min.? 35.0 m
  - What is the position of the bicycle at 3.50 min.? 35.0 m
  - What is the displacement of the bicycle between the times 1.00 min. and 5.00 min.? 0.00 m
  - Describe the motion of the bicycle.  
The bicycle is not moving.
- 2.
- What is the position of the car at 0.00 s? 40.0 m
  - What is the position of the automobile after 2.00 s has elapsed? 20.0 m
  - How far did the automobile travel between the times 1.00 s and 3.00 s?  
20.0 m
- 4.
- What is the position of the train traveling north at 6.0 h? 600.0 km
  - What is the position of the train traveling south at 6.0 h? -300.0 km
  - What is the distance between the trains at 6.0 h? 900.0 km
  - What is the distance at 10.0 h? 1,500 km  $N = 1,000 \text{ km}$   
 $S = -500 \text{ km}$
  - At what time are the trains 600.0 km apart? 4.0 hr
  - Which train is moving more quickly? North-bound Steeper = Faster
- 6.
- How far apart are the two runners at 10 min.? 1.50 km
  - At what time are they 1.00 km apart? 20.0 min.
  - How far apart are they at 50.0 km? 0.50 km
  - At what time do they meet? 40.0 min.
  - What distance does jogger B cover between 30.0 min and 50.0 min? 0.00 km  
(Not moving)
  - What distance does jogger A cover between 30.0 min and 50.0 min? 1.00 km