Vocabulary: Distance-Time and Velocity-Time Graphs

Vocabulary

- Displacement – overall change in position.
  - Horizontal displacement can be written as Δx, which is short for "change in x."
  - When displacement is along a horizontal line, displacement to the right is positive, and displacement to the left is negative.
  - For example, if a person walks 100 meters to the right, and then walks 30 meters to the left, the resulting displacement is 70 meters: Δx = 70 meters.
  - Displacement is a *vector* quantity because it includes a number and a direction.
- Distance traveled – the total distance connecting all the points on a path.
  - For example, if a person walks 100 meters to the right, and then walks 30 meters to the left, the distance traveled is 130 meters.
  - Distance traveled is a *scalar* quantity because it does not specify direction.
- Slope – a measure of the steepness of a line.
  - The slope tells you how the value on the vertical axis changes.
    - A *positive slope* () shows that the value increases from left to right.
    - A *negative slope* () shows that the value decreases from left to right.
    - A *zero slope* () shows that the value does not change.
  - You can calculate the slope between two points by dividing the vertical *rise* by the horizontal *run*.
- Speed – the rate at which an object is changing its position.
  - More informally, speed is a measure of how fast something moves.
  - Average speed is calculated by dividing the distance traveled by the elapsed time: *speed* = *d* / *t*.
    - For example, the average speed of a runner who travels 56 meters in 8 seconds is 56 ÷ 8 = 7 m/s.
  - Speed is a scalar quantity; it tells you nothing about direction.
  - Speed is never negative.
- Velocity – a vector quantity describing speed and direction of a moving object.
  - *Average velocity* is equal to displacement divided by elapsed time. For horizontal motion, this would mean: $v = \Delta x / t$.
  - Velocity is positive when motion is to the right or upward.
  - Velocity is negative when motion is to the left or downward.