Chapter 10 Section 1 – Describing Motion

Objective(s): Review motion in one dimension

**Vocabulary Terms: 1. Distance 2. Displacement 3. Speed 4. Average speed 5. Instantaneous speed 6. Velocity**

I. Motion

1. Motion occurs when an object changes its position.
2. Describing motion!
   1. Relative motion – how are you moving relative to your desk? How are you moving relative to Mars?
   2. Distance – How far an object has moved?
   3. Displacement – the distance and direction of an objects change in  position from a starting point.
3. Describing Speed!
   1. Speed – the distance an object travels per unit of time = rate.
   2. Calculating speed
      1. Speed = distance / time
      2. s=d/t
      3. SI units for speed = meters/second = m/s
   3. Measuring speed

1. Constant speed

a. Example = light

1. Changing speed
2. Average speed

a. total distance/total time

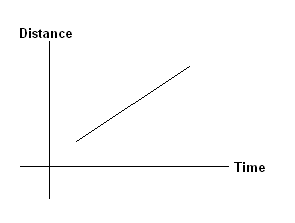
4. Instantaneous speed a. A speed at any given point in time.

II. Graphing Motion a. Distance-time graphs display the motion of an object over a period of

time. i. Example:







1. Steeper the graph (greater slope) the higher the speed.
2. Changing speed like standing still results in a graph with different  slopes:

III. Velocity

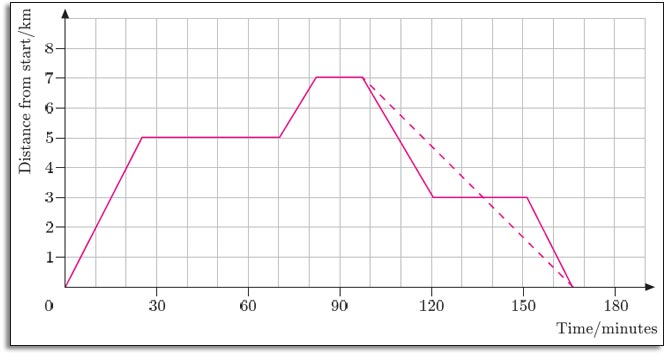
1. Speed with a direct component.
2. Velocity can change even as speed does not change because the direction  can be constantly changing. See the velocity vector on the following graph:

Section 2: Acceleration

**Vocabulary Terms: 1. Acceleration**

I. Acceleration = The rate of change of velocity and occurs when an object changes its speed, its direction, or both.

a. Positive acceleration = speed increases.









b. Negative acceleration = speed decreases.

c. Changing direction while keeping the speed constant also results in an acceleration. Examples:

1. Earth is accelerating constantly as it orbits the sun in a nearly circular

path. II. Calculating Acceleration

a. Acceleration = change in velocity / time 1. Change in velocity = final velocity – initial velocity = vf – vi

b. a=(vf–vi)/t c. SI units for acceleration = meters/second/second = m/s2 (meters per second squared).

Section 3: Motion and Forces

**Vocabulary Terms: 1. Force, 2. Net force, 3. Inertia**

I. Motion and Forces a. Force = a push or pull that one body exerts on another.

1. Forces can cause a change in motion of objects. 2. Forces do not always change velocity. 3. Forces can also cancel each other out.

b. Net Force = Two or more forces act on an object at the same time. 1. Unequal forces in opposite directions results in a net force in the direction of the larger force = unbalanced force.

c. Inertia and Mass 1. Newton’s First Law of Motion (Law of Inertia) Sir Isaac Newton (1642-1727)

a. Definition = an object moving at constant velocity keeps moving at that velocity unless a net force acts on it.









b. Examples: 1. An object at rest stays at rest unless a net force acts on it. 2. Car crash: occupants keep moving forward even though the car is slowing. Passengers will continue moving forward will the force of the steering wheel, dashboard, or windshield acts as a net force against them.