PhyzSpringboard: Speeding Thru Motion

Felix

REST STOP AND MOTION

Write brief definitions using words and graphs.

1. Rest

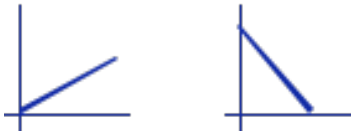
   position is not changing.

2. Motion

   position is changing.

3. Uniform Motion

   position is changing at a constant rate.



Complete each statement.

4. a. The rate at which position changes is called

   Speed

b. It can be written as

   change in position / change in time

c. and abbreviated as

   Δ x / Δ t

5. a. In uniform motion, _____speed_____ is constant. But so is the _____direction_____ of motion. In other words, an object in uniform motion has constant _____velocity_____.

b. The _____velocity_____ of an object is its _____speed_____ and its _____direction_____.

6. a. What common device can a driver use to monitor his or her speed?

   speedometer

b. How might a driver determine his or her velocity?

   speedometer and compass

7. a. Can two cars moving with the same ***speed*** collide? Explain.

   yes; head-on collision, for example

b. Can two cars moving with the same ***velocity*** collide? Explain.

   no

BEYOND UNIFORM MOTION AND ALL THE REST
Complete each statement.

8. a. Accelerated motion occurs when the velocity of an object is ***changing***.

b. If the velocity changes at a ***constant*** rate, the motion is called uniform accelerated motion

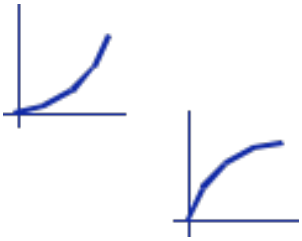
9. a. The rate at which velocity changes is called acceleration

b. It can be written as change in velocity / change in time

c. and abbreviated $\Delta v / \Delta t$

10. DANGER! Acceleration is arguably the single most difficult concept presented in high school physics.

a. Accelerated motion includes



i. speeding up

ii. slowing down: "decelerating"

iii. changing direction - so an object with constant speed can be accelerating "turning"

b. What control mechanisms on a car, if any, could be called "accelerators." Justify each answer.

Gas pedal ("accelerator") - can be used to speed the car up.
Brake pedal - can be used to slow car down.
Steering wheel - can be used to change direction of the car.

c. ***Deceleration*** is not the antonym (opposite) of ***acceleration***. Explain.

Deceleration means slowing down. Acceleration means speeding up, slowing down, or changing direction.

d. An object can be at rest and accelerating ***at the same time!***

An example will be shown later.