PHYSICS

Motion/Momentum Quiz

- **Velocity … [$v = d/t$]**
- **Acceleration … [$a = \Delta v/t$]**
- **Distance … [$d = \frac{1}{2} a t^2$]**
- **Momentum … [$P = mv$]**

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1. **How fast is Natalie going in mph if she travels at 120 ft in 6.0 sec (where is she going that fast? – no need to ask!)?**

   velocity = _____

2. **What is the acceleration of Molly if he is walking 14 girls from the main building to Smith Hall and goes from 0.00 mph to 80.0 mph in 0.50 second (and therefore makes it to class on time)?**

   acceleration =_____

3. **How high on a building (in meters) is Ellie, if he drops a dime and it falls 15.00 seconds before hitting the ground?**

   distance from earth =_____

4. **Emmy jumps from a rocket that is traveling at a horizontal velocity of 2,732.42839523901006442 87 km/hr. How far down (in meters) will he go if he falls 8 seconds miraculously without air friction (did you expect less than a miracle from him)?**

   distance =_____

5. **How fast will a tennis ball be going when it is caught at the exact height from which it was hit, if Evan hits it straight up at 88.888 km/hr?**

   tennis ball's velocity =_____

6. **Courtney is driving a 1,200. kg car at 100.0 km/hr. Shannon is driving a 4,800. kg cement truck. How fast will Shannon's truck have to move to have the same momentum?**

   truck's velocity =_____

7. **Ms. D'Arcy has a 13 ton railroad car which she is driving at 12 mph. It links to a stationary 26 ton car. They move slowly down the track after the linkage. How fast are they now going?**

   the railroad car plus the linked car's velocity =_____

8. **Matt is scuba diving. He is hungry. He eats a small, cute fish. He was going 5.0 m/s. The poor little, unsuspecting, innocent, fish was still. He ate it (I know. I too stand in protestation).**
   m_{big} = 5.00 kg
   m_{little} = 1.00 kg
   What is the net momentum before and after Matt's lunch? And what is his velocity with the small fish inside him?

   net momentum =_____ final velocity =_____

9. **Extra Credit: Mr. B. sees a steel pinball try to roll through a 'loop the loop'. The track for the steel ball is made from two parallel rods.**

   The ball is let go on the track. It doesn't make the loop!

   Mr. B. makes a solid track of aluminum. It works. Why???????? (Write answer on back.)