1. An 80 kg boater, initially at rest in a stationary 40 kg boat, steps out of the boat and onto the dock. If the boater moves out of the boat with a velocity of 2.5 m/s to the right, what is the final velocity of the boat?

2. A 70 kg person running with a speed of 4 m/s lands on a stationary cart of mass 25 kg. Determine the speed of the person-cart system after the person comes to rest on the cart.

3. A person of mass 50 kg is hold a ball of mass 15 kg. The two are initially at rest. The person now tosses the ball horizontally with a speed of 5 m/s. Determine the velocity of the person right after the ball is released.

4. A bomb of mass 5 kg moving with a speed of 25 m/s due east explodes into two pieces. A piece of mass 3 kg is observed to have a velocity of 30 m/s due east. Determine the velocity of the other piece. Determine the energy released in the explosion. (Energy released is equal to the change in the kinetic energy.)

5. A 2000 kg car moving with a speed of 18 m/s collides perfectly inelastically with a truck of mass 3500 kg initially at rest. Determine the velocity of the two vehicles right after the collision. Determine the change in the kinetic energy of the system.

6. A block of mass 5 kg moving with a speed of 25 m/s due east collides with another 4 kg block moving due west with a speed of 20 m/s. The two blocks stick after the collision. Determine the velocity of the blocks right after the collision. Find the change in the kinetic energy of the system.

7. A block of mass 15 kg moving with a speed of 15 m/s due east collides with another 20 kg block. The two blocks stick after the collision. Determine the velocity of the 20 kg block such that the two blocks stop right after the collision. Find the change in the kinetic energy of the system.