Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Conservation of Momentum-Short answer

1. A rifle recoils while firing a bullet. Why is the speed of the rifle small compared to the speed of the bullet?
2. A 1 kg chunk of putty moving at 1 m/s collides and sticks to a 5 kg bowling ball initially at rest. The bowling ball and putty then move with a momentum equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_kg m/s.
3. Two cars having the same mass move toward each other with the same speed. When they collide, what is their combined momentum?
4. You are driving down the highway and you hit a bird. Which undergoes the greater change in momentum? Which undergoes the greater force? Which undergoes the greater acceleration?
5. An astronaut is floating in outer space when he throws a wrench. If the wrench moves away at a speed of 30 m/s, describe the motion of the astronaut. Which direction is he moving? Is he moving faster, slower or the same speed as the wrench?

Conservation of Momentum Problems-Identify each as an explosion or collision problem. Then solve using the 4 column format. No work=no credit.

1. A rifle of mass 2 kg is suspended from the ceiling by strings. If it fires a bullet of mass .01 kg at a speed of 200 m/s, what is the recoil velocity of the rifle?
2. A 5 kg fish swimming at a speed of 1 m/s swallows another 1 kg fish that is at rest. What will be the speed of the larger fish after his “lunch”.
3. A 500 kg freight car moving at 2 m/s runs into a stationary 10,000 kg freight car. They couple and move away as one body. What is their final speed?
4. John and Mary are standing on frictionless ice skates. John has a mass of 70 kg, Mary 50 kg. If Mary pushes John and gives him a speed of 3.5 m/s, how fast is Mary now moving?