Name: _____ _____/ 15

Chapter 4.3 Homework
Conceptual Physics Parent Signature: _____

Reviewing Concepts

23. Distinguish between *elastic* and *inelastic* collisions. (1)

24. Classify each collision as elastic or inelastic. (1)

a. A dog catches a tennis ball in his mouth.

b. A ping-pong ball bounces off a table.

c. You jump on a trampoline.

d. A light bulb is knocked onto the floor and breaks.

25. Is momentum conserved during elastic collisions? Is it conserved during inelastic collisions? (1)

26. Why does bouncing nearly always cause a greater force than simply stopping during a collision? (1)

27. Cars that crumple in a collision are safer than cars that bounce when they collide. Explain why this is so. (1)

28. What is the secret to catching a water balloon without breaking it? Explain using what you know of physics. (1)

Solving Problems

16. A demolition derby is a car-crashing contest. Suppose an 800-kg car moving at 20 m/s crashes into the back of and sticks to a 1,200-kg car moving at 10 m/s in the same direction. Refer to the figure on page 100, and answer the below:

a. Is this collision elastic or inelastic? Why? (0.5)

b. Calculate the momentum of each car before the collision. (1)

c. What is the total momentum of the stuck-together cars after the collision? Why? (1)

d. What is the speed of the stuck-together cars after the collision? (1)

17. A 5-kg ball moving at 6 m/s collides with a 1-kg ball at rest. The balls bounce off each other and the second ball moves in the same direction as the first ball at 10 m/s. What is the velocity of the first ball after the collision? Refer to the figure on page 100. (1)

18. Yanick and Nancy drive two identical 1,500-kg cars at 20 m/s. Yanick slams on the brakes and his car comes to a stop in 1 s. Nancy lightly applies the brakes and stops her car in 5 s.

a. How does the momentum change of Yanick's car compare to the momentum change of Nancy's car? (0.5)

b. How does the impulse on Yanick's car compare to the impulse on Nancy's car? (0.5)

c. How does the force of Yanick's brakes compare to the force of Nancy's brakes? (0.5)

d. Calculate the stopping force for each car. (1)

19. Your neighbor's car breaks down. You and a friend agree to push it two blocks to a repair shop while your neighbor steers. The two of you apply a net force of 800 N to the 1,000-kg car for 10 s.

a. What impulse is applied to the car? (1)

b. At what speed is the car moving after 10 s? The car starts from rest. (1)