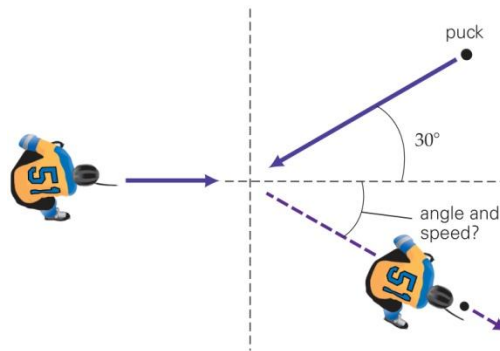


Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

- 1 At a basketball game, a 120-lb cheerleader is tossed vertically upward with a speed of  $4.50\text{ m/s}$  by a male cheerleader. (a) What is the cheerleader's change in momentum from the time she is released to just before being caught if she is caught at the height at which she was released? (b) Would there be any difference if she were caught  $0.30\text{ m}$  below the point of release? If so, what is the change then?
- 2 A small asteroid (mass of  $10\text{ g}$ ) strikes a glancing blow at a satellite in empty space. The satellite was initially at rest and the asteroid traveling at  $2000\text{ m/s}$ . The satellite's mass is  $100\text{ kg}$ . The asteroid is deflected  $10^\circ$  from its original direction and its speed decreases to  $1000\text{ m/s}$ , but neither object loses mass. Determine the (a) direction and (b) speed of the satellite after the collision.
- 3 In a noninjury chain-reaction accident on a foggy freeway, car 1 (mass of  $2000\text{ kg}$ ) moving at  $15.0\text{ m/s}$  to the right elastically collides with car 2, initially at rest. The mass of car 2 is  $1500\text{ kg}$ . In turn, car 2 then goes on to lock bumpers (that is, it is a completely inelastic collision) with car 3, which has a mass of  $2500\text{ kg}$  and was also at rest. Determine the speed of all cars immediately after this unfortunate accident.
- 4 A  $20.0\text{-g}$  bullet traveling at  $300\text{ m/s}$  passes completely through a wooden block, initially at rest on a smooth table. The block has a mass of  $1000\text{ g}$ . The bullet emerges traveling in the same direction, but at  $50.0\text{ m/s}$ . (a) What is the speed of the block afterward? (b) What fraction (or percentage) of the total initial kinetic energy is lost in this process?
- 5 A hockey player is initially moving at  $5.00\text{ m/s}$  to the east. Her mass is  $50.0\text{ kg}$ . She intercepts and catches on her stick a puck initially moving at  $35.0\text{ m/s}$  at an angle of  $30^\circ$  (▼ Fig. 6.40). Assume that the puck's mass is  $0.50\text{ kg}$  and the two form a single object for a few seconds. (a) Determine the direction angle and speed of the puck and skater after the collision. (b) Was this collision elastic or inelastic? Prove your answer with numbers.



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