

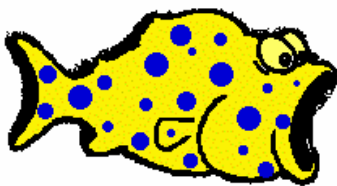
Collision Puzzlers

1. A 0.105-kg hockey puck moving at 48 m/s is caught by a 75-kg goalie at rest. With what velocity does the goalie slide on the ice after catching the puck?



2. A large fish eats a small fish according to the information provided below. What was the mass of the small fish?

BEFORE

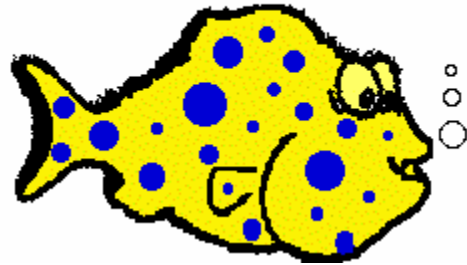


Mass = 4 Kg
V = + 7m/s



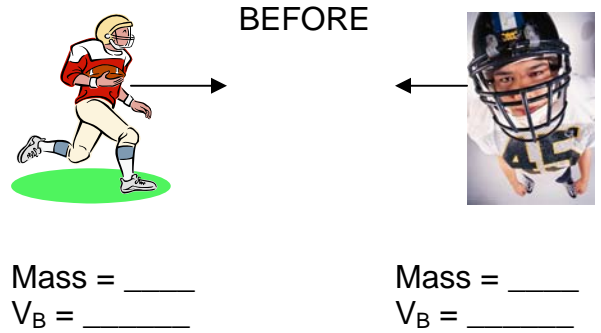
Mass = ?????
V = -3.0 m/s

AFTER

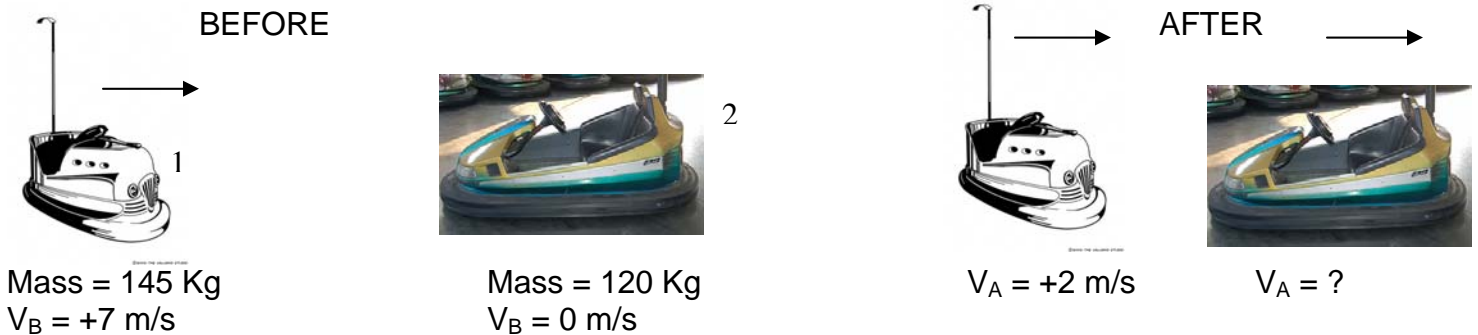


$V_A = +4 \text{ m/s}$

3. During a goal-line stand, a 75-kg fullback moving eastward with a speed of 8 m/s collides head-on with a 100-kg lineman moving westward with a speed of 4 m/s. The two players collide and stick together, moving at the same velocity after the collision. Determine the post-collision velocity of the two players. (CAREFUL: Be cautious of the +/- sign on the velocity of the two players.)



4. Bumper car #1 with a mass of 145 Kg moves at +7 m/s towards stationary bumper car #2 with a mass of 120 Kg that is sitting motionless. They strike and bounce off each other. After the collision bumper car #1 continues to move in the same direction at +2 m/s. What is the velocity of bumper car #2 after the collision?



5. Two soccer players are running towards each other. The Manchester United player has a mass of 107 Kg and is running East at 4.1 m/s. The Brazilian player has a mass of 97 Kg and is running west at 7.1 m/s. If they strike in an elastic collision, who wins the battle? (in other words, which player gets to keep moving in their original direction?) Prove using the law of conservation of momentum.