1. A large 10. kg medicine ball is caught by a 70. kg student on the track team. If the ball was moving at $4.0 \text{ m/s}$, how fast will the student be moving after catching the ball?

2. An 0.010 kg bullet is fired down the barrel of a gun, which is pointed to your left. The bullet accelerates from rest to a velocity of $400. \text{ m/s}$. What velocity does the 1.5 kg gun acquire as a result of this impulse? (Note that neither the bullet nor the gun is moving before the “collision.”)

3. A student is rushing to class and collides with a vice principal, who was standing still just before the collision. The vice principal has a mass of 100. kg, and the student has a mass of 50. kg, and had a velocity of $2.0 \text{ m/s}$ before the collision. What is the velocity of the entangled vice principal and student after they collide?
4. A 730 kg Mini runs into a stationary 2500 kg SUV. If the Mini was moving at \(10 \frac{m}{s}\), how fast will it be moving after making a completely inelastic collision with the SUV?

\[2.3 \frac{m}{s}\]

5. A 6.0 kg bowling ball moving at \(3.5 \frac{m}{s}\) to the right makes a collision, head-on, with a stationary 0.70 kg bowling pin. If the ball is moving \(2.77 \frac{m}{s}\) to the right after the collision, what will be the velocity (magnitude and direction) of the pin?

\[6.25 \frac{m}{s} \rightarrow\]

6. A pair of 0.20 kg billiard balls make an elastic collision. Before the collision, the 4-ball was moving \(0.50 \frac{m}{s}\) to the right, and the 8-ball was moving \(1.0 \frac{m}{s}\) to the left. After the collision, the 4-ball is now moving at \(1.0 \frac{m}{s}\) to the left. What is the velocity (magnitude and direction) of the 8-ball after the collision?

\[0.50 \frac{m}{s} \rightarrow\]

7. A 75 kg astronaut on a space walk pushes to the right on a 1000 kg satellite. If the velocity of the satellite after the push is \(0.75 \frac{m}{s}\), what is the velocity of the astronaut?

\[10 \frac{m}{s} \leftarrow\]