**Model:** This problem deals with a case that is the opposite of a collision. Our system is comprised of three coconut pieces that are modeled as particles. During the blow up or “explosion,” the total momentum of the system is conserved in the $x$-direction and the $y$-direction.

**Visualize:**

![Pictorial representation]

**Solve:** The initial momentum is zero. From $p_i = p_f$, we get

$$+m_1(v_{i1}) + m_3(v_{i3}) \cos \theta = 0 \text{ kg m/s} \implies (v_{i1}) \cos \theta = \frac{-m_3(v_{i3})}{m_1} = \frac{-m(-20 \text{ m/s})}{2m} = 10 \text{ m/s}$$

From $p_i = p_f$, we get

$$+m_2(v_{i2}) + m_3(v_{i3}) \sin \theta = 0 \text{ kg m/s} \implies (v_{i2}) \sin \theta = \frac{-m_3(v_{i3})}{m_2} = \frac{-m(-20 \text{ m/s})}{2m} = 10 \text{ m/s}$$

$$\implies (v_{i3}) = \sqrt{(10 \text{ m/s})^2 + (10 \text{ m/s})^2} = 14.1 \text{ m/s} \quad \theta = \tan^{-1}(1) = 45^\circ$$

The velocity is $14.1 \text{ m/s}$ at $45^\circ$ east of north.