5.34. **Model:** Use the particle model for the object.

**Solve:**  
(a) We are told that for an unknown force (call it $F_0$) acting on an unknown mass (call it $m_0$) the acceleration of the mass is 10 m/s$^2$. According to Newton’s second law, $F_0 = m_0(10 \text{ m/s}^2)$. The force then becomes $\frac{1}{2}F_0$. Newton’s second law gives

$$\frac{1}{2}F_0 = m_0a = \frac{1}{2}[m_0(10 \text{ m/s}^2)]$$

This means $a$ is 5 m/s$^2$.

(b) The force is $F_0$ and the mass is now $\frac{1}{2}m_0$. Newton’s second law gives

$$F_0 = \frac{1}{2}m_0a = m_0(10 \text{ m/s}^2)$$

This means $a = 20 \text{ m/s}^2$.

(c) A similar procedure gives $a = 10 \text{ m/s}^2$.

(d) A similar procedure gives $a = 2.5 \text{ m/s}^2$. 