

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 $a = 2.5 \text{ m/s}^2$.