

9/10 & 9/11

Entry



Cannon

$$\text{Weight} = \text{Force due to Gravity} = mg = 15,130 \text{ N}$$

$$\text{mass} = \frac{F}{g} = 15,130 \text{ N} / 9.8 \text{ m/s}^2 = 544 \text{ kg} = m_C$$

$$a_C = ?$$

Cannon Ball

$$\text{Weight} = \text{Force due to gravity} = mg = 140 \text{ N}$$

$$\text{mass} = \frac{F}{g} = 140 \text{ N} / 9.8 \text{ m/s}^2 = 14 \text{ kg} = m_B$$

$$a_B = 20 \text{ m/s}^2$$

3rd Law says: For every force there is an equal and opposite force

$$\text{Force Pair} \Rightarrow F_{CB} = -F_{BC}$$

Force on Cannon due to Cannon Ball = - Force on Cannon Ball due to Cannon

$$F_{CB} = \text{mass of cannon} \times \text{acceleration of cannon} = m_C a_C$$

$$F_{BC} = \text{mass of cannonball} \times \text{acceleration of Cannon Ball} = m_B a_B$$

$$m_C a_C = -m_B a_B$$

$$544 a_C = -14 \cdot 20$$

$$\frac{544 a_C}{544} = \frac{280}{544}$$

$$a_C = 0.5 \text{ m/s}^2$$

Kinematic Lab Part of Day