Example problems

(1) A car with a mass of 1000 kg is traveling at 10 m/s. If 6 sec later, it is traveling at 22.37 m/s what force is used?

$$Ft = m\Delta v$$

$$F(6s) = (1000kg)(22.37\ m/s - 10\ m/s)$$

$$F(6) = \frac{(22370 - 10000)}{6}$$

$$F = 2061.7\ N$$

(2) A father on a pair of skiis swoops down a mountain traveling 10 m/s & picks up his son and continues on. Dad has a mass of 85 kg and son has mass of 15 kg, what velocity did they have together?

Inelastic

$$m_1v_1 + m_2v_2 = (m_1 + m_2)v_f$$

$$(85kg)(10\ m/s) + (15kg)(0\ m/s) = (85kg + 15kg)v$$

$$850 + 0 = 100v$$

$$\frac{850}{100} = \frac{100v}{100}$$

$$\boxed{8.5\ m/s = v}$$

(3) A teacher ($m = 60\,kg$) throws a brick phone ($m = 12\,kg$) at 4 m/s. If the teacher is standing on ice, what is the teacher's velocity after she throws the phone?

Recoil

$$(m_1 + m_2)v_i = m_1 v_{1f} + m_2 v_{2f}$$

$$(60\,kg + 12\,kg)(0\,m/s) = (60\,kg)v_{1f} + (12\,kg)(4\,m/s)$$

$$0 = 60\,v_{1f} + 48\,\frac{kg\,m}{s}$$

$$-48$$

$$\frac{-48}{60} = \frac{60\,v_{1f}}{60}$$

$$-0.8\,m/s = v_{1f}$$