Impulse

Remember Newton's Second Law...

$$F = m \times a$$

$$F = \frac{m \times \Delta v}{t}$$

$$\vec{F} \times t = m \times \Delta \vec{v}$$

Impulse = Change in Momentum

How does this apply to...?

***contact time*

Striking a baseball...

Airbags

Catching a ball

Safety Net used by acrobats

1. A 100.0g golf ball leaves the tee at 100.0m/s. If the club was in contact with the ball for 0.0400s, determine the force exerted by the club.

2. A 150g baseball traveling at 24 m/s[W] is struck by a bat. It then travels at 40.0 m/s[E].
   Find (a) the impulse from the bat on the ball.
   (b) the contact time if the force from the bat was 7.0 x 10^3 N[E].

3. An unbalanced force of 2100N[up] acts on a 500.0kg rocket causing its velocity to go from rest to 220 m/s[up]. How long does the impulse last?

4. An impulse of 3200 Ns [W] is applied to a cannon ball. If the ball started at rest and reached a velocity of 320 m/s[W], what is the mass of the cannon ball?

5. A boat with mass 8.0×10^5 kg is moving at 0.1m/s[S].
   (a) What impulse is required to stop the boat?
   (b) What net force must act on the boat to stop it in 2.0 minutes?

6. A soccer goalie kicks the ball with a force of 1200N and the contact time is 8.0×10^{-3}s. If the 420g ball starts from rest, how fast is the ball now travelling?