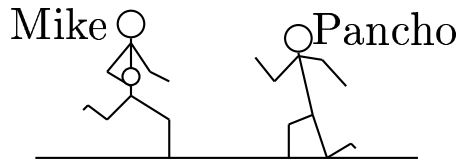


Mike(200 lb , 8 ft/s) Gonzales(100 lb , 16ft/s)



Mike(200 lb , 8 ft/s) Pancho(400 lb , 4ft/s)

Who will be more effective in stopping and hurting Mike?

- A) stopping: Gonzales and hurting: Gonzales.
- B) stopping: Pancho and hurting: Pancho.
- C) stopping: both and hurting: Gonzales.
- D) stopping: both and hurting: Pancho.

The sum of the initial momenta equals the final momentum of the two athletes who are now together; *i.e.*,

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2) v_f . \text{ From Mike: } p = m v = 1600 \text{ lbft/s.}$$

Gonzales:  $p = 1600 \text{ lbft/s.}$

So for both cases the sum of initial momentum vectors is 0, so  $v_f = 0$ .

Both cases are equally effective in stopping Mike.

$$\text{The kinetic energy, } K = \frac{m v^2}{2} = \frac{p^2}{2 m} .$$

Gonzales' weight is 4 times lighter than that of poncho.

Having the same momentum, Gonzales' kinetic energy is 4 times greater.

Upon collision, the kinetic energy is dissipated through work done on the opponent's body.

Thus  $K = F s$ , where  $F$  is the average force exerted on Mike,  $s$  is the distance of compression.

The greater the kinetic energy, the stronger the force and farther the compression is expected.

In turn the collision hurts Mike more.

Answer **C**.