Energy "old test" #2

Solutions.

1. $p = mv$

$= (10.0\ kg)(5.0\ m/s)$

$= 50\ kg \cdot m/s$

2. $w = mg$

$m = \frac{w}{g} = \frac{98.0\ N}{9.81\ m/s^2} = 10.0\ kg$

3.

change in momentum = Δp

$\Delta p = m(v_2 - u_1)$

$= m(5 - 3)$

$\Delta p = 2m$

4.

$$F\Delta t = m(v_2 - v_1)$$

$$F = \frac{1000\,kg\,(0 - 20\,m/s)}{10\,sec}$$

$$F = -2000\,N$$

2000 N opposite to the car's motion

5.. $F\Delta t = m(v_2 - v_1)$

Follow through vs no follow through.

$F\Delta t = m(v_2 - v_1)$

Same Same Same

increase .. v_2 increase what you want.

6 Crumple vs no crumple

$$F\Delta t = m(v_2 - v_1)$$

↑ increases

stays the same if crumple or not.

∴ F must ↓

F is what you feel.

7. Same direction as Ball.

$$F\Delta t = m(v_2 - v_1)$$

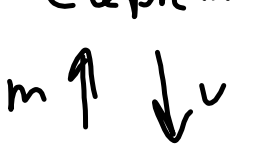
Same for all

if you can ↑ Δt you will decrease the Force your hands feel.

8. yes

momentum = $p = mv$

elephant



mouse

9. $F\Delta t = m(v_2 - v_1)$

$$F = \frac{0.144(-40 - 38)}{0.0008 \text{ sec}}$$

$F = -14\,040$ N

opposite to the direction the ball was pitched.

10. Momentum Before = Momentum After

$$B + S = B + S$$

$$6(1) + 2(-4) = 8v$$

$$6 - 8 = 8v$$

$$-0.25_{m/s} = v$$

direction of the smaller fish.

11. Momentum Before = Momentum After

$0.03(475) + 2.5(0) = 0.03(275) + 2.5v$

$14.25 + 0 = 8.25 + 2.5v$

$6 = 2.5v$

$+2.4 \text{ m/s} = v$

Same direction the bullet was shot at.

12. Entangled → increases Δt
decreasing Force felt

13. Momentum Before = Momentum After

$0.50(6) + 1(-12) = 0.50(-14) + 1v$

$3 - 12 = -7 + v$

$-2.0\ m/s = v$

2 m/s opposite to direction originally moving.

14. $F\Delta t = m(v_2 - v_1)$

$30(0.16) = 0.115(v_2 - 0)$

$4.8 = 0.115 v_2$

$+41.7 \text{ m/s} = v_2$

15. $F\Delta t = m(v_2 - v_1)$

$\Delta t = \frac{m(v_2 - v_1)}{F} = \frac{0.24(-2.4 - 3.8)}{-60}$

$\Delta t = 0.0248$ seconds.