

* Assume 1.5m acceleration distance

Baseball: $v = 80 \text{ mph} = 35.7 \text{ m/s}$
 $\Delta x = 1.5 \text{ m}$

$$(35.7 \text{ m/s})^2 = 0 + 2a(1.5 \text{ m})$$

$$a = 425 \text{ m/s}^2$$

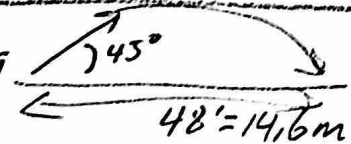
$$\Sigma F_{\text{Baseball}} = 0.145 \text{ kg} (425 \text{ m/s}^2) = 61.6 \text{ N} = \boxed{13.8 \text{ lb}}$$

Wiffle Ball $v \approx 90 \text{ mph} = 40.2 \text{ m/s}$
 $\Delta x = 1.5 \text{ m}$

$$(40.2 \text{ m/s})^2 = 0 + 2a(1.5 \text{ m})$$

$$a = 538 \text{ m/s}^2$$

$$\Sigma F_{\text{wiffle}} = 0.045 \text{ kg} (538 \text{ m/s}^2) = 24.2 \text{ N} = \boxed{5.4 \text{ lb}}$$

Shotput Assuming  $48' = 14.6 \text{ m}$ $14.6 \text{ m} = \frac{v_0^2 (\sin(2(45^\circ)))}{9.8 \text{ m/s}^2}$

$$v \approx 12 \text{ m/s}$$
$$\Delta x = 1.5 \text{ m}$$

$$v_0 \approx 12 \text{ m/s}$$

$$(12 \text{ m/s})^2 = 0 + 2a(1.5 \text{ m})$$

$$a = 48 \text{ m/s}^2$$

$$\Sigma F_{\text{Shotput}} = 6.3 \text{ kg} (48 \text{ m/s}^2) = 288 \text{ N} = \boxed{64.8 \text{ lb}}$$