

Experiment 2: Conservation of linear Momentum:

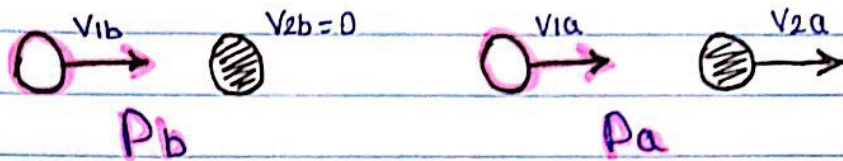
الهدف من التجربة: اختبار قانون حفظ كمية التحرك

The law: "The linear Momentum of an isolated system is conserved"

isolated:
- No External resultant force acts on the system.
- (مغزل)

$$\vec{P} = M \vec{V} \rightarrow \text{velocity}$$

Linear Momentum Mass



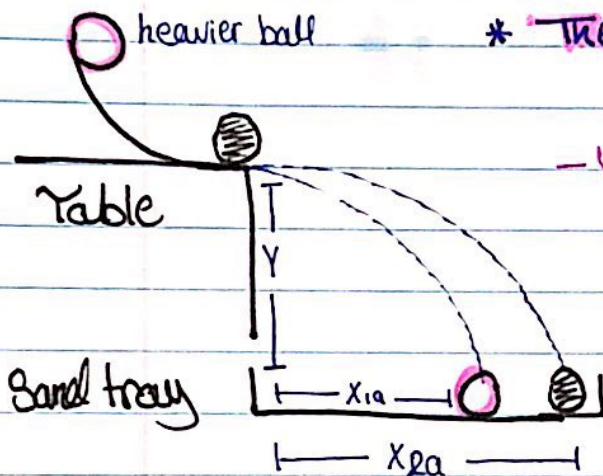
We will find The ratio between:

$$R = P_a / P_b$$

* Theo: it should equals "1"

- we can describe $y = \frac{1}{2} g t^2$

$$- T = \sqrt{\frac{2Y}{g}} \quad (\text{Time of flight})$$



$$- V_{1b} = \frac{X_{1b}}{\sqrt{\frac{2Y}{g}}}, \quad V_{1a} = \frac{X_{1a}}{\sqrt{\frac{2Y}{g}}}, \quad V_{2a} = \frac{X_{2a}}{\sqrt{\frac{2Y}{g}}}$$

$$R = \frac{M_1 V_{1a} + M_2 V_{2a}}{M_1 V_{1b}} = \frac{M_1 \bar{X}_{1a} + M_2 \bar{X}_{2a}}{M_1 \bar{X}_{1b}} = \frac{A}{B}$$

* Since The balls falls from the same distance so they have the same Time of flight.

The unc. ?

$$\frac{\Delta R}{R} = \frac{\Delta A}{A} + \frac{\Delta B}{B}$$

$$\Delta A = M_1 \Delta X_{1a} + X_{1a} \Delta M_1 + M_2 \Delta X_{2a} + X_{2a} \Delta M_2$$

$$\Delta B = M_1 \Delta X_{1b} + \Delta M_1 X_{1b}$$

$\Delta M =$ from the balance (least division)

$\Delta X = 0.1 \text{ m}$ (Because we have more than one read)