Experiment 2 : Conservation of linear Momentum :
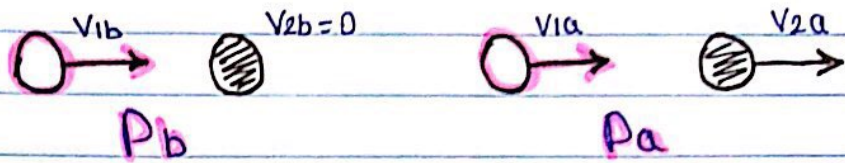
الهدف من التجربة : إثبات قانون حفظ كمية التحرك .

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

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

Linear Momentum   Mass

V_{1b} ⟶ $V_{2b} = 0$ V_{1a} ⟶ V_{2a} ⟶

P_b P_a
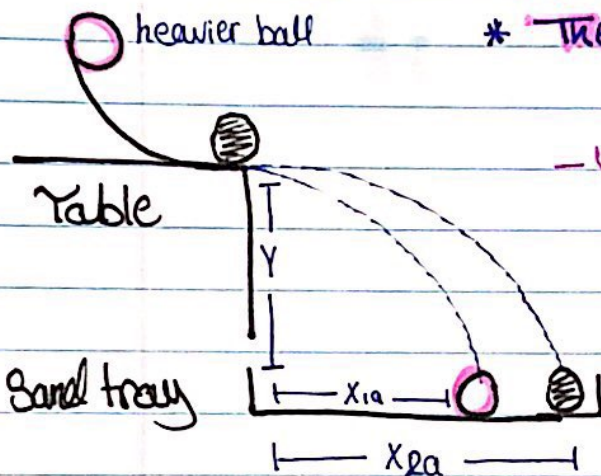
we will find The ratio between :
$$R = P_a / P_b$$
* Theo : it should equals "1"

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

heavier ball

Table

Sand tray

⊢— X_{1a} —⊣

⊢— X_{2a} —⊣

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

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

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

* 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)

$\Delta X = 6m$ (Because we have More Than one read)