

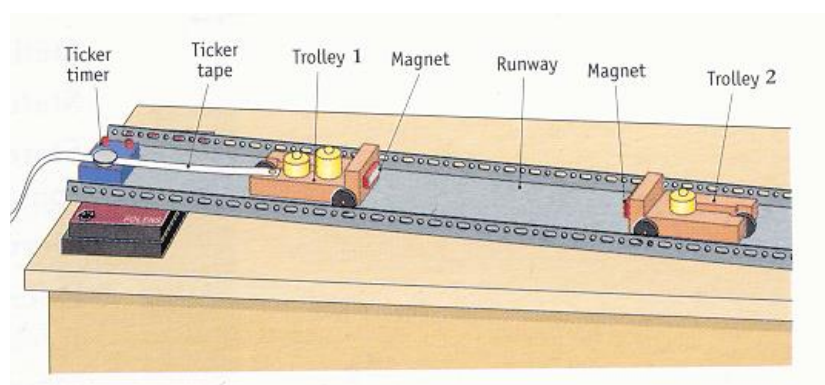
To Verify the Principle of Conservation of Momentum

Apparatus Needed: Runway, Two trolleys with Velcro attached, Power Supply, Ticker Timer, Ticker Tape, Balance, and Ruler.

Precautions:

- Raise one end of the runway to negate friction and ensure the trolleys travel at a constant velocity.
- Dust the runway to remove any dirt or grit.
- Use trolleys with frictionless wheels.
- Ensure there is enough ticker tape out for the trolley to use.
- Zero the balance before measuring the mass of the trolleys.
- Position the trolleys so that they will collide and move off together (Use Velcro).

Diagram:



Method:

- (1) Set up the apparatus as in the diagram.
- (2) Switch on the ticker tape timer and give Trolley A a gentle push.
- (3) After Trolley A and Trolley B have collided stop them before they reach the end of the runway.
- (4) Stop the timer and remove the tape.
- (5) Take ten spaces on the tape *just before collision* and divide this distance by 0.2 because each space is 0.02 of a second. Record this result as velocity before collision U_1 of Trolley A.
- (6) Take ten spaces *immediately after collision* and divide this distance by 0.2. Record this result and velocity after collision V .
- (7) Measure the mass of each trolley using a zeroed balance.
- (8) Now find the momentum before and after collision using the formula:

Questions:

(1) Describe the apparatus which might have been used in the experiment.

(2) Describe how the time interval was measured.

(3) Using the data: (i) calculate the velocity of body A before and after collision, and (ii) show how the experiment verifies the principle of conservation of momentum.

(4) How were the effects of friction and gravity minimised in the experiment?

(5) Give one precaution which might have been used to improve the accuracy of this experiment.