

## Thought-provoking practical physics workshop

## فکر انگیز عملی طبیعیات

### Lesson: Energy-Momentum Transfer

Why do we often see cars stuck to a tree or light pole after a road accident? How does one win a game of billiards by hitting the cue ball in order to score the object ball? What happens during a game of golf?

#### Objectives

The purpose of this experiment is to develop an understanding of the transfer of linear momentum. We will observe elastic and inelastic collisions of a variety of objects using video tracking.

#### How to conduct the experiment

Apparatus: Custom built wooden cradle for suspension of objects; Objects: golf ball, snooker ball, ping pong ball, sim sim ball, sandbag, foam ball; Camera; Tripod.

Software: Tracker, MS Excel

Two objects will be suspended by strings in the custom built wooden cradle. The objects will be made to collide and their motion will be recorded on the camera. The video will be analyzed using Tracker and MS Excel.



#### Exploration Points

1. Conduct the experiment with three similar objects, e.g. three golf balls.
2. Conduct the experiment with three different objects, e.g. two golf balls, one ping pong ball, etc
3. Propose and investigate a scenario in which the collisions are perfectly inelastic.
4. Propose a method to calculate the actual energy lost during these collisions.
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