Curiosity Guide #303
Momentum

Accompanies Curious Crew, Season 3, Episode 3 (#303)

Newton's Cradle

Investigation #1

Description

This fun activity demonstrates momentum in action.

Materials

- Newton's Cradle

Procedure

1) Carefully pull back a single ball.
2) Let the single ball swing into the four stationary balls.
3) What happens?
4) Repeat the process, swinging two balls, and then three balls, into the system.
5) What do you notice?

My Results

Explanation

Whenever something is moving, it has momentum. The faster the object is moving, the more momentum it has. The more mass an object has, the more momentum the object has as well. So, momentum is equal to an object's mass times its velocity.

In an elastic collision, the initial momentum of the first object plus the initial momentum of the second object is equal to the final momentum of the first object plus the final momentum of the second object. In a Newton Cradle, the first ball has momentum, which strikes the stationary remaining balls, so the final momentum can only be the movement of one ball.

In a collision, momentum transfers from one object to the next, but the total momentum stays the same in the system. This is referred to as the Law of Conservation of Momentum, and both momentum and kinetic energy are conserved. So long as there is no additional external force acting on the system, the total momentum does not change.

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