Curiosity Guide #303
Momentum

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

Bowling Ball Bangers

Investigation #9

Description

What happens when two bowling balls collide?

Materials

- 1 old 6-pound bowling ball
- 1 old 16-pound bowling ball
- Drill bit and drill
- Screw eyes
- Rope

Procedure

1) Drill a centered hole into each of the bowling balls.
2) Twist a screw eye into each ball.
3) Suspend two ropes from the top of a swing set or suspended board.
4) Hang the 6-pound ball so that it is stationary.
5) Hang the 16-pound ball, pull it back, and let it swing into the lighter ball.
6) What happens?
7) Try swinging the 6-pound ball into the 16-pound ball.
8) What happens?

My Results

Explanation

Whenever something is moving, it has momentum. The faster the object is moving, the more momentum the object 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. The swinging bowling ball has momentum, which strikes the stationary bowling ball, so the final momentum will be impacted by the mass of the striking ball. If a less massive ball gets hit, it will travel further, but if a more massive ball is struck it will travel less far.

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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