Curiosity Guide #303
Momentum

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

Bouncy Bouncy Balls

Investigation #2

Description

What happens when momentum transfers from one object to another?

Materials

- Basketball
- Tennis ball

Procedure

1) Take the balls outside onto a large, clear, paved area.
2) Demonstrate that each ball can bounce by itself.
3) Carefully place the tennis ball on top of the basketball and drop them at the same time.
4) What did 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.

When the balls were dropped separately and struck the ground, the momentum went back into the same ball and the ball bounced up. However, when the tennis ball and basketball struck the ground together, the momentum from the basketball's larger mass and velocity was transferred to the tennis ball. This transfer of momentum made the tennis ball bounce extremely high.

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.

Think about it: All objects have mass! When that mass starts moving, like a baseball that has just been hit, we say that the baseball has **momentum**. The faster an object is moving, the more momentum it has. Also, the more mass an object has the more momentum it has. A racecar driver has more momentum than a bicyclist, but a jet pilot has even more momentum. The larger objects have more total mass and potentially more speed. Momentum can even be transferred from one object to another like when a bowling ball strikes the pins and gives them momentum, too. Strike!

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