Curiosity Guide #601
Collisions

Accompanies Curious Crew, Season 6, Episode 1 (#601)

Newton's Cradle

Investigation #4

Description

Newton's Cradle is just a toy—or so you thought!

Materials

- Newton's Cradle

Procedure

1) Pull back the first ball on each end and hold them at a similar height.
2) Predict what will happen when the balls are released.
3) What did you notice?
4) Now try to release just one ball so it collides with the group. Then try releasing 2, 3, and even 4 balls on one side.
5) What do you notice?

My Results

Explanation

When the opposing balls are dropped, each ball bounces back up, which is an example of a head-on elastic collision. Although the balls don't bounce back to their starting points because some of the kinetic energy is transferred into heat and sound, much of the kinetic energy is still there. When a ball is dropped from only one side, its momentum is conserved, causing a single ball on the opposite side to swing away. The same is true with any combination of balls released, showing that the momentum is conserved, just as much of the kinetic energy is conserved in elastic collisions.

Think about this: Imagine if you could drop a ball on the ground and it bounced all the way back up to your hand. That would be incredible! We would call that a perfect elastic collision because none of the kinetic energy would get transferred. We don't really see perfectly elastic collisions but instead see some combination of elastic and inelastic collisions. When a deflated ball drops to the ground, the ball may bounce a little, but some of the kinetic energy gets transferred into the thud sound it makes and its change in shape and temperature. The deflated ball's collision is more inelastic because it doesn't bounce much.

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