



Curiosity Guide #309

Inertia

Accompanies Curious Crew, Season 3, Episode 9 (#309)

Tennis Ball Challenge

Investigation #5

Description

Can your friends do this seemingly simple task? You'll be surprised!

Materials

- Empty 5-gallon bucket
- Tennis ball
- Volunteers who are willing to run
- Video camera

Procedure

- 1) Place the empty bucket in a large, open area.
- 2) Challenge a friend to run by the bucket as fast as possible, dropping the tennis ball inside the bucket as he or she runs by.
- 3) Video-record the attempts.
- 4) Watch the attempts in slow motion.
- 5) What do you notice?

My Results

Explanation

Did the runners find that dropping the tennis ball into the bucket was difficult while in motion? When the runner is holding the ball, the *normal force* balances the force of *gravity*. The ball continues to move in the same direction of the runner, even after the ball is released. Although the ball begins to fall because of the force of gravity, the ball does not fall straight down. This is a good example of Newton's First Law of Motion, the Law of Inertia. Newton's First Law of Motion says that an object that is still or at rest will stay at rest. An object in motion will keep moving, unless another force acts on it.

Do some more investigation: Because the ball is in motion with the runner, the ball will continue to move forward while falling. Keep experimenting to discover when the runner must drop the ball to make the ball land in the bucket.

Think about this: Have you ever been riding in the back of a car, and the driver turns suddenly? Do you remember what that felt like? Because you were moving forward with the car, your body was also experiencing a forward motion. When the car suddenly turned, your body still tried to go in that same original direction. You may have even been pushed into the door or into someone sitting beside you. Remember, according to Newton's Law of Inertia, an object in motion will keep going in the same direction and with the same speed until a new force happens. Thank goodness you were wearing your seatbelt!

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