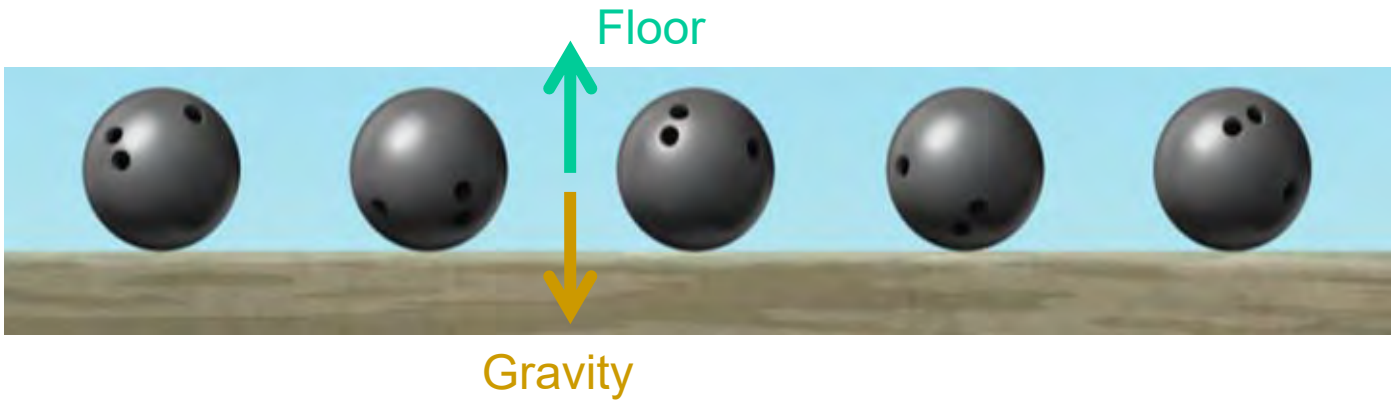
Law of Inertia
Part 2

National Science Foundation
WHERE DISCOVERIES BEGIN

Animation
Physics

Law of Inertia, Part 1

Newton's Law of Inertia says:
An object moves with constant, uniform motion until acted on by an unbalanced force.

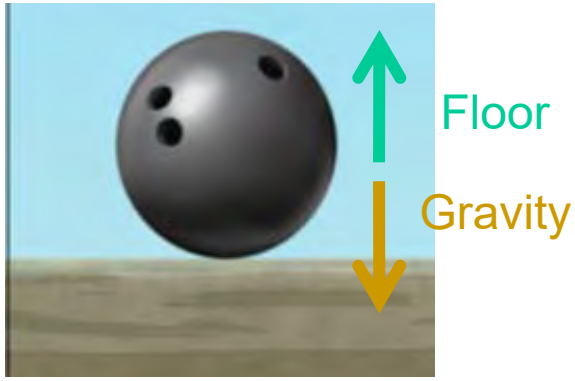


The bowling ball moves with constant speed*

*In reality, there is a small unbalanced force, friction, that does slow the ball's speed.

Law of Inertia, Part 2

Newton's Law of Inertia also says:
An object at rest (not moving) remains at rest until acted on by an unbalanced force.

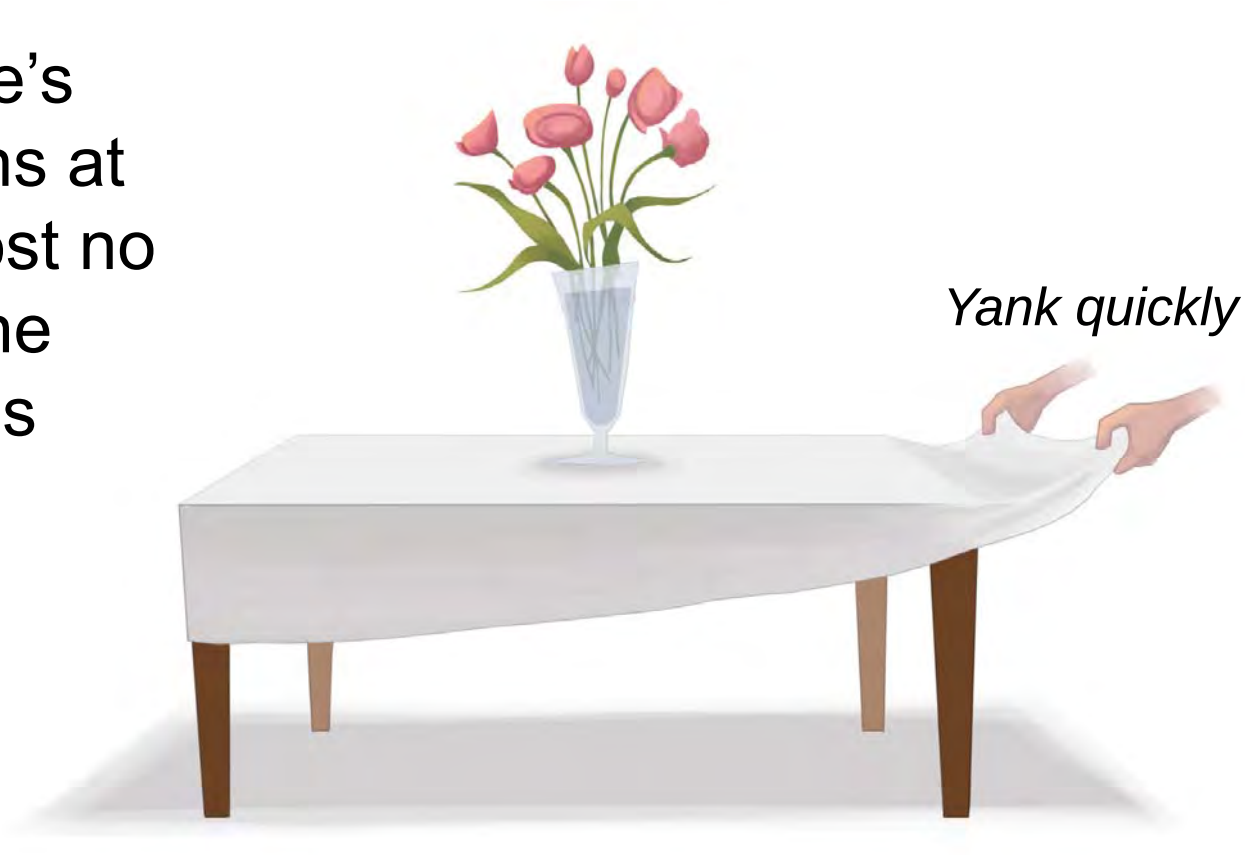


A stationary bowling ball remains stationary until some unbalanced force comes along.

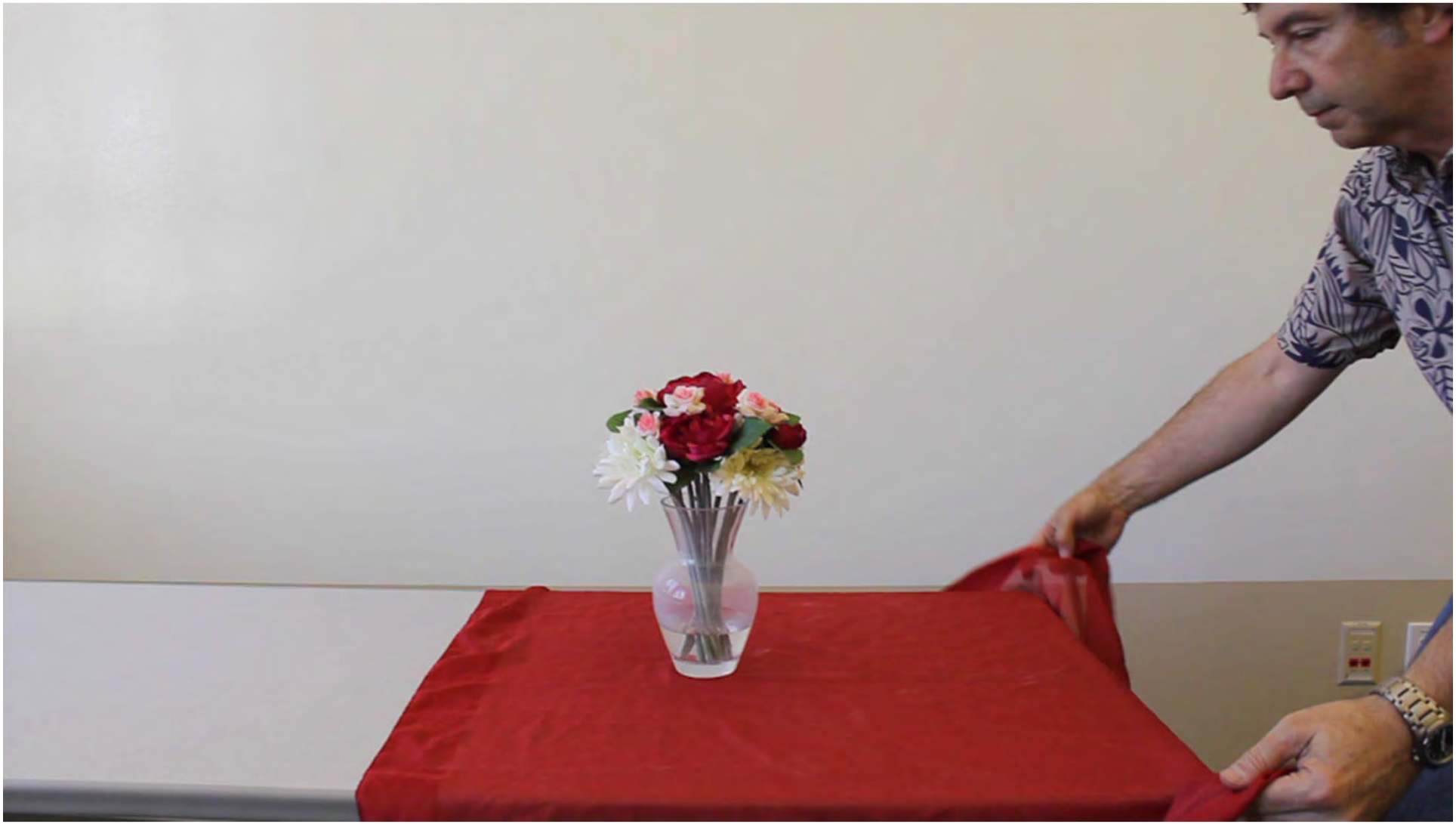
This is nothing more than motion at constant speed but with speed equal to zero.

Tablecloth Pull

Due to the vase's inertia it remains at rest since almost no force acts on the vase if one pulls quickly and straight.



Tablecloth Pull

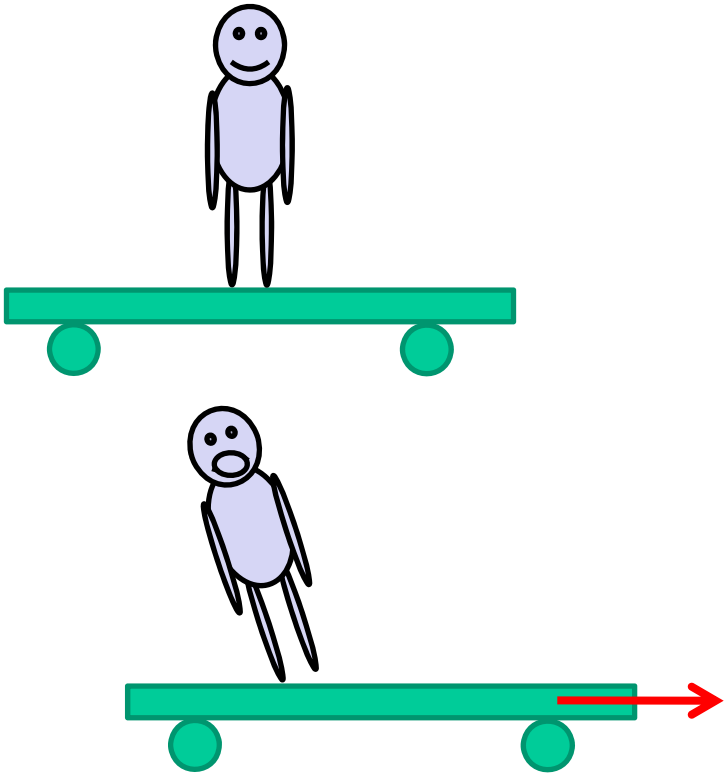


Shopping Cart Inertia

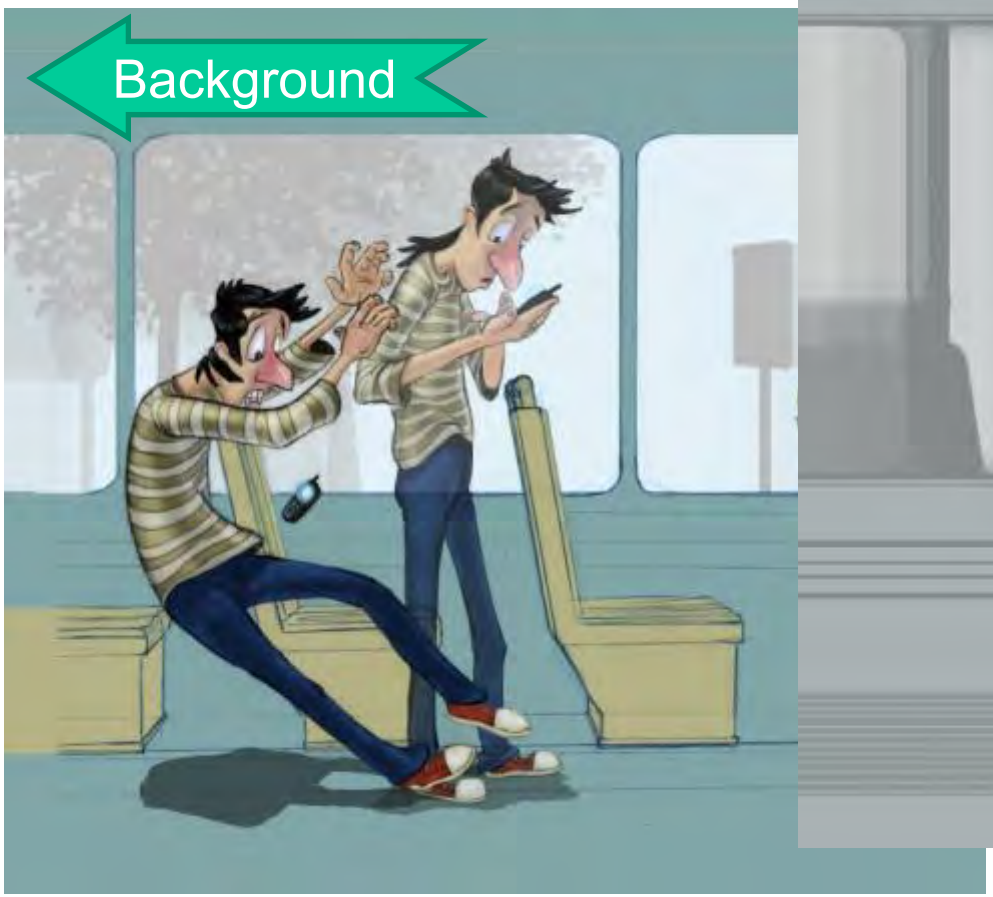
https://www.youtube.com/watch?v=u5--s0qASUE

Riding the Bus

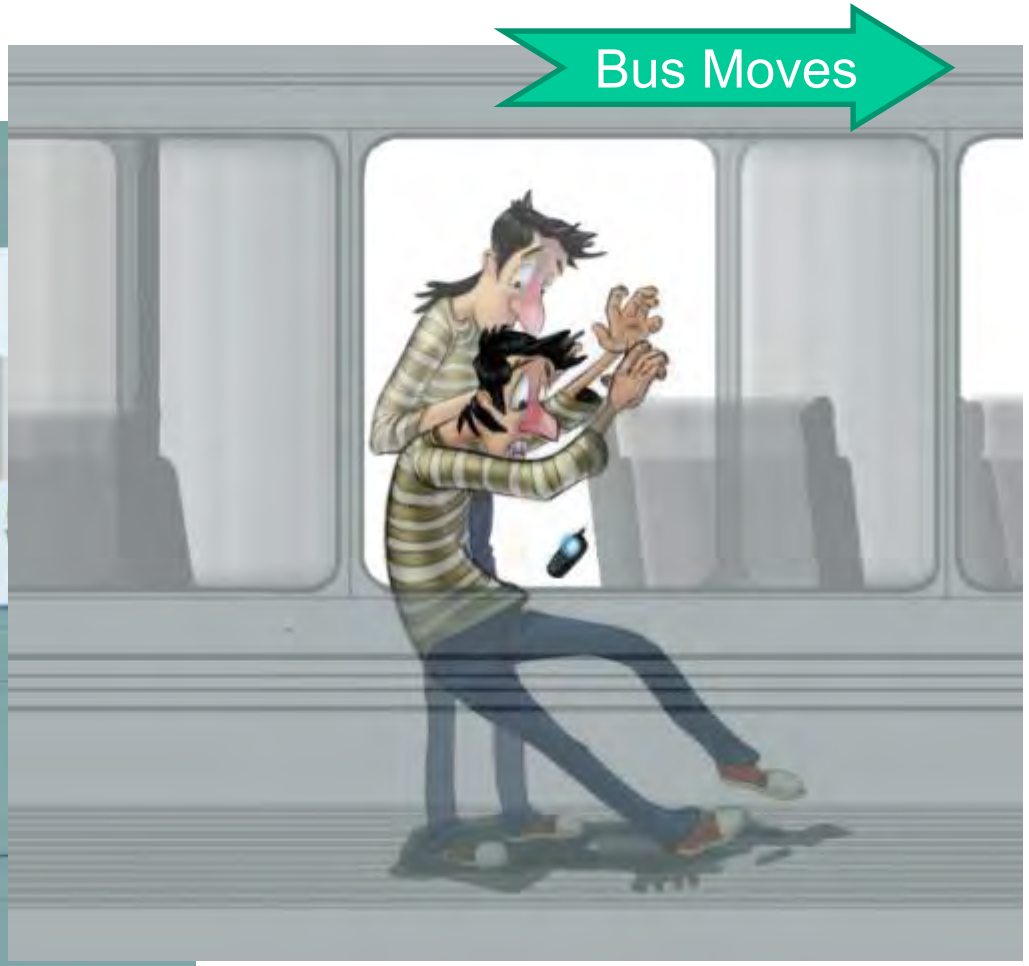
The bus is stopped but then suddenly starts moving.
You remain stationary, seemingly thrown backwards.



Frame of Reference

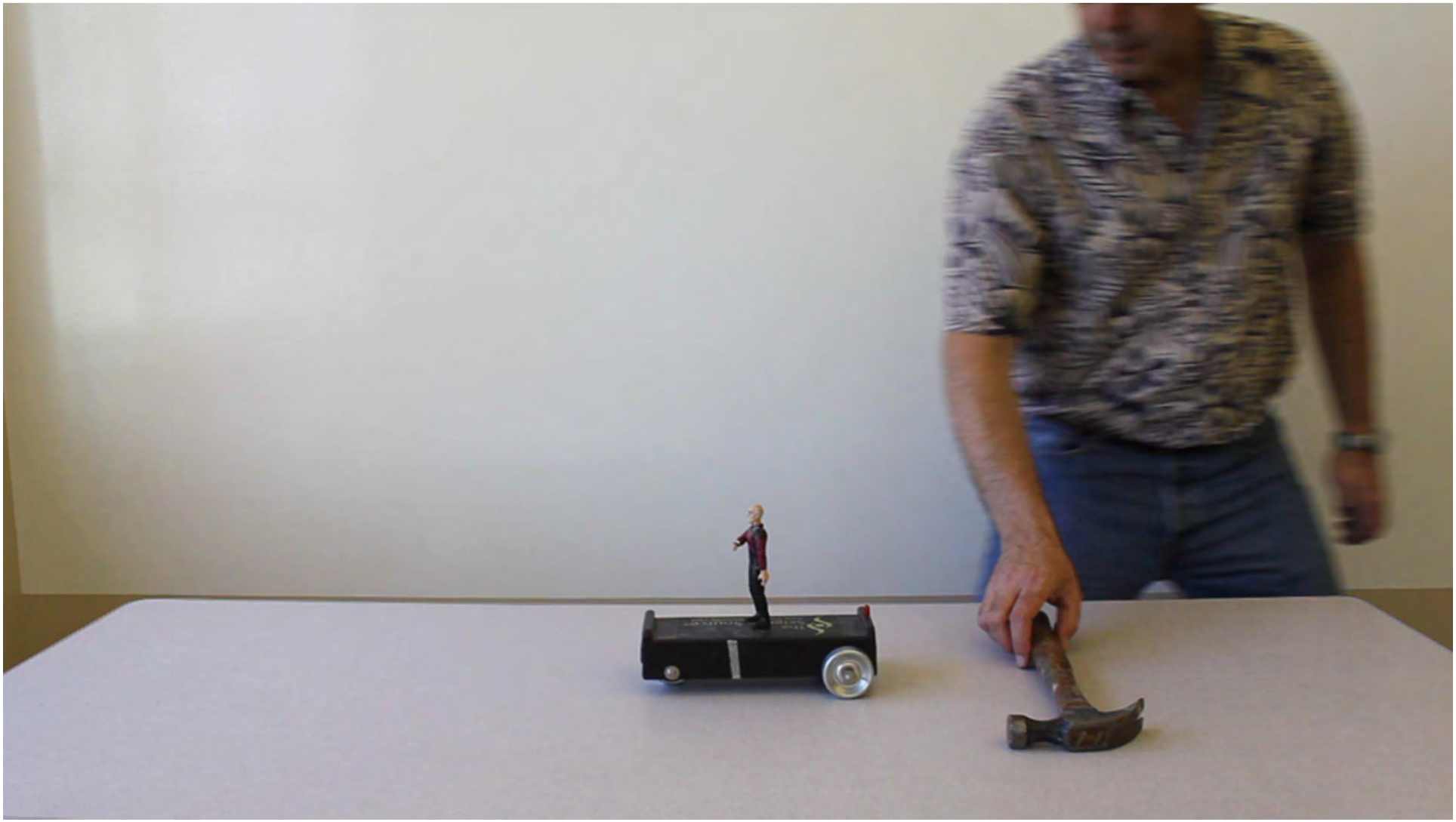


As seen by observer sitting in the bus



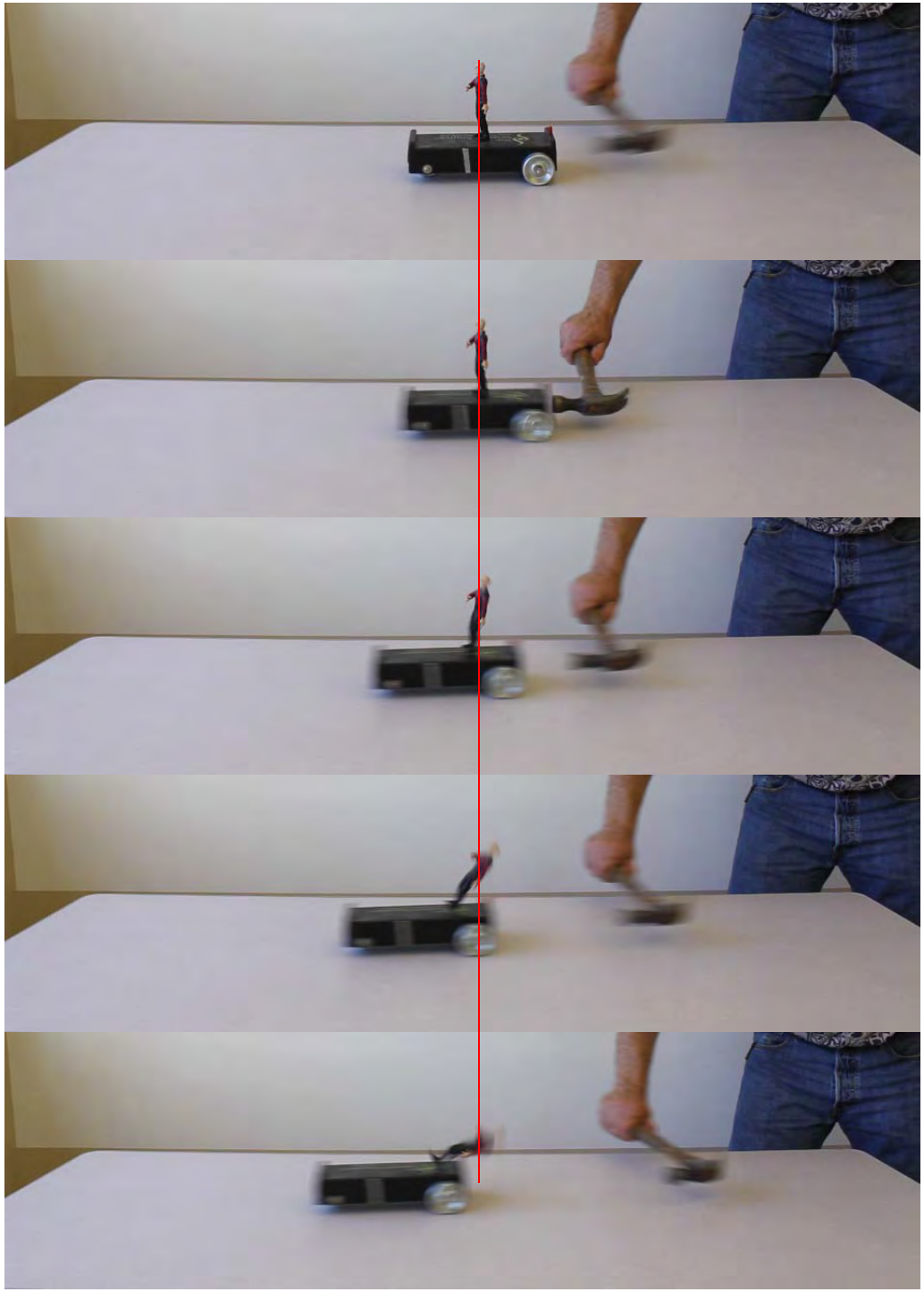
As seen by observer on the street

Frame of Reference



Frame of Reference

The center of the character remains stationary in the POV of the camera as the character falls and lands behind the cart.



Frame of Reference

Let's watch in slow motion

Summary

- The Law of Inertia also says, “An object at rest (not moving) remains at rest until acted on by an unbalanced force.”
- Pulling a tablecloth out from under a vase demonstrates the Law of Inertia, with the vase remaining at rest since there’s little force on it.
- When the camera accelerates away from a stationary character, the character seems to be thrown backwards, as in the bus example.