

Summary:

We found that the top string will break if it is pulled slow and a bottom string breaks if it is pulled fast. Sometimes the top string breaks when pulled “fast” because what some people thought was “fast” was really slow. The “fast” wasn’t fast enough. Newton’s first law says an object in motion will stay in motion unless acted upon by an outside force and an object at rest will stay at rest unless acted upon by an outside force. When the bottom string breaks it is because when we pull quickly there isn’t enough time for the force to be transferred to the top string. The cannon ball keeps the force from being transferred because the cannon ball has lots of inertia (mass). Sometimes people call Newton’s first law the law of inertia. Inertia is the resistance to change in motion. The amount of inertia is determined by measuring the mass. The more mass, the more resistance to the change in motion.

We learned how martial art students break boards. The first time the board was not moving and the hand, moving fast broke through the board. The board that was at rest broke rather than move. The more inertia the board has the easier it is to break because it has more resistance to the change in motion. In the second situation the board was moving and when it hit the head it broke so that it could keep moving.

Errors happened in this experiment if the string was not tied well enough to make the string break. There was also an error in “fast” and “slow” pulls. Some people’s fast was not fast enough to cause the bottom string to break.

Improvements might include using a machine to pull the string, tying the knots the same way for everyone and giving everyone a chance to break a board over their head.