

Pendulum on Trolley

Apparatus

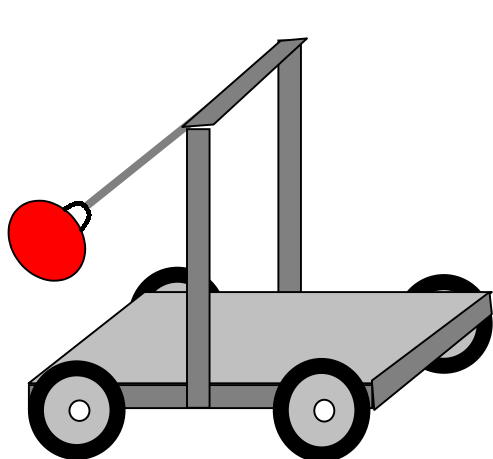
simple pendulum (not too big) mounted on a trolley

Action

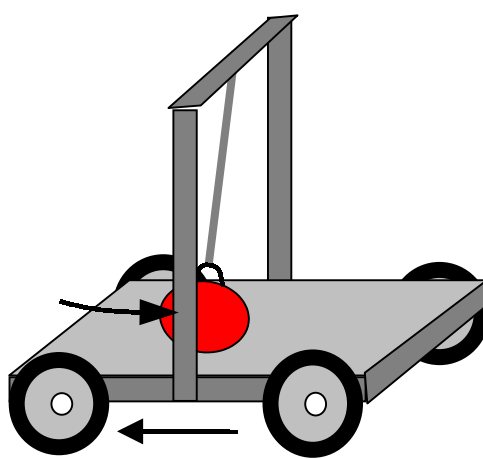
The students swing the pendulum bob out while holding the base still. They then let go of the base and release the bob. They should observe the motion of the pendulum and the trolley.

The Physics

When the bob is raised and the base held still the total momentum of the pendulum-trolley system is zero. When you release the bob it swings down, gaining momentum. In order for momentum to be conserved the trolley must move the opposite way, which it does. As the pendulum swings back and forth the trolley will roll back and forth in the opposite direction, until friction eventually stops it.



release bob



bob and pendulum move
in opposite directions

Accompanying sheet

Pendulum on Trolley

Hold the trolley still and swing the pendulum bob out.

Now let go of the trolley and release the bob.

What happens to the trolley?
Why does it behave like this?