FROM TEACHERS FOR TEACHERS

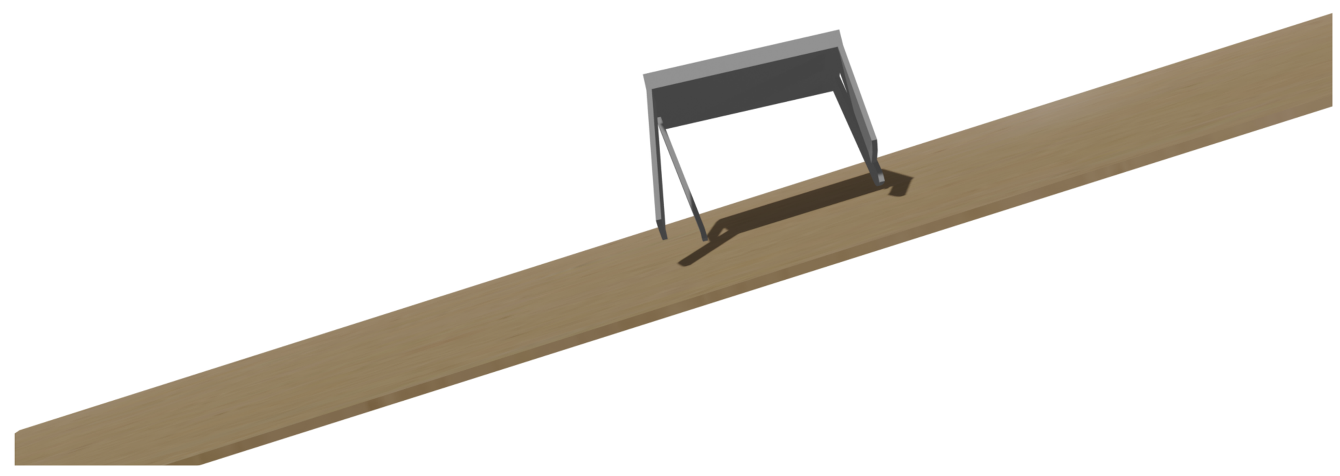
STEM WITH ARTS

projects combining STEM with other disciplines,
i.e. arts, music, sports, history, etc.

François Balty | University of Liège | Liège | Belgium

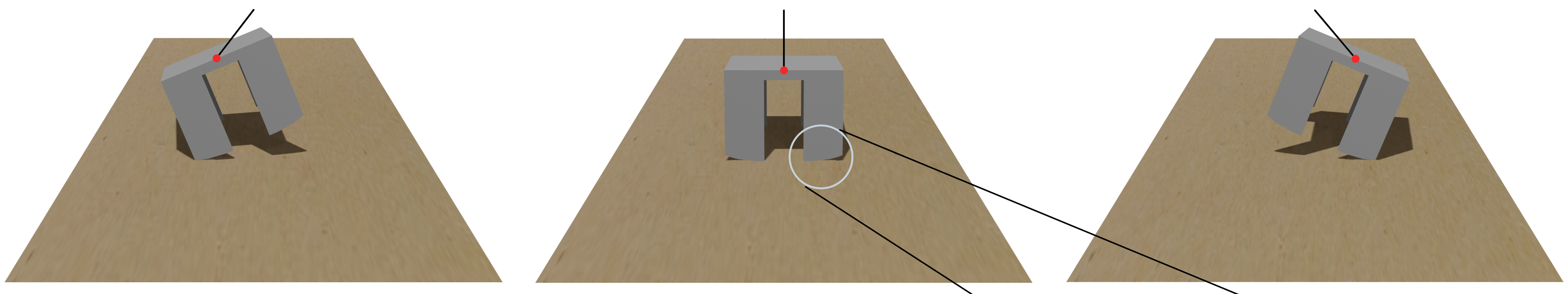
Gravity driven cardboard walker

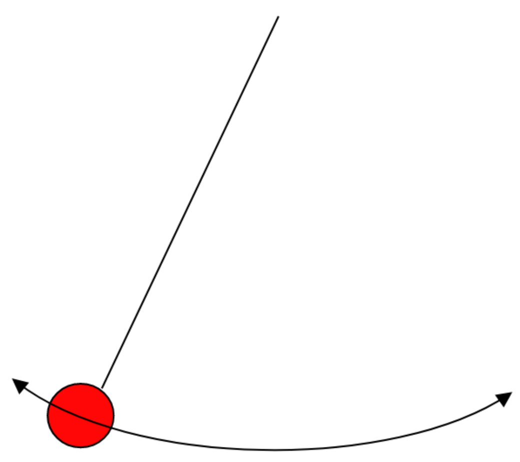
Did you know that gravity can make some objects walk ? Here we observe the strange behavior of a cardboard cut in such a way that it walks down an inclined plane.



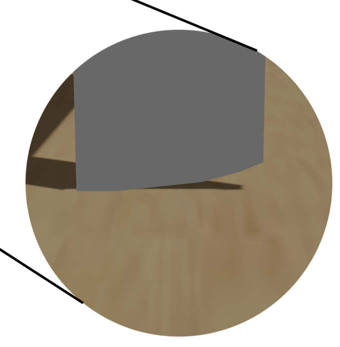
How does it work ?

In order to walk, our piece of cardboard has to be tilted to an angle and then released. If the inclined plane's surface is not too slippery, our object begins to walk. It is convenient to describe the motion of an object using its **center of mass**, i.e. the average position of each particle composing the object. Tilting the object raises its center of mass, which tends to go back down due to gravitation. While going back down, the inertia of the object makes it tilt to the other direction : the center of mass **oscillates** from one side to the other.





The center of mass oscillates like a pendulum. The circular shape of the feet falcilitates the oscillations.



With each oscillation, the weight of our walker is distributed exclusively on the two side legs. This bends them slightly **forward** : the walker has taken one step. These bent legs regain their natural angle once the weight is distributed on the other two and the walking cycle repeats.