

Coin Funnel Activity

due at start of next class for participation points

On the fifth floor of the Physics building, just to the left of the elevators, there is a funnel-shaped device with marbles and coins in the bottom. The funnel shape provides a centrally directed force on the marbles you throw in. Practice rolling the marbles so that they “orbit” the center. Coins will also work, but require a bit more practice.

(a) How do you have to throw the marble to get it to orbit? What happens if you let it roll straight in from the edge?

(b) The orbit gradually decays. Why do you think that is? Do real astronomical orbits do this? Why or why not?

(c) When the orbit is small, how does the velocity compare with when the orbit is large? Can you relate this to what we learned in class?

(d) Does the velocity of a circular orbit depend on anything other than the size of the orbit? Does it depend on the mass of the marble?

(e) Try making an elliptical orbit. Is the velocity constant throughout the orbit? If not, describe how it varies. Can you relate this to one of Kepler’s laws described in the book??

(f) What happens if you throw the marble in too fast? Can you explain what happened in terms of kinetic and potential energy?