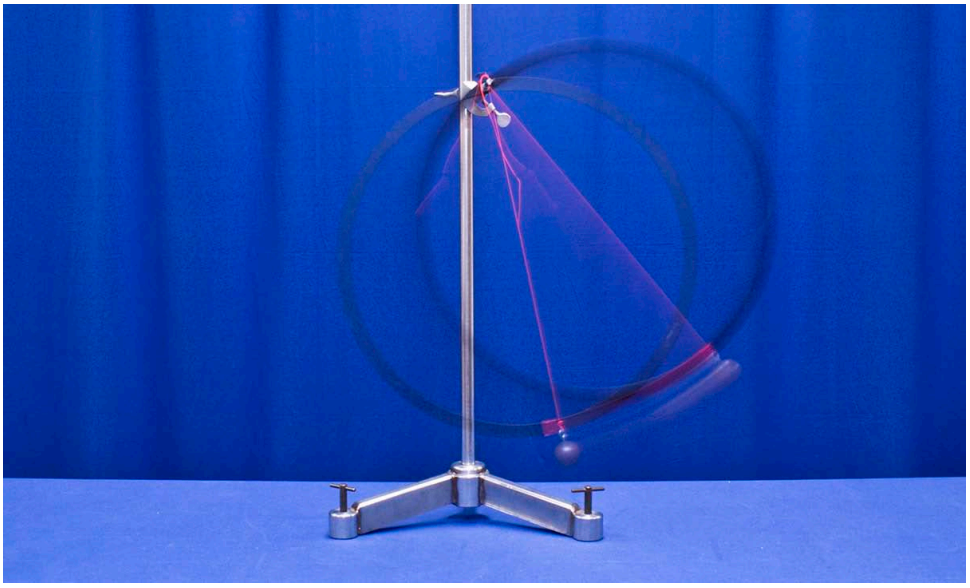

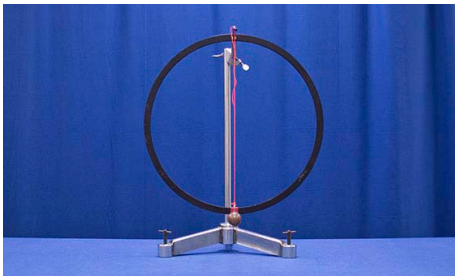

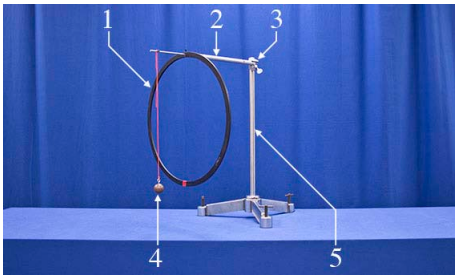

Concept:

The period of a physical pendulum pivoted about its end is

$$T = 2\pi\sqrt{\frac{I}{mgd}},$$

where I = moment of inertia about the pivot and d = distance from the pivot to the center of mass. For the hoop in this demo, $I = \frac{1}{2}mD^2$ and $d = \frac{D}{2}$ where D = hoop diameter. These values give

$$T = 2\pi\sqrt{\frac{D}{g}}.$$

Thus, a simple pendulum of length D has the same period.

Equipment:

1. Hoop (0.5 m diameter)
2. Physical Pendulum Rod
3. Large Rod Clamp
4. Pendulum Bob
5. Large 3' Rod Stand

Procedure:

1. Verify that the pendulum's length matches the diameter of the hoop. The bob should align with the red tape on the hoop.
2. Slowly displace the pendulum bob and hoop to one side and release them at exactly the same time.
3. Notice that the pendulum bob and the hoop oscillate at the same frequency.