Wednesday Reading Assessment: Unit 7, Power and Conservation of Energy

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1   Conservation of Energy

1. A particle of mass m is hung from the ceiling by a massless string of length 1.0 m, as shown in Figure 1. The particle is released from rest, when the angle between the string and the downward vertical direction is 30 degrees.
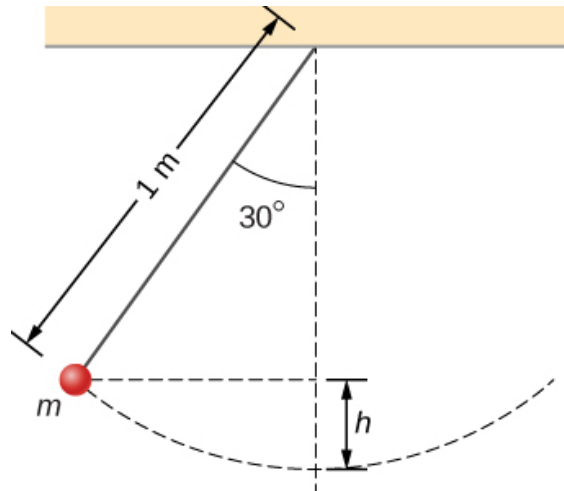

Figure 1: A particle hung from a string constitutes a simple pendulum. It is shown when released from rest, along with some distances used in analyzing the motion.

2. Show using trigonometry that the height of the pendulum is given by $h = L(1 - \cos\theta)$.

3. What is the gravitational potential energy as a function of the angle θ?

4. What is its speed when it reaches the lowest point of its arc, if the initial angle is 30 degrees?