

1 Hanging a Mass on a Spring

A weight, of mass $m = 200\text{g}$, is hung on a spring with unknown spring constant k . The mass is hung vertically on the spring so that gravity pulls on the mass too. The weight is released from a position where the spring is relaxed (not stretched or compressed). The weight is observed to move up and down with a period, τ , of 1.1 seconds.

Use $g = 9.8 \frac{\text{m}}{\text{s}^2}$. Assume that all given numbers are exact. Assume there is no damping in the motion. Express your answers to at least 3 significant figures.

1.1 Spring Constant

Given these measurements, determine the spring constant of the spring, k .

1.2 Maximum Speed

Given these measurements, determine the maximum speed of the weight, \dot{x}_{max} , as it oscillates up and down.

1.3 on the Moon (10 pts extra credit)

Given the same spring, weight and initial conditions, what will be the measured period τ' , and the the maximum speed of the weight \dot{x}'_{max} , if this experiment is performed on the surface of the moon where the acceleration due to gravity is $\frac{g}{6}$. As before, the weight is released from rest at a position where there is no stretch in the spring.