Question #54634, Physics - Mechanics | Kinematics | Dynamics

A student wanted to make a pendulum, the time period of which would be one second. He used a string of length L and found that that period was 1/2 seconds. A string of what length must have been used in order to get the desired period?

Answer:

The period of a pendulum is defined by the equation:

$T = 2\pi(L/g)^{0.5}$, where L – the length of string and g –the constant which equals 9.18 m/s^2, and $\pi = 3.14$

For the half-second period, the period is: $T_1 = 2\pi(L_1/g)^{0.5} = 0.5$ s

For the one second period, the period is: $T_2 = 2\pi(L_2/g)^{0.5} = 1$ s

Then, $T_2/T_1 = (L_2/L_1)^{0.5} = 1/0.5 = 2$

$L_2/L_1 = 4$

Thus, the length must be in 4 times longer than that used for 0.5 sec pendulum. If the first string has the length of **L** then the length to get the desired period is of **4L**.