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## Tick-Tock

### Purpose

To construct a pendulum with a period of one second

### Required Equipment/Supplies

ring stand  
pendulum clamp  
pendulum bob  
string

stopwatch or wristwatch  
balance  
meterstick

### Discussion

A simple pendulum consists of a small heavy ball (the bob) suspended by a lightweight string from a rigid support. The bob is free to oscillate (swing back and forth) in any direction. A pendulum completes one cycle or oscillation when it swings forth from a position of maximum deflection and then back to that position. The time it takes to complete one cycle is called its *period*.

If, during a 10-second interval, a pendulum completes 5 cycles, its period  $T$  is 10 seconds divided by 5 cycles, or 2 seconds. The period is then 2 seconds for this pendulum.

What determines the period of a pendulum? You will find out the factors by trying to make your pendulum have a period of exactly one second.

### Procedure

Construct a pendulum with a period of *exactly* one second. To do this, change one variable at a time and keep track of which ones affect the period and which ones do not.

### Questions

- Briefly describe the method you used to construct your pendulum.

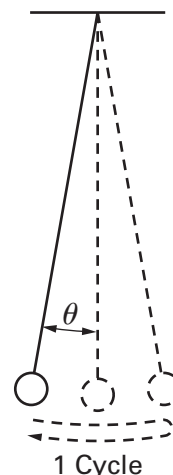
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2. What was the mass of your pendulum?

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3. What effect, if any, does mass have on the period of a pendulum?

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4. What effect, if any, does amplitude (size of swing) have on the period of a pendulum?

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5. What was the length of your pendulum?

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6. What effect, if any, does length have on the period of a pendulum?

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7. If you set up your pendulum atop Mt. Everest, would the period be less than, the same as, or greater than it would be in your lab? Why?

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8. If you set up your pendulum aboard an orbiting space vehicle, would the period be less than, the same as, or greater than it would be in your lab?

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