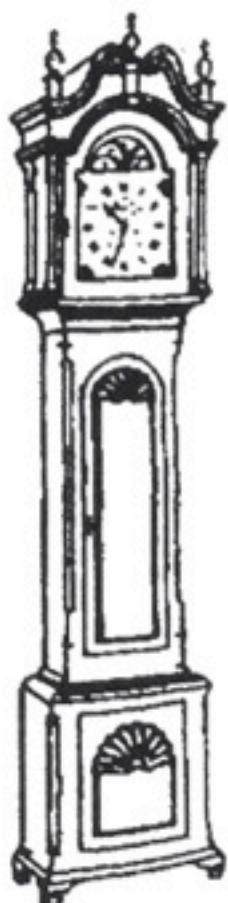


# TICK-TOCK



**PURPOSE:** To investigate how the period of a pendulum varies with its length.

**MATERIALS:** ring stand, pendulum bob, string, meter stick, stopwatch.

Earlier today you discovered that the period of a pendulum depends on its length. In this experiment, you will determine exactly how the length and period of a pendulum are related.

## PROCEDURE:

- A. Set up the pendulum using the equipment listed above. Make its length 15 cm. Measure its period by timing 10 oscillations. Repeat the timing to make sure you have it correct.
- B. Increase the pendulum length to 25 cm and repeat the above procedure.
- C. Continue increasing the length until by 10 cm increments until you reach 75 cm.
- D. Use your graphing calculator to make a graph of period (vertical axis) vs. length (horizontal axis).  
Stat – Edit – L<sub>1</sub> and L<sub>2</sub> – Stat – Calc – PwrReg
- E. Analyze the data to determine the relationship between period and length. Write the equation below:

DATA TABLE

| Length of Pendulum (m) | Time for 10 Oscillations (s) | Period (s) |
|------------------------|------------------------------|------------|
|                        |                              |            |
|                        |                              |            |
|                        |                              |            |
|                        |                              |            |
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## INTERPRETATIONS:

1. Use the equation from your graph to determine the period of a pendulum that has a length of 3 meters.
2. Use the equation from your graph to determine the length of a pendulum that has a period of 6 seconds.
3. A metal ball is suspended as a pendulum 2 m long. It swings in a 12-cm arc.
  - a. If the length of the pendulum is doubled, the period will be \_\_\_\_\_.
  - b. The time of vibration \_\_\_\_\_ when a wooden bob is substituted for the metal ball.
  - c. The period of the pendulum is \_\_\_\_\_ when the arc is increased to 20 cm.