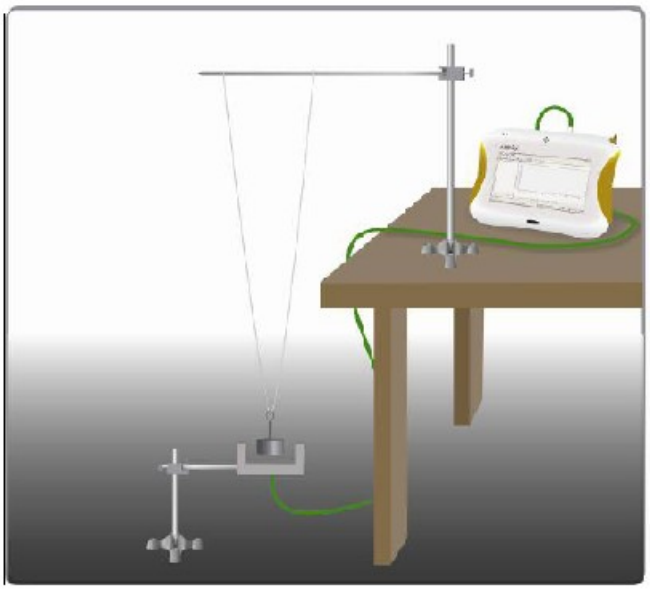
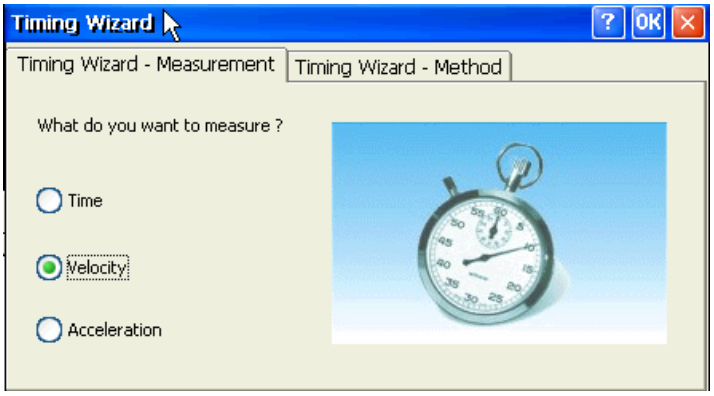
Title: To investigate the periodic time of a simple pendulum.



1. Set up apparatus as shown in diagram. Use the stand to hang the mass from two strings. Attach the strings to a horizontal rod about 10 cm apart. This arrangement will let the mass swing only along a line, and will prevent the mass from striking the photogate. The length of the pendulum is the distance from the point on the rod halfway between the strings to the centre of the mass. The pendulum length should be at least 1 m.
2. Attach the photogate to the second stand. Position it so that the mass blocks the photogate while hanging straight down.
3. Launch MultiLab.
4. Connect the photogate to Input 1 (I/O-1) of the Nova5000.
5. Click **Logger** —> **Setup**—> **Rate:** 100 samples per second; **Sample** 1000—> **OK**

6. Measure the length of the pendulum. Record the length in the data table. Pull the mass to the side about 10º from vertical and release.
7. Click **Run**  on the main toolbar to begin recording data.
8. Click **Tools** on the menu bar, then click **Analysis** and choose **Timing Wizard** to open the **Timing Wizard**:



9. Select **Time**.
10. Click the **Timing Wizard – Method** tab.
11. Select **Pendulum** (one gate) and click **OK**. Record the results in the data table.
12. Repeat steps 1 to 10 for various pendulum lengths. Change the length of the pendulum in steps of 10 cm, from 1.0 m to 0.50 m.

Analysis

1. Plot a graph of the square of the period (T^2) vs. the pendulum's length (l).
2. Does the graph support the relation in equation $T = 2\pi \sqrt{\frac{l}{g}}$
3. Fit a straight line that passes through the origin to your data points.
4. Calculate the slope of the linear fit and use it to evaluate the free fall acceleration.