Computer Simulation of Pendulums

1. Go to http://phet.colorado.edu/
   - Play with Sims
     - Physics
       - Pendulum Lab
         - Download
2. Swing the pendulum back to see what happens.
3. Experiment with some of the controls to see what they do.
4. Push Reset when you are ready to begin collecting data. Make sure the simulation is set for the Earth, with no friction, in real time, and photogate timer turned on.
5. Set the length to the smallest value you want.
6. Pull the pendulum back and let it go. Start the photogate timer. Record the length of the pendulum and the time on the photogate timer.
7. Reset and adjust the length to the next setting.
8. Collect data for 20 different lengths.
9. Using Excel, graph the data with length on the x-axis and time for one swing (period) on the y-axis. Remember the rules for drawing a graph.
10. If the graph is not a straight line, use a power trendline on Excel to produce a best-fit line.
11. Print the equation and R^2 data for the graph. Hand in both the Excel file and this paper to be marked.
12. Is the relationship between the Period (T) of the pendulum and its length **(l) linear, power curve. Root curve, or inverse curve?**

Data Table 1

Length (m)	Period (s)

Sketch the shape of graph.

Equation of relationship between period and length of a pendulum.

Pendulum lab

Data -
- enough points
- varied (short lengths)
- labelled
- details of setup

/4

Graph -
- Title
- Labels
- Trendline
- Equations
-

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Questions -

Equation ?

Bonus -

% difference

$T = 2\pi\sqrt{\frac{l}{g}} = \frac{2\pi}{\sqrt{g}} \times \sqrt{l} = 2.01\sqrt{l}$

/1

- "g" on planet

- $T^2 = \frac{4\pi^2 l}{g}$

$g = \frac{4\pi^2 l}{T^2}$

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