

General Lab Format 2011

Name _____ Date _____

Source Notes:

This lab was modeled after the “Pendulum” lab #13
“Laboratory Physics”, Murphy Doyle, Merrill, 1990.
ISBN 0-675-02477-3

Jim Haine - Wissahickon High School, Ambler PA.
1997(?)
Modified 2010

Teacher Notes:

Depending on the class; directions can be offered to use the picket fence, the smart pulley, or the motion sensor. With many classes that decision is left up to the student.

Modifications:

This was redesigned to use the Pasco Data Studio Software.

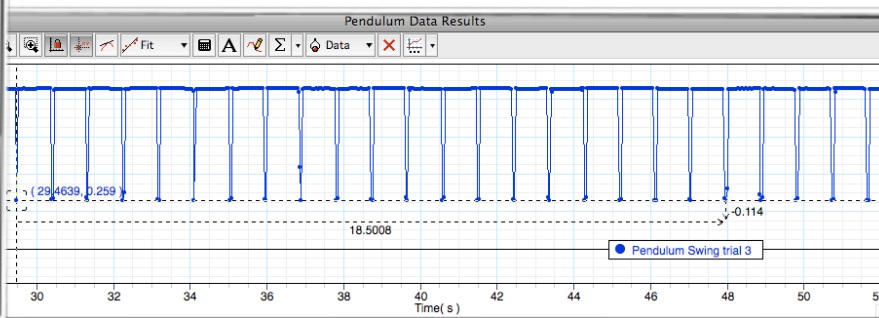
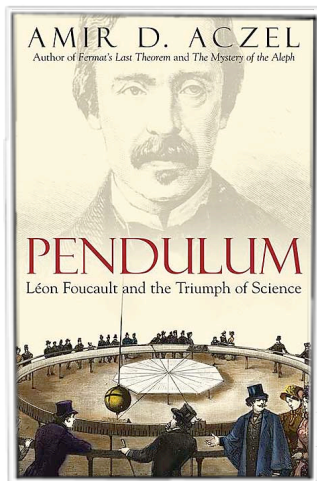
Grade

Activity 4: Pendulum Motion

According to legend, Galileo discovered the principle of the pendulum while attending mass at the Duomo (cathedral) located in the Piazza del Duomo of Pisa, Italy. A lamp hung from the ceiling by a cable and, having just been lit, was swaying back and forth. Galileo realized that each complete cycle of the lamp took the same amount of time, compared to his own pulse, even though the amplitude of each swing was smaller than the last. As has already been shown, this property is common to all harmonic oscillators, and, indeed, Galileo's discovery led directly to the invention of the first accurate mechanical clocks. Galileo was also able to show that the period of oscillation of a simple pendulum is proportional to the square root of its length and does not depend on its mass.

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

<http://www.britannica.com/eb/article-77542>



Data

Use the Pasco Motion Sensor to find the period of a pendulum. Start by tying a string to a ring stand leaving about a meter of length to the mass. Place the motion sensor beneath the pendulum near the bottom of the swing. Record the motion for 20 complete swings. This will require at least 40 data points for the graph as the Record the time for 20 swings. To find the period, simply divide by 20.

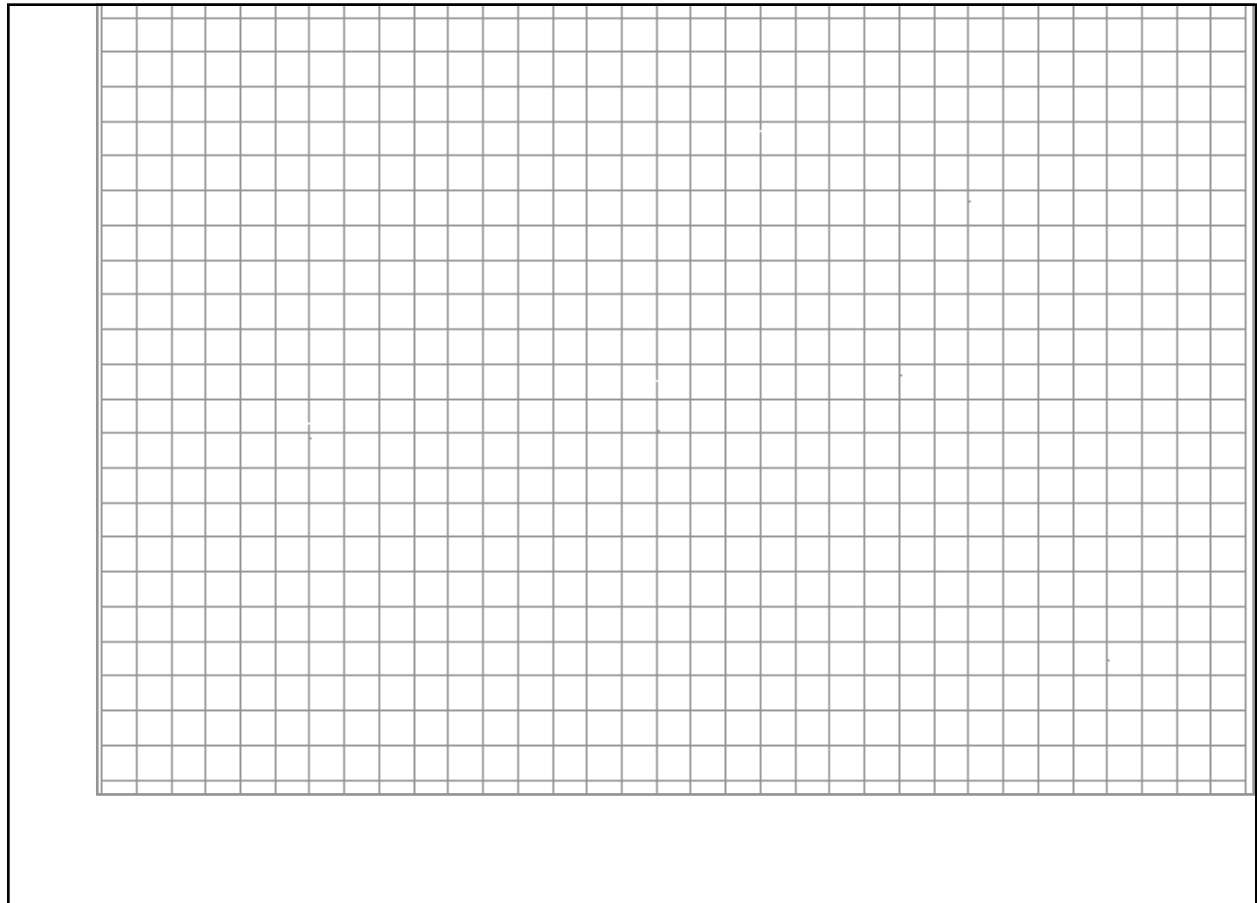
#	Length	Time (20)	T (period)
1			
2			
3			
4			
5			
6			

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Graph Results

Create a graph for the pendulum. Plot the period on the y axis and the *square root of the length* on the x axis. When you find the slope of each line use the equation to solve for the acceleration of gravity (g). Compare the answer with an accepted value of 9.8 m/s^2 .



Grade