Title: Pendulum Lab II

Purpose:

- To determine the relation among mass, length, gravity, and period of a pendulum

Materials:

- Exploration of Physics Spring and Pendulum Lab

Procedure:

Go to Exploration of Physics ….Motion….Spring and Pendulum

Part A: Length of a Pendulum

1. Set mass constant at 5.0 kg and length at 1.0 m (gravity constant at 9.8 m/s^2)
2. √ Time Axis (this will give you a 5 second viewing window…sufficient for this part of the lab)
3. Let run through one cycle and then pause.
4. Read time fro one period *from the graph.*
5. Record your results in the data tables (see below)
6. Repeat by increasing the length at 0.5 m intervals as indicated in the data table.
7. Graph your data and draw line of best fit or connect dots as appropriate!

Part B: Mass of a Pendulum

1. Set length constant at 5.0 m and mass at 0.1 kg (gravity constant at 9.8 m/s^2)
2. √ Time Axis (this will give you a 5 second viewing window…sufficient for this part of the lab)
3. Let run through one cycle and then pause.
4. Read time fro one period *from the graph.*
5. Record your results in the data tables (see below)
6. Repeat by increasing the mass at 0.5 to 1.0 kg intervals as indicated in the data table.
7. Graph your data and draw line of best fit or connect dots as appropriate!

Part C: Gravity Effects

1. Set mass constant at 10.0 kg, length constant at 5.0 m, and gravity at 9.8 m/s^2
2. DO NOT √ Time Axis (this will give you a 25 second viewing window…which you will need for gravity below 9.0). You may want to √ Time Axis when you increase gravity above 9.0 m/s^2
3. Let run through one cycle and then pause.
4. Read time fro one period *from the graph.*
5. Record your results in the data tables (see below)
6. Repeat by increasing the gravity at 1.0 m/s^2 intervals as indicated in the data table.
7. Graph your data and draw line of best fit or connect dots as appropriate!

Discussion:

1. Summarize what you did.
2. Discuss your results…..remember to include data to support your statements.
   a. Does length affect period? Is the relation direct or inverse or constant? Give examples of the data to support your statements!
   b. Does mass affect the period? Is the relation direct or inverse or constant? Give examples of the data to support your statements!
   c. Does gravity affect the period? Is the relation direct or inverse or constant? Give examples of the data to support your statements!
3. Did you verify the conclusions from your previous pendulum lab? Restate the conclusions from the lab and discuss whether or not they were supported by this lab…provide support!!
4. Describe sources of error.
5. Suggest improvements.

Conclusion: (answer the questions)

What is the relation between mass and period of a pendulum?
What is the relation between length and period of a pendulum?
What is the relation between gravity and period of a pendulum?

Reflection: Personal Statement

Results:

Data Chart A: Pendulum Length [a]

Length (m)	Period (s)
1.0	
1.5	
2.0	
2.5	
3.0	
3.5	
4.0	
4.5	
5.0	
5.5	
6.0	
6.5	

[a] mass = 5.0 kg, gravity =9.8 m/s^2

Data Chart B: Pendulum Mass [b]

Mass (kg)	Period (s)
0.1	
0.5	
1.0	
2.0	
3.0	
4.0	
5.0	
6.0	
7.0	
8.0	
9.0	
10.0	

[b] length = 5.0 kg, gravity = 9.8 m/s^2

Data Chart C: Gravity Effects [c]

Gravity (m/s^2)	Period (s)
1.0	
1.7 (moon!)	
2.0	
3.0	
4.0	
5.0	
6.0	
7.0	
8.0	
9.0	
10.0	
11.0	
12.0	
13.0	
14.0	
15.0	

[c] mass = 10.0 kg, length = 5.0 m