Pendulum Lab Sheet

NOTE: Change no values in the fields except the Length!

1. Change the ***Length*** value to the one listed in the current line in the table below.
2. Click the ***Start*** button and watch the red dot follow the curve.
   a. Each time it reaches the top it has completed one full swing.
   b. Let it keep swinging until it has reached the top 10 times (10 complete swings)
3. When it hits the top of the curve for the 10th time hit the ***Pause/Resume*** button.
   a. You can check the ***Slow motion*** box to slow the movement and make it easier to pause right at the top of the curve.
4. Record the result in the *10 Swings Time* column.
5. Then click the ***Reset*** button.

Repeat steps 1 through 5 until you have filled in the whole table.

Length (meters)	10 Swings Time (seconds)
0.50	
0.75	
1.00	
1.25	
1.50	
1.75	
2.00	
2.25	
2.50	
2.75	
3.00	
3.25	
3.50	
3.75	
4.00	

Answers to the Chapter 9 Project Questions:

1. You should notice that it doesn't look like a full parabola. Why doesn't it?

2. Do you think that we could, in reality, make the pendulum long enough to make the graph turn back downward? Why or why not?

3. What is the Model for the relationship between Length of Pendulum and Time for 10 Swings? (Write out the equation using the information on your graph.)

4. Which number in the Model tells you that the parabola will open downward if we could see the whole parabola?

5. According to the Model (equation), how long will ten swings take when the length is zero? Does that make sense in the real world? Why or why not?

6. If my cuckoo clock pendulum is supposed to swing once every second to keep correct time, how far down from the top should the leaf be? Use your Model and the quadratic formula to find the length. (Hint: 10Swings = 10 Seconds).

Model was: 10Swings(s) = a (Length)^2 + b (Length) + c

For correct timing: 10 = a (Length)^2 + b (Length) + c

In Standard form: 0 = a (Length)^2 + b (Length) + (c - 10) *After we subtract 10 from both sides.*

This makes our quadratic formula to find Length = $\frac{-b \pm \sqrt{(b)^2 - 4(a)(c-10)}}{2(a)}$

So, using your values for a, b, & c, Length =