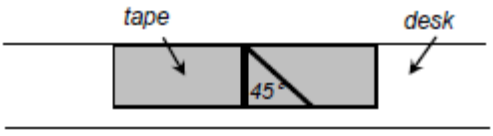
Name _____ Date _____

Pendulum Lab

Background Information: Pendulums consist of a mass or bob attached by a string to a pivot point (center of rotation). As a pendulum moves it sweeps back and forth in a circular arc. One full movement, from left to right and back again, is called a period.

Initial Setup:

1. Place a piece of masking tape on the side of the table so that the top of the tape is flush with the top edge.
2. Use a marker to draw a vertical line in the middle of the tape.
3. Draw a second line beginning at the top of the vertical line making a 45 degree angle to the right. Your finished setup should look like this the diagram to the right.



4. Cut a 40 cm length of string.
5. Tie one washer to the end of the string.
6. Measure 15 cm along the string beginning at the place where the string meets the washer. Mark that spot on the string with the marker.
7. Measure an additional 15 cm from that mark, and make a second mark. This is your 30 cm mark.
8. Cut a second 40 cm long string and repeat steps 4-7 using two washers instead of one.

Experiment Part 1: Control

1. Take the pendulum with one washer and hang it off the table so that the 15 cm mark rests on the edge of the table and the string is parallel to the vertical line on the tape.
2. Move the washer up and to the side so that the string matches the 45 degree line.
3. Release the pendulum and use the stopwatch to time the period (time to swing back AND forth) of 3 swings.
4. Repeat the experiment three times. Calculate the average of the times you measured.
5. Record your data in the table below.

Test 1	Test 2	Test 3	Average

Experiment Part 2: Variable of Mass

1. Repeat Experiment 1 using the pendulum with two washers.
2. Record your data in the table below.

Test 1	Test 2	Test 3	Average

Experiment Part 3: Variable of Length

1. Repeat Experiment 1, but this time hang the one-washer pendulum off the table so the 30 cm mark rests on the edge of the table.
2. Record your data in the table below.

Test 1	Test 2	Test 3	Average

Experiment Part 4: Variable of Amplitude

1. Repeat Experiment 1, but this time you will release the pendulum from 22.5 degrees. Make a 22.5 degree mark by drawing a line exactly halfway between the vertical line and the 45 degree line.
2. Record your data in the table below.

Test 1	Test 2	Test 3	Average

Analysis/Conclusions:

1. How does the change mass affect the period of the pendulum?

2. How does the change in length of the string affect the period of the pendulum?

3. How does the change in amplitude affect the period of the pendulum?

4. Explain how the pendulum transforms energy.