Name(s): _____ Date: _____ Period: ____

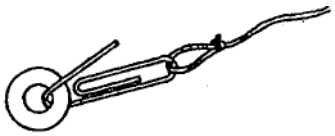
ACTIVITY #2 SIMPLE OSCILLATIONS

Problem:
What is the mathematical relationship between the frequency of a pendulum and is period?

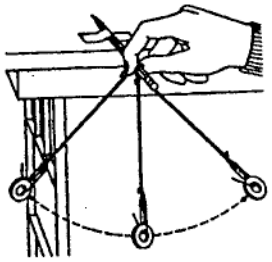
Materials:
Washers or small weights, assorted lengths of string, large paper clips, masking tape, a pencil and graph paper, stopwatches, meter stick or ruler.

Procedure:

1. Attach a paper clip on one end of the pendulum string that you received. Add from one to four washers or from 50 to 200 grams.



2. Secure the string to a pencil and tape the pencil to the table as shown. For alternative methods of suspending a pendulum see AAPT/PTRA Teaching about Kinematics Manual, Activity #2: Making a One-Second Timer.



3. Hold the washer or weight at an angle less than 15^{o} from the vertical.
4. Have your laboratory partner use a stopwatch to time ten oscillations. NOTE: One oscillation is a swing over and back.
5. When directed by your laboratory partner, let go, skip the first cycle, and count ten complete oscillations while your partner times the process. Do 3 trials, and record your data in a data table. Average the three trials to the nearest 0.1 s of the time it take to complete ten complete oscillations.
6. Determine the number of (or fraction of) oscillations that would have occurred in one second. This numerical value is the frequency of the pendulum.
7. Determine the seconds (or fraction of) that it takes to complete one oscillation. This numerical value is called the period of the pendulum
8. Record your data on a classroom data chart provided by the instructor.
9. Repeat the process described above using a second pendulum of a different length, or one having the same length but a different number of washers.
10. Utilizing the class data make a graph that compares the frequency and the period.
11. Draw the best line or curve of fit that connects as many points as possible.

Summing Up:

1. What graphical relationship fits your data? Linearize your data and determine the mathematical relationship between the frequency and the period of the pendula.