

Name \_\_\_\_\_  
AP Physics  
Period \_\_\_\_\_

Date \_\_\_\_\_  
Lab Activity #17 (50 pts)  
Mrs. Nadworny

Partners: \_\_\_\_\_

Due Date \_\_\_\_\_

## Simple Harmonic Motion

**NO Lab Write-Up Required**  
*must be neatly written in pencil*

### Purpose

- To investigate simple harmonic motion (SHM) in two systems.

### Materials

- mass set
- spring
- pendulum
- ring stand
- pendulum clamp
- measuring devices

### **PART 1** **Pendulum System**

In this section, you are first going to predict the period of oscillation of a pendulum and then measure the period to see how close your prediction is. Finally, you are going to change the physical parameters of the system in such a way that the period is doubled.



1. Hang a pendulum bob from a string and gently lower it to its equilibrium position. Take any measurements needed in order to predict the period of oscillation, **without** setting the system swinging.

- **Data Collection** (3)  
Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing** (4)  
Calculate the predicted period of the system. Show all work clearly, with formulas and substitutions.

Predicted Period \_\_\_\_\_

2. Set the pendulum swinging. Take any measurements needed in order to measure the period of oscillation of the system.

- **Data Collection** (3)

Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing** (4)

Calculate the measured period of the system and a percent difference from the predicted value. Show all work clearly, with formulas and substitutions.

Measured Period \_\_\_\_\_

3. Change a physical characteristic of the system in such a way that you predict that the period of oscillation will double. Clearly state the physical change you are going to make and your predicted period. (2)

New length \_\_\_\_\_

Predicted Period \_\_\_\_\_

- **Data Collection** (3)

Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing** (4)

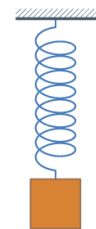
Calculate the measured period of the system and a percent difference from the predicted value. Show all work clearly, with formulas and substitutions.

Measured Period \_\_\_\_\_

4. State what factors will affect the period of this system. (1)

## PART 2

### Mass on a Spring System



In this section, you are first going to predict the period of oscillation of a mass hanging from a spring and then measure the period to see how good your prediction is. Finally, you are going to change the physical parameters of the system in such a way that the period is doubled.

5. Hang a mass from a spring and gently lower it to its equilibrium position. Take any measurements needed in order to predict the period of oscillation, **without** setting the system bobbing up and down.

- **Data Collection** (3)

Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing** (4)

Calculate the predicted period of the system. Show all work clearly, with formulas and substitutions.

Predicted Period \_\_\_\_\_

6. Gently set the mass bobbing up and down. Take any measurements needed in order to measure the period of oscillation of the system.

- **Data Collection** (3)

Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing**

(4)

Calculate the measured period of the system and a percent difference from the predicted value. Show all work clearly, with formulas and substitutions.

Measured Period \_\_\_\_\_

7. Change a physical characteristic of the system in such a way that you predict that the period of oscillation will double. Clearly state the physical change you are going to make and your predicted period. (2)

New mass \_\_\_\_\_

Predicted Period \_\_\_\_\_

- **Data Collection**

(3)

Record all data, clearly labeled and with appropriate units and uncertainties.

- **Data Processing**

(4)

Calculate the measured period of the system and a percent difference from the predicted value. Show all work clearly, with formulas and substitutions.

Measured Period \_\_\_\_\_

8. State what factors will affect the period of this system. (1)

(2)  
neatness