

## Mass on a Spring Interactive

### Purpose:

To determine what factors affect the frequency and the period of a vibrating mass on a spring and to state the relationship between those variables and the frequency or period.

### Getting Ready:

Navigate to the **Vibrating Mass on a Spring** Interactive at The Physics Classroom website:

<http://www.physicsclassroom.com/Physics-Interactives/Waves-and-Sound/Mass-on-a-Spring>

### Navigational Path:

www.physicsclassroom.com ==> Physics Interactives ==> Waves and Sound ==> Vibrating Mass on a Spring

### Getting Acquainted:

Once you've launched the Interactive and resized it, experiment with the interface. Place a mass on the end of the spring and observe the vibration. Click/tap the **Start** button to view the plot of its vertical position as a function of time. **Reset** the system and place a mass on each spring and observe that their graphs are color coded - consistent with the color of the spring. Notice that the time, height, and velocity of the mass are reported below the graphs. And most importantly for this lab, observe how the vertical line on the graph can be moved along the axis in order to obtain values of height and velocity at various times on the graph.

### The Challenge:

Your challenge is to determine what factors affect the frequency and the period of a vibrating mass on a spring. Make your study of this question very systematic - varying one factor at a time while you hold others constant. You can easily test the mass and the stiffness of the spring as possible factors. If you are "quick," you might also be able to test damping as a possible factor. Conduct several trials for each variable under study. For each trial, measure the period by recording the difference in time from the start and the end of one cycle or of several cycles. Use the provided tables. Not all columns or rows will necessarily be used.

**Factor #1:** \_\_\_\_\_

Factor: _____	# of Cycles	Start Time (s)	Stop Time (s)	Period (s)	Frequency (Hz)

**Factor #2:** \_\_\_\_\_

<b>Factor:</b> _____	<b># of Cycles</b>	<b>Start Time (s)</b>	<b>Stop Time (s)</b>	<b>Period (s)</b>	<b>Frequency (Hz)</b>

**Factor #3:** \_\_\_\_\_

<b>Factor:</b> _____	<b># of Cycles</b>	<b>Start Time (s)</b>	<b>Stop Time (s)</b>	<b>Period (s)</b>	<b>Frequency (Hz)</b>

**Conclusion:**

Identify the factors that affect the frequency and the period of a vibrating mass on a spring. For each factor having an effect, describe the effect (e.g., state something like ... "As the \_\_\_\_\_ increases, the period \_\_\_\_\_ and the frequency \_\_\_\_\_.")