

## ACTIVITY 2: OSCILLATING SPRINGS

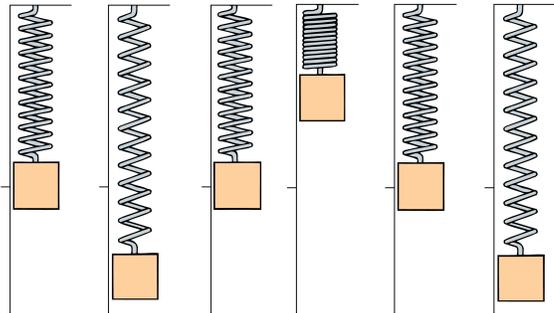
There are four springs attached to spindles, labeled Spring 1, Spring 2, Spring 3, and Spring 4. The springs are identical but have different masses attached to the bottoms. The springs initially hang at rest. Gently pull the bottom of the spring 2-3 inches lower than the rest position, then let the spring go. The spring should obtain a perpetuating uniform up-and-down motion. Using a stopwatch, measure the amount of time it takes to for the spring to oscillate 10 consecutive times. Record this value in the table below. Repeat this procedure 4 times and record your time data. Calculate the average time for each spring to oscillate 10 times. (Average = sum the times, divide by 4).

	Trial 1	Trial 2	Trial 3	Trial 4	Average Time (seconds)
<b>Spring #1</b>					
<b>Spring #2</b>					
<b>Spring #3</b>					
<b>Spring #4</b>					

Calculate the frequency and the period of each spring. Use the average time (seconds)

Frequency:  $f = \frac{\#Oscillations}{t}$       Period:  $T = \frac{1}{f}$

	Frequency (Hz)	Period (s)
<b>Spring #1</b>		
<b>Spring #2</b>		
<b>Spring #3</b>		
<b>Spring #4</b>		



On a separate piece of paper, NEATLY write 1 paragraph that analyzes your observations with the springs and with the pendulum. You should discuss the differences with the springs because of the additional masses added to the springs. You should discuss the differences with the pendulums because of the different lengths of string from which they swing. Give reasons for why you think the springs and the pendulums behaved that way.

Name: \_\_\_\_\_

### ACTIVITY 1: SWINGING PENDULUMS

There are five pendulums (bobs on the end of strings): The pendulums initially hang at rest. Use the meter stick to measure the length of the pendulum from the center of the bob to the wooden support. Record this value in cm in your calculations table. Gently lift the bob (ball at the end of the string) upward with the string tight and release to induce a **low angle** back-and-forth swing. Do not push the bob, allow gravity to move the bob. The bob should have a uniform back-and-forth swinging motion. Using the stopwatch, measure the amount of time it takes for the pendulum to swing back-and-forth 10 consecutive times. Record this value in the table below. Repeat this procedure 4 times and record your time data. Calculate the average time for each pendulum to swing back-and-forth 10 times. (Average = sum the times, divide by 4).

	Trial 1	Trial 2	Trial 3	Trial 4	Average Time (seconds)
<b>Pendulum #1</b>					
<b>Pendulum #2</b>					
<b>Pendulum #3</b>					
<b>Pendulum #4</b>					
<b>Pendulum #5</b>					

Calculate the frequency and the period of each spring. Use the average time (seconds)

Frequency:  $f = \frac{\#Oscillations}{t}$       Period:  $T = \frac{1}{f}$

	Length of pendulum (cm)	Frequency (Hz)	Period (s)
<b>Pendulum #1</b>			
<b>Pendulum #2</b>			
<b>Pendulum #3</b>			
<b>Pendulum #4</b>			
<b>Pendulum #5</b>			

