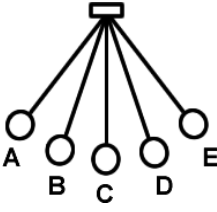
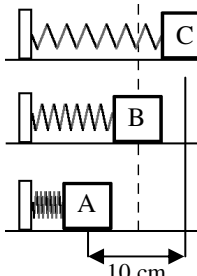
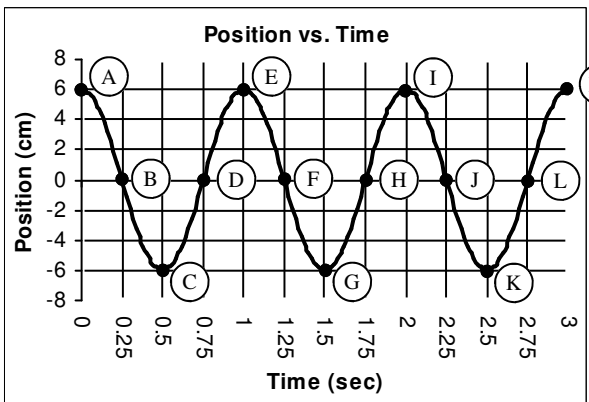
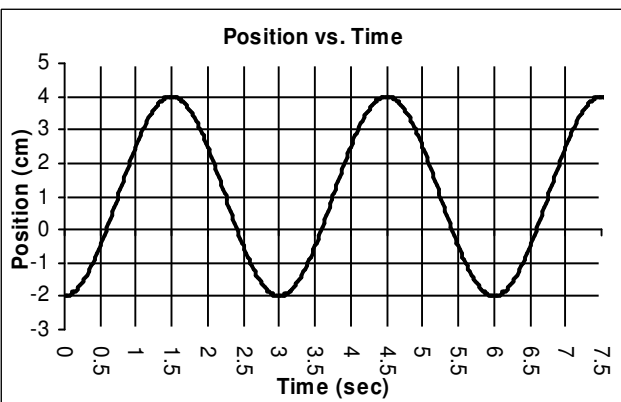


# PreAP Harmonic Motion 1

<ol style="list-style-type: none"> <li>Period</li> <li>Equilibrium position</li> <li>Amplitude</li> <li>Damping</li> <li>Frequency</li> <li>Cycle</li> <li>Hertz</li> </ol>	<ol style="list-style-type: none"> <li>The number of cycles per second.</li> <li>A unit of one cycle per second.</li> <li>The size or strength of a cycle.</li> <li>Time it takes to complete one cycle.</li> <li>A part of motion that repeats over and over with a set series of events.</li> <li>Halfway between the two sides and where the motion comes to rest.</li> <li>The motion dying out over time.</li> </ol>	<p>8.</p>  <p>Where is the equilibrium position for this pendulum?</p> <p>If the pendulum starts at C going to the right, where does 1 cycle end?</p> <p>From letter A to letter ____ would be the amplitude.</p> <p>If the pendulum starts at A, how many times does it pass point C in 1 cycle?</p>
<p>9. A spring vibrates between points A and C.</p>  <p>Where is its equilibrium position?</p> <p>If the spring starts at position A, how much of a cycle does it complete from A to C?</p> <p>If the spring moves 10 cm from C to A (side to side), how big is its amplitude?</p>	<p>10. An spring has a period of 4 seconds. What is its frequency?</p> <p>11. A pendulum has a frequency of 3 Hz. What is its period?</p>	
<p>12.</p>  <p>1 cycle after A is E, so 2 cycles after D is ____.</p> <p>1/2 cycle after G is I, so 1/4 cycle <i>before</i> M is ____.</p> <p>Number of complete cycles shown is ____.</p> <p>Period (T) = _____ Frequency (f) = _____</p> <p>Equilibrium position = _____ Amplitude (A) = _____</p>	<p>13.</p>  <p>Mark 1 cycle of the harmonic motion.</p> <p>Starting at 1.5 secs, when does the 2nd cycle end:</p> <p>Number of cycles shown on the graph is ____.</p> <p>Period (T) = _____ Frequency (f) = _____</p> <p>Equilibrium position = _____ Amplitude (A) = _____</p>	

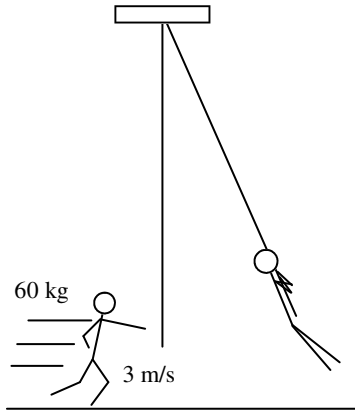
Understanding frequency vs period. You know that  $T = 1/f$  or  $f = 1/T$ , where  $f$  is frequency and  $T$  is the period.

- A pendulum has a period of 2 seconds.
  - That means it takes \_\_\_\_ seconds for it to complete one full swing or one c\_\_\_\_\_.
  - \* Calculate the frequency of the pendulum.
  - This is how frequent the motion is. It completes \_\_\_\_ cycles each second.
- A second pendulum has a period of 0.25 seconds.  $f$ 
  - That means it takes \_\_\_\_ seconds for it to complete one full swing or one c\_\_\_\_\_.
  - \* Calculate the frequency of the pendulum.
  - This is how frequent the motion is. It completes \_\_\_\_ cycles each second.

B.  $1/2 = 0.5$  Hz  
C. 1/2 times

B.  $1/.25 = 4$  Hz  
C. 4 times

*This second pendulum is more frequent, so it has a higher frequency!*



16. Slim Jim is running 3 m/s when he grabs onto a long rope, becoming, himself, a human pendulum!
- A. \* Calculate how far above the ground Jim swings (his vertical height).
- B. \* If the rope is 5 m long, what is the angle the rope makes with the vertical when Slim Jim is at his highest part of his swing?

16A) Conservation of Energy

16B) Might find help on “Momentum 7”, if you took notes, or on 2nd page of “Conservation of Momentum Practice”.