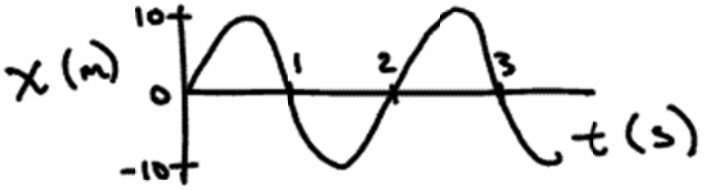
AP Physics - Simple Harmonic Motion - Definition

Note Title 11/11/2007

Simple Harmonic Motion ≡ Back-and-forth oscillations that are sinusoidal with respect to time.



Amplitude - 10m
Period - 2s
Frequency - $\frac{1}{2}$ Hertz

In order for SHM to happen, two things must be present:

1. A restoring force to push the object back to its equilibrium position when the object is displaced. Force must be...
   - opposite in direction to displacement, and...
   - directly proportional to the displacement.

   .... Sounds kind of like Hooke's Law: $F = -kx$
2. Inertia. The object must have mass so that its momentum carries it beyond the equilibrium position into the opposite displacement. Without this momentum, the object would simply stop when it reached the equilibrium position.

For a pendulum swinging back and forth, when is:

Max Displacement: A, -A

Min Displacement: 0

Max Velocity: 0

Min Velocity: A, -A

Max Force: A, -A

Min Force: 0

Max Acceleration: A, -A

Min Acceleration: 0