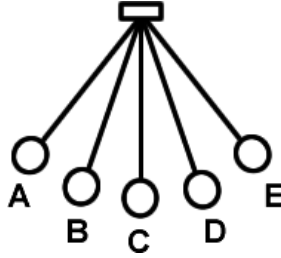## In Class Review 1 – Harmonic Motion

Which ones are harmonic motion?

___ A tennis ball dropped on the ground.
___ A swinging pendulum.
___ A guitar string being plucked.
___ A meter stick vibrating at one end.

When a train is coming toward you it's pitch goes up or down? As it passes you the pitch goes up or down? This is known as the:

If the angle between A and E is 60°, what is the amplitude of the pendulum (in degrees)?

90° out-of-phase with A is: _____.
180° out-of-phase with A is: _____.
The pendulum will stop at: _____.

As the pendulum loses a_____, it loses e_____, which is known as d_____.

Directly proportional (one goes up, the other does) or Inversely proportional (one goes up , the other goes down)?

_____ A sound's pitch and wavelength.   _____ A spring's force and displacement.

_____ Amplitude and Energy   _____ Period and frequency.

If a transverse wave is moving to the left, which way will it oscillate?

If a longitudinal wave is moving to the left, which way will it oscillate?

A wave undergoes 25 cycles in 6 seconds. Find its period.

A spring takes 8 seconds to do 12 cycles. Find its frequency.

A pendulum completes half a cycle in 1 second. Find angular frequency.

A spring moves 16 cm side-to-side. What is its amplitude?

What distance does it travel in two complete cycles?

What maximum force does the spring provide (k = 25 N/m)?

A 150 g object is put onto a spring which stretches 12 cm.
A. Find its spring constant.

B. How much force is necessary to pull it an additional 3 cm?
(Gravity pulls it 12 cm; you need an additional force to pull it 3 cm more.)

How does it affect its period?
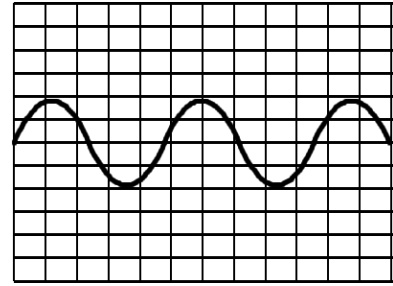(Period is longer, shorter or unchanged?)

___ Decreasing a pendulum's amplitude.
___ Increasing a spring's spring constant.
___ Decreasing a pendulum's mass.
___ Decreasing a spring's mass.
___ Increasing a spring's amplitude.
___ Increasing a pendulum's length.
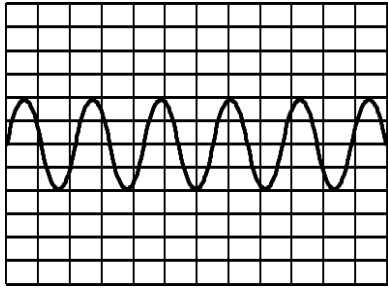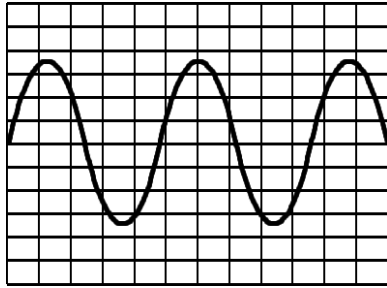
Graph A   **Graph B**   **Graph C**

How many cycles does graph A show?
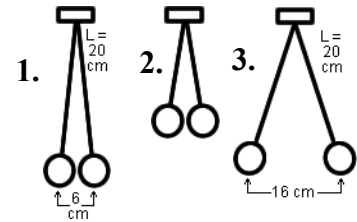
Graph A and C have the same: _____   B and C have the same: _____

Match Graphs to Pendulums: Graph A: _____; Graph B: _____; Graph C: _____.

When a pendulum has a higher spring constant it moves faster or slower?

Match Graphs to Springs: Graph A: _____; Graph B: _____; Graph C: _____.

If M = 2 kg, find the period of Spring 2.

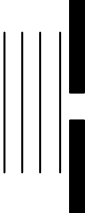1. L = 20 cm
2.
3. L = 20 cm
6 cm
16 cm

Spring 1; k = 20 N/m
M M

Spring 2; k = 20 N/m
2M 2M

Spring 3; k = 40 N/m
M M

Waves _____ around corners
(called _____).

Show what will happen as the straight
wave goes through the hole.

A fellow astronaut is using a hammer to input a cotter pin into a fitting outside the International Space Station. If you
are 30 meters away from the hammer in a Russian Soyuz Rocket, how long does it take for the sound to get to you?

Which of the following changes the speed of a wave?
A. ____ Amplitude; B. ____ Period; C. ____ Wavelength; D. ____ Pitch; E. ____ Medium.

If the fundamental frequency of a standing wave is 60 Hz, give the frequencies of the first
6 harmonics:

If wave B has frequency of 128 Hz be harmonic with the above harmonic 2?

Would H_2 and Wave B constructively or destructively interfere with each other?
(This is why two notes just a bit out of tune "fight" with each other, creating "beats".)

Draw harmonic 4 at the right, with nodes and antinodes marked, the wave form, and
1 wavelength shown.