Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hr \_\_\_\_\_\_\_\_\_\_

**Natural Frequency and Resonance**

Do Now: Describe or draw the differences between reflection and refraction.

**Frequency Review**

Frequency is:

 - Measure of \_\_\_\_\_ \_\_\_\_\_\_\_\_ a wave goes \_\_\_\_\_ and \_\_\_\_\_\_\_\_

 - Measured in \_\_\_\_\_\_\_\_\_ (Hz);

 - One Hertz is one \_\_\_\_\_\_\_\_\_ per \_\_\_\_\_\_\_\_\_

What is the frequency of this wave? (Time from point A to F is 2 seconds.) From point A to F is \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_. At F the \_\_\_\_\_\_\_\_\_ begins to repeat its form. \_\_\_\_\_\_\_\_\_\_\_\_\_ is number of cycles (wavelengths) per one second. For this wave, one wavelength takes \_\_\_\_ seconds so:

 f=1cycle/2 sec. = \_\_\_\_\_\_\_\_\_ Hz



**Natural Frequency**

Most objects \_\_\_\_\_\_\_\_\_\_\_ when hit, struck, plucked, strummed, or somehow \_\_\_\_\_\_\_\_\_\_. If you drop a meter stick or pencil on the floor, it will begin to \_\_\_\_\_\_\_\_\_\_\_. If you pluck a guitar string, it will begin to \_\_\_\_\_\_\_\_\_\_\_. If you blow air over the top of a pop bottle, the \_\_\_\_\_\_\_ inside will vibrate.

<http://www.videobash.com/video_show/high-speed-camera-guitar-strings-28853>

When an object vibrates, it tends to \_\_\_\_\_\_\_\_\_\_\_ at a particular \_\_\_\_\_\_\_\_\_\_\_\_. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at which an object tends to vibrate when disturbed is the \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ of the object.

The \_\_\_\_\_\_\_\_\_\_\_\_\_ at which an object will \_\_\_\_\_\_\_\_\_ is determined by a variety of factors. Each of these factors will affect the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or the \_\_\_\_\_\_\_\_\_\_\_ of the object. Since

 frequency = \_\_\_\_\_\_\_\_\_\_\_\_/ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

a change in \_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_ will change the \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.



The vibrating portion of a particular string can be shortened by pressing the string against one of the frets on the neck of the guitar. This modification in the length of the string would affect the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the wave and in turn the \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ at which a particular string vibrates.

https://video.search.yahoo.com/video/play;\_ylt=A2KLqILANCZTmg4AHrD7w8QF;\_ylu=X3oDMTEwb25mNWVtBHNlYwNzcgRzbGsDdmlkBHZ0aWQDVjE1MgRncG9zAzEz?p=playing+chords+on+a+guitar&vid=a485c337de3c8f5fd2167c6d3cb711b4&l=1%3A37&turl=http%3A%2F%2Fts4.mm.bing.net%2Fth%3Fid%3DVN.608046023479526239%26pid%3D15.1&rurl=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DBEeh4T03aoo&tit=Bass+Guitar+%3A+Learn+to+Play+Chords+on+the+Bass+Guitar&c=12&sigr=11a523s0q&sigt=11li9v73g&pstcat=arts+culture+and+entertainment&age=0&&tt=b

\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are important to know to:

 -to determine \_\_\_\_\_\_\_ an object will vibrate

 -to know \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ of wave an object will make if disturbed

 -to make an object \_\_\_\_\_\_\_\_\_\_\_\_\_ a specific kind of \_\_\_\_\_\_\_\_

Products in which this is important include:

Microwave ovens, \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_, musical instruments, \_\_\_\_\_\_\_\_\_, buildings, cars and trucks

**Resonance:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ happens when an object is vibrated by an \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ at its \_\_\_\_\_\_\_\_\_ frequency.

Both tuning forks below have the same \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_. The sound wave from the tuning fork on the left is causing the tuning fork on the right to \_\_\_\_\_\_\_\_\_ even though the tuning fork on the right is not being stuck.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an important way to \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ into waves. It is used in microwave ovens, musical instruments, and lasers.

Resonance can also be \_\_\_\_\_\_\_\_\_\_\_\_\_\_ if a structure is designed to have a \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ close to that of its surroundings.

Take a look at the example of a bridge built in Tacoma, Washington in 1940.

http://www.youtube.com/watch?v=3mclp9QmCGs