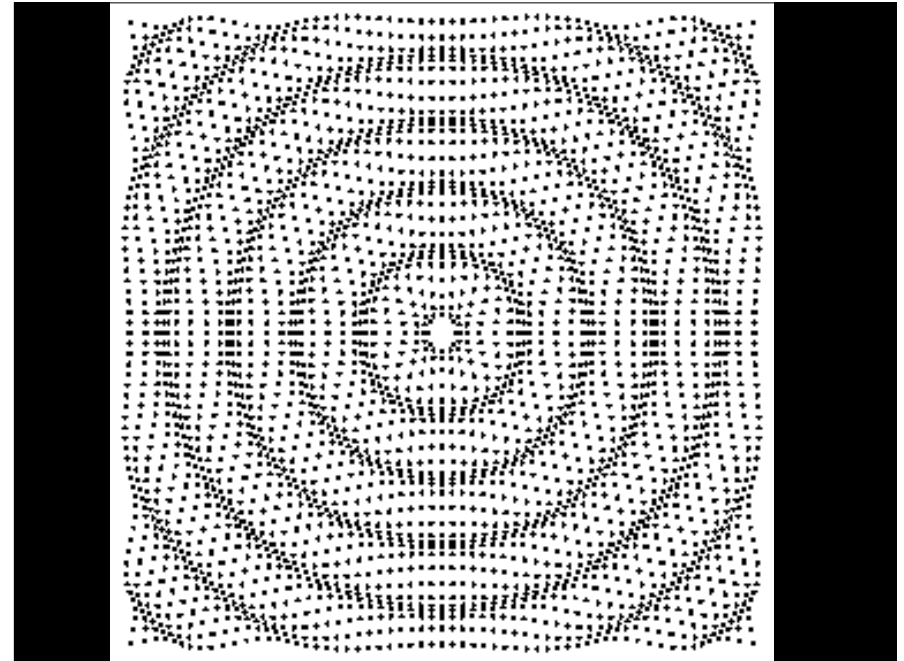
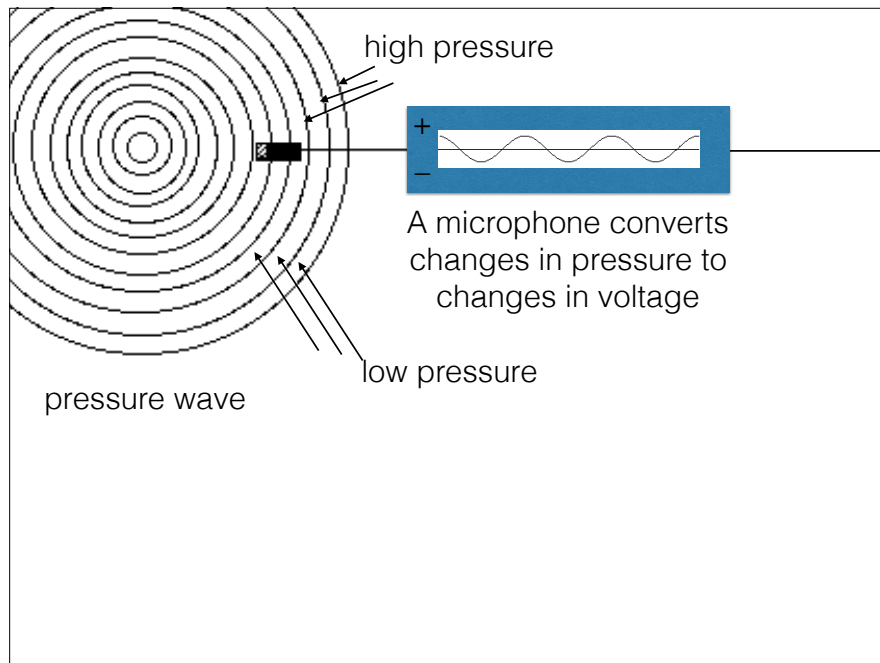


Introduction to Acoustics

1



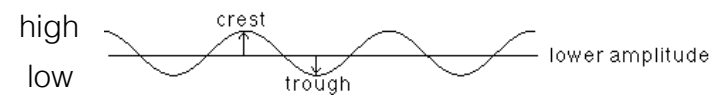
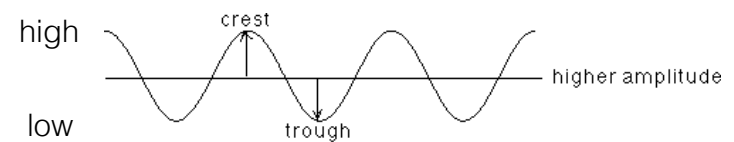
2



3

Amplitude

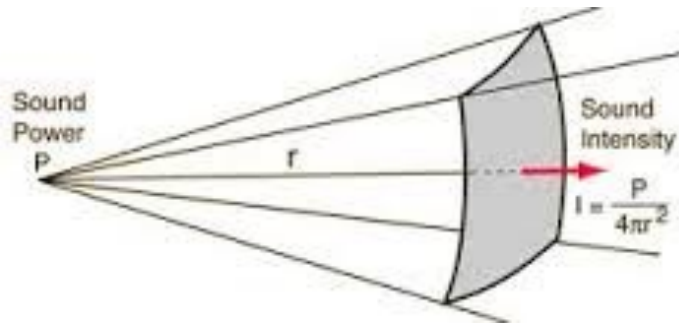
- The *amplitude* of a signal or sound is the maximum absolute value above or below the center line.



4

Intensity

- *Intensity* is the energy carried by the sound waves per unit area, measured in watts per square meter.



5

Decibels

- Named in honor of Alexander Graham Bell
- A decibel = 1/10 of a bel.
- A *decibel* is a measurement used to compare the ratio of intensities of two acoustic signals.

6

- A decibel is a logarithmic measurement that can measure the tremendous range of sound intensities that the human ear can perceive.

Source	Power (watts/m ²)	dB SPL
Threshold of pain	10	130
Jet takeoff from 500 ft.	1	120
Medium-loud rock concert	.1	110
Circular saw	.01	100
New York subway	.001	90
Jack-hammer from 50 ft.	.0001	80
Vacuum cleaner from 10 ft.	.00001	70
Normal conversation	.000001	60
Light traffic from 100 ft.	.0000001	50
Soft conversation	.00000001	40
Whisper from 5 ft.	.000000001	30
Average household silence	.0000000001	20
Breathing	.00000000001	10
Threshold of hearing in young	.000000000001	0

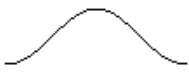
7

Physics
amplitude

Music
dynamics

8

- The *waveform* of an signal is the shape of the alternations between high and low points over time.

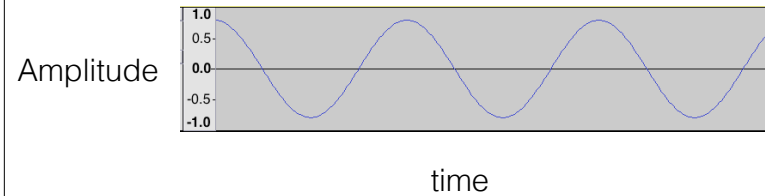
sine 

triangle 

square 

9

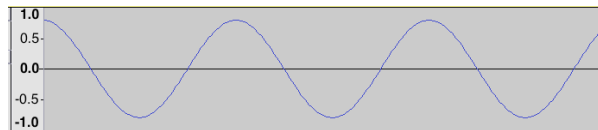
The graph shows changes in the amplitude of the signal over time



10

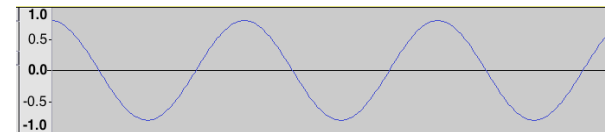


A *sine wave* has the simplest vibration pattern in nature and sounds like a single pure tone.



This signal is created by going through the wine wave vibration cycle 440 times a second

11



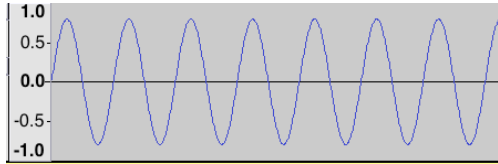
This signal is created by going through the wine wave vibration cycle 440 times a second

The *frequency* of a signal is the number of cycles in one second. We can say that this signal has a frequency of 440 cycles per second.

We use Hertz (Hz) as the unit for cycles per second. We can say that this signal has a frequency of 440 Hz.

12

- The frequency of this sine wave has increased to 880 Hz. Doubling the frequency of a wave makes the pitch go up an octave.

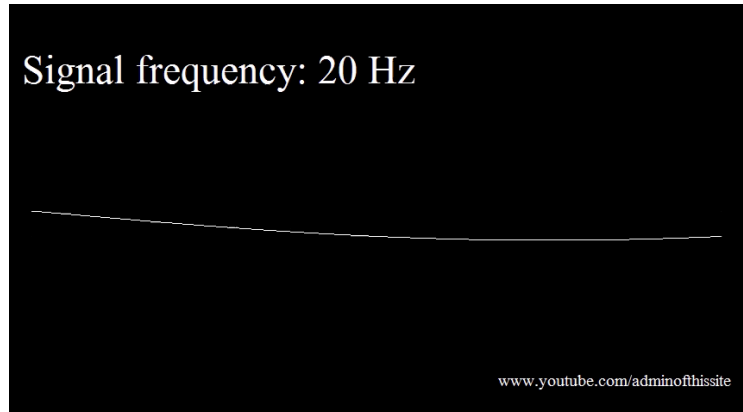


13

Range of Human Hearing

About 20 Hz to 20 kHz

Signal frequency: 20 Hz



www.youtube.com/adminofhissite

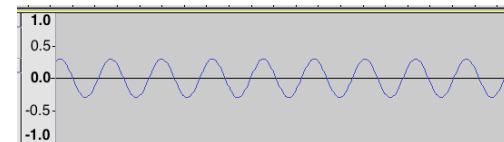
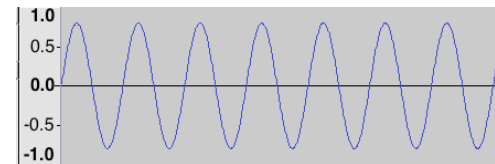
14

Physics
frequency

Music
pitch

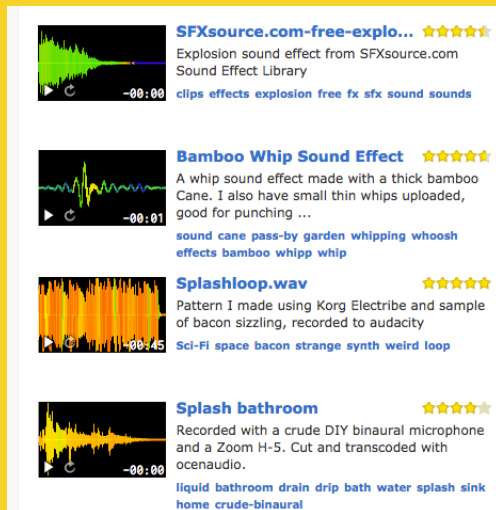
15

- The amplitude of the sine wave on the bottom has been reduced.



16

freesound.org



SFXsource.com-free-explo... ★★★★★
Explosion sound effect from SFXsource.com Sound Effect Library
clips effects explosion free fx sfx sound sounds

Bamboo Whip Sound Effect ★★★★★
A whip sound effect made with a thick bamboo Cane. I also have small thin whips uploaded, good for punching ...
sound cane pass-by garden whipping whoosh effects bamboo whipp whip

Splashloop.wav ★★★★★
Pattern 1 made using Korg Electribe and sample of bacon sizzling, recorded to audacity
Sci-Fi space bacon strange synth weird loop

Splash bathroom ★★★★★
Recorded with a crude DIY binaural microphone and a Zoom H-5. Cut and transcoded with ocaudio.
liquid bathroom drain drip bath water splash sink home crude-binaural

17

Work left on the lab computers is erased each time the computer is restarted.



18

Develop a system for how to store and name your files.

19

Rule of 3-2-1 for Backups

Have 3 copies
in 2 different formats
with at least 1 being offsite

20

ballstate.box.com

Create a new folder called "MUST121"

Inside that create two new folders:

- 1) "work"
- 2) "portfolio"

This is where you save copies of your work between lab session. You may also want to use a USB flash drive.