VA335
SOUND AND IMAGE

Week 3

Principles of Sound Design & Basic Acoustics

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Sight into
http://filmsound.org/terminology/diegetic.htm

The sound of Jurassic World

Source: https://vimeo.com/130365792

The Sound of Avatar

Source: http://vimeo.com/9246454

What is Sound?

Simply put, sound is the aural perceptions of vibrations.

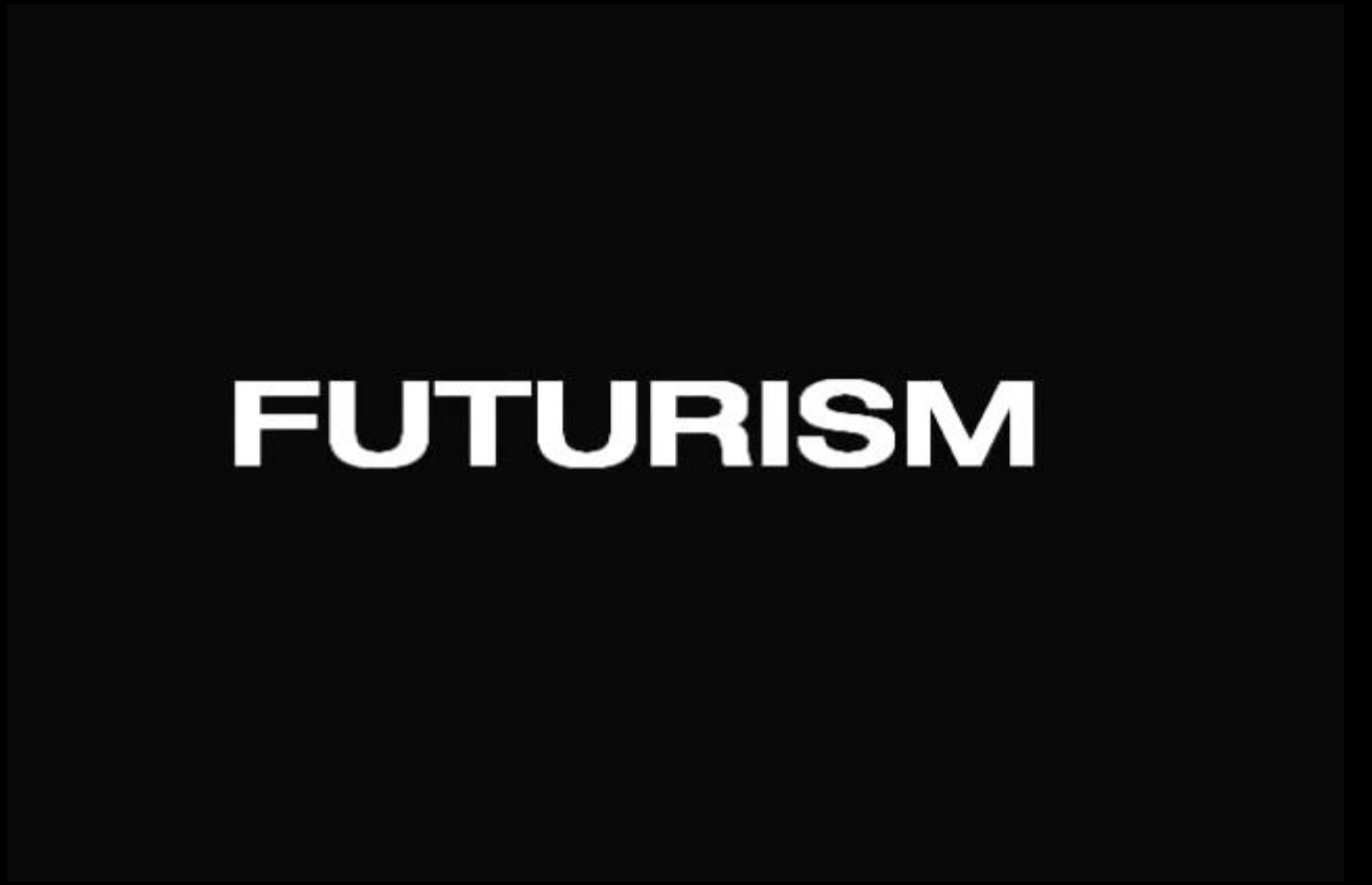
There are generally two types of audible sound that we perceive and interact with all the time: noise and music

Noise is defined as all sounds that are not organized or harmonious

Music is organized and intentional

Difference between Music and Noise

In the world of contemporary music, what was once called music and what was once called noise are now one and the same.



Source: https://www.youtube.com/watch?v=NZHpmJvU7sM&t=73s

Source: https://www.youtube.com/watch?v=IC3KMbSkYNI

Prepared Piano

Source: David Greilsammer - John Cage - "prepared piano"

MERZBOW — SILENT NIGHT

Source: https://www.youtube.com/watch?v=rBOanPoEek4

Empirical View

Sound is part of the physical world and as such follows the principles and laws of physics.
Our perception and understanding of sound, as humans is purely empirical.

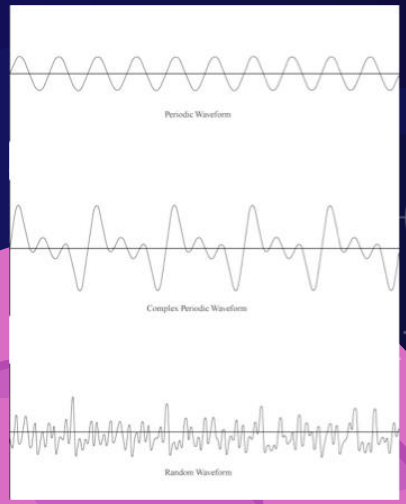
Sound Experience

If a tree fell in a forest and no one was there to hear it, no one experienced sound and therefore, as far as human perception is concerned, the tree made no sound.
But physically it did.

Lets have a break, we'll put some definitions

WAVEFORM

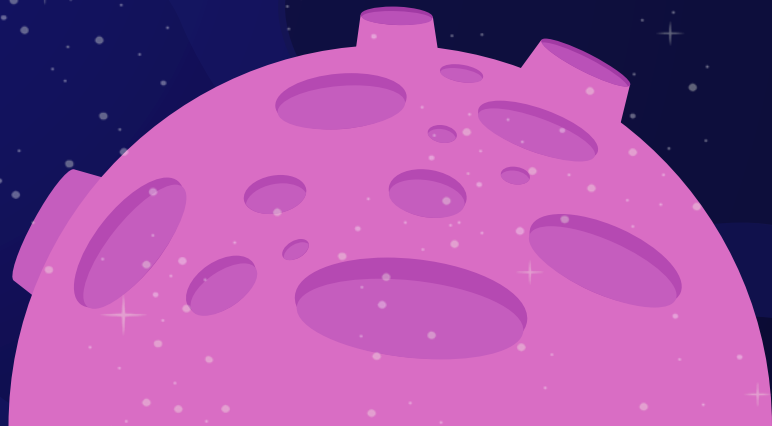
A waveform is a visual representation of a wave so that we can break down its components and analyze it.



Frequency

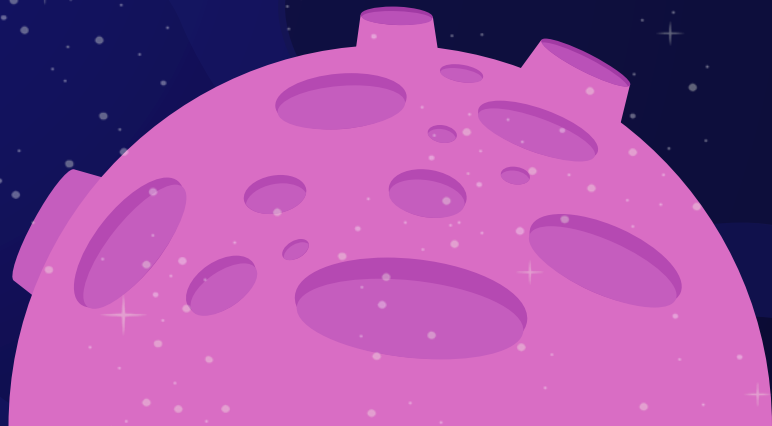
Frequency is defined as the rate at which a vibrating mass, electrical signal or acoustic generator reiterates a complete cycle of compression and rarefaction.

A cycle is represented by the 360 degrees of a circle.



HERTZ

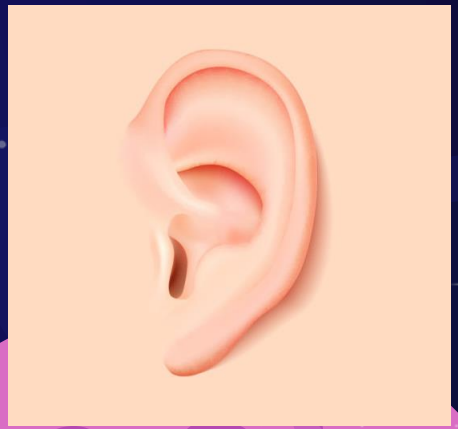
The rate at which the cycles occur per second, or the frequency, is measured in Hertz (Hz).
Example : A4



The Frequency Range of Human Hearing

The range of human hearing is approximately 20 Hz to 20,000 Hz.

Let's try how well you do with that!

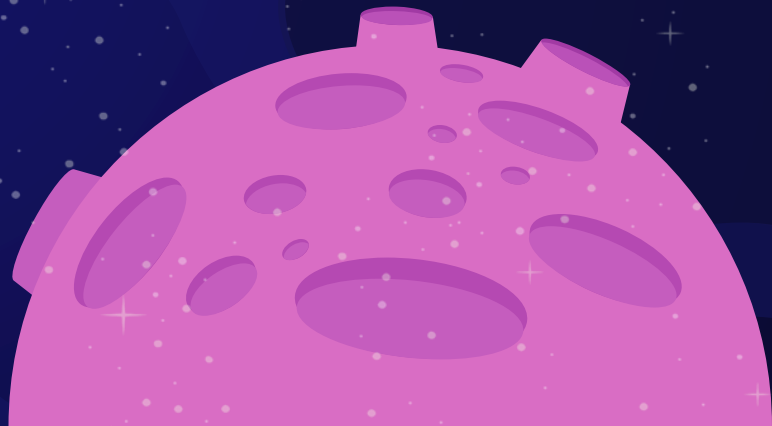


Species Approximate Range (Hz)

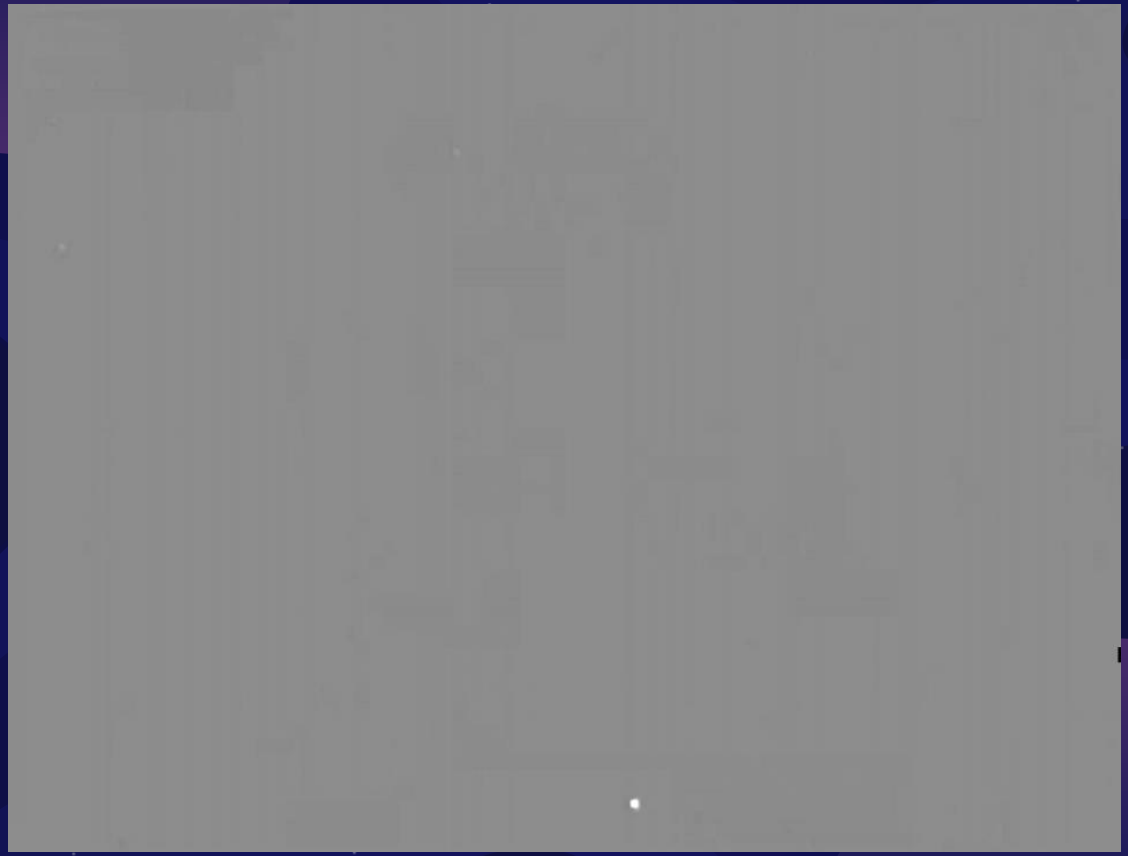
dog 67-45,000
cat 45-64,000
cow 23-35,000
horse 55-33,500
sheep 100-30,000
rabbit 360-42,000
rat 200-76,000
mouse 1,000-91,000
bat 2,000-110,000
beluga whale 1,000-123,000
elephant 16-12,000
goldfish 20-3,000
canary 250-8,000
chicken 125-2,000

AMPLITUDE

The amplitude of a sound wave is the maximum amount of instantaneous sound pressure deviations from normal atmospheric pressure.
Peak amplitude value

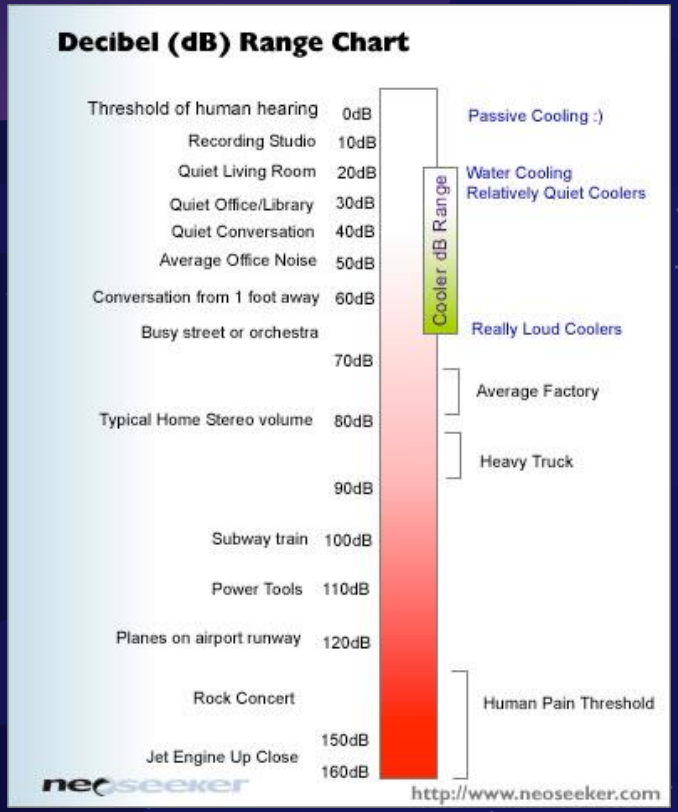


Sound Vibration Characteristics



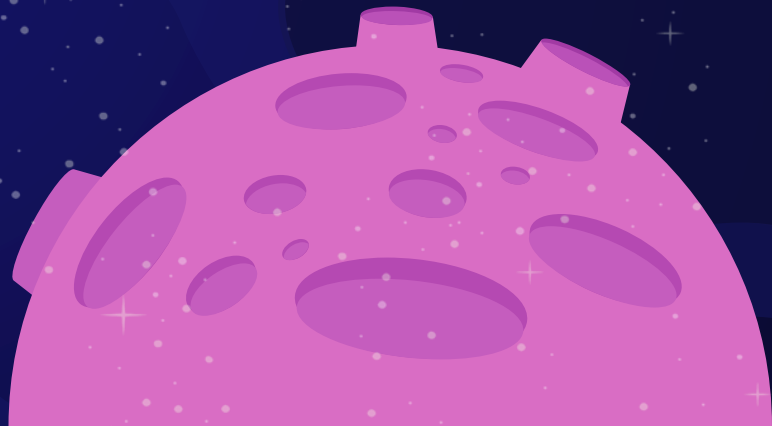
Source: https://www.youtube.com/watch?v=dbeK1fg1Rew

DECIBEL SCALE



Speed of sound

Standard 344 m/s
V = 0.6 m/s * Y
Y represents the difference between the given temperature, in Celsius and the standard speed of sound.
http://www.sengpielaudio.com/calculator-speedsound.htm



PSCYHOACOUSTICS VS ACOUSTICS

Psychoacoustics is the scientific study of sound perception.

Acoustics is the interdisciplinary science that deals with the study of all mechanical waves in gases, liquids, and solids including topics such as vibration, sound, ultrasound and infrasound.

Source: wikipeida

PSCYHOACOUSTICS VS ACOUSTICS

Pitch vs Frequency

Pitch : Sounds perceived as high or low.

Frequency : Specific measurement of the rate of repetition of a vibrating mass

PSCYHOACOUSTICS VS ACOUSTICS

Loudness vs Amplitude

Loudness : Subjective impression of the strength or weakness of a sound.

Amplitude : Measurement of the strength or weakness of air pressure produced by a sound signal.

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Source: http://designingsound.org/2014/12/designing-sound-discussion-group-psychoacoustics-for-sound-designers/

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing 400 ms Intervals

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing 200 ms Intervals

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing 100 ms Intervals

*Threshold of comprehension 100-50 ms

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing 50 ms Intervals

*Threshold of comprehension 100-50 ms

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing 25 ms Intervals

*Threshold of comprehension 100-50 ms

PSCYHOACOUSTICS

Now we'll have fun: Slice and Reverse Experiment

Playing Original Track