



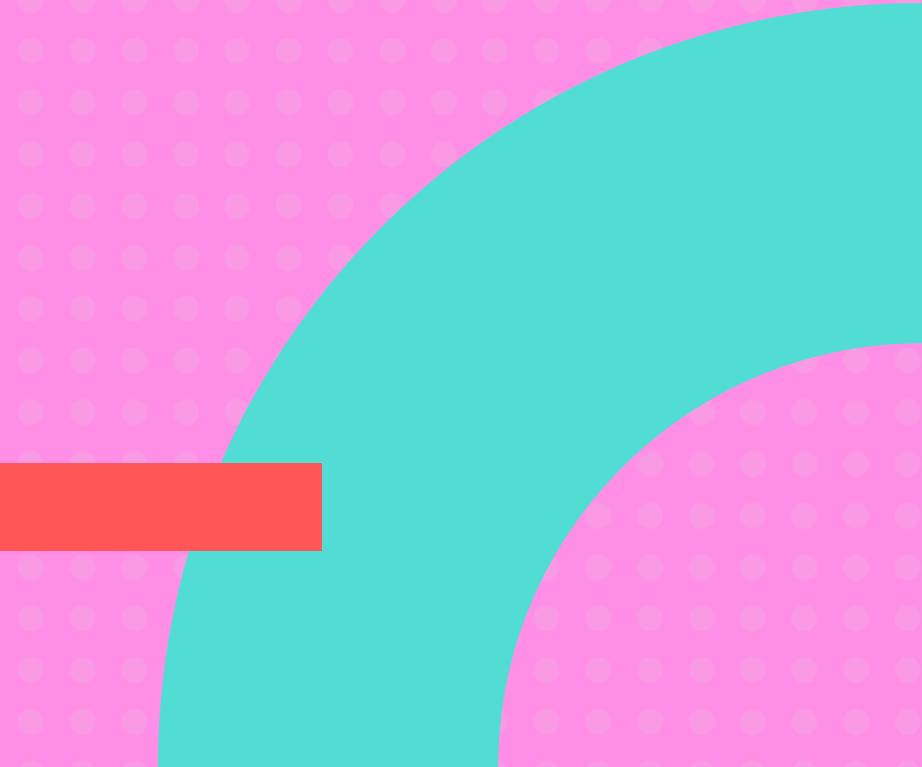
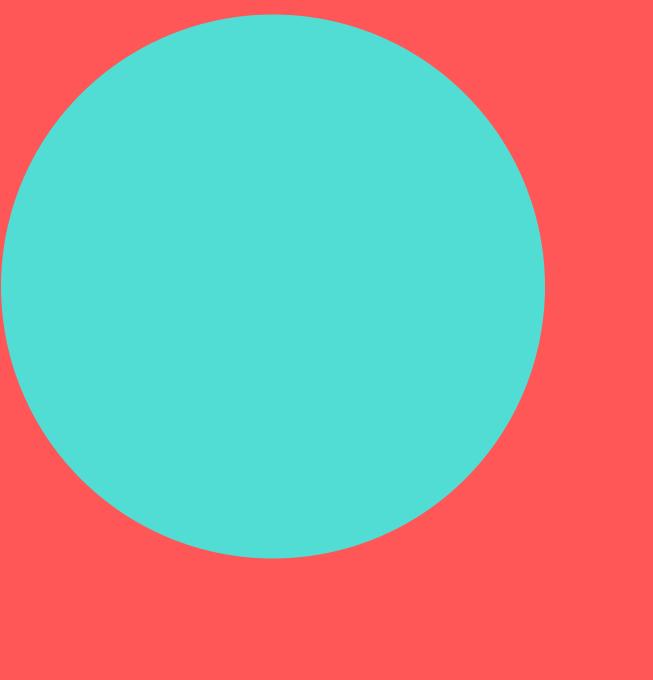
# EXPERIMENTS IN SOUND

With Ari Melenciano

# How this class will go:

- x Introduce ourselves
- x Intro to Sound Design + Synthesis
- x Composing with Korg
- x Learning how to mix, arrange + add effects in Ableton
- x Studio of experimentation
- x Share

# Agenda



Music theory  
Traditional Beat-making

**What we won't cover**

# Intro duct ions

Say the following:

- Name
- Where did you come from to get here today?
- What made you take this class?
- One of your favorite songs or albums?

WHAT IS  
SOUND  
DESIGN?



THE PROCESS OF  
RECORDING,  
ACQUIRING,  
MANIPULATING OR  
GENERATING  
AUDIO ELEMENTS.

WHAT IS  
SOUND  
DESIGN  
USED FOR?



- FILMS/MOVIES
- TV SHOWS
- COMMERCIALS
- THEATER
- VIDEO GAMES
- EXPERIMENTATION
  - SOUND ART
  - MUSIC

# LEARNING (Western) SOUND DESIGN

With our Korg sound machines



# ADSR

Attack

Sustain

Decay

Release

An envelope generator, describes how a sound changes over time.

# Attack

The initial part of the envelope of sound - changes occurring before the sound reaches its steady-state intensity.

the time taken for initial run-up of level from nil to peak, beginning when the key is pressed.

# Decay

The time taken for the subsequent run down from the attack level to the designated sustain level.

And other times, the rate at which the sound fades to silence.

# Sustain

The period of time during which the sound remains before it becomes inaudible, or silent.

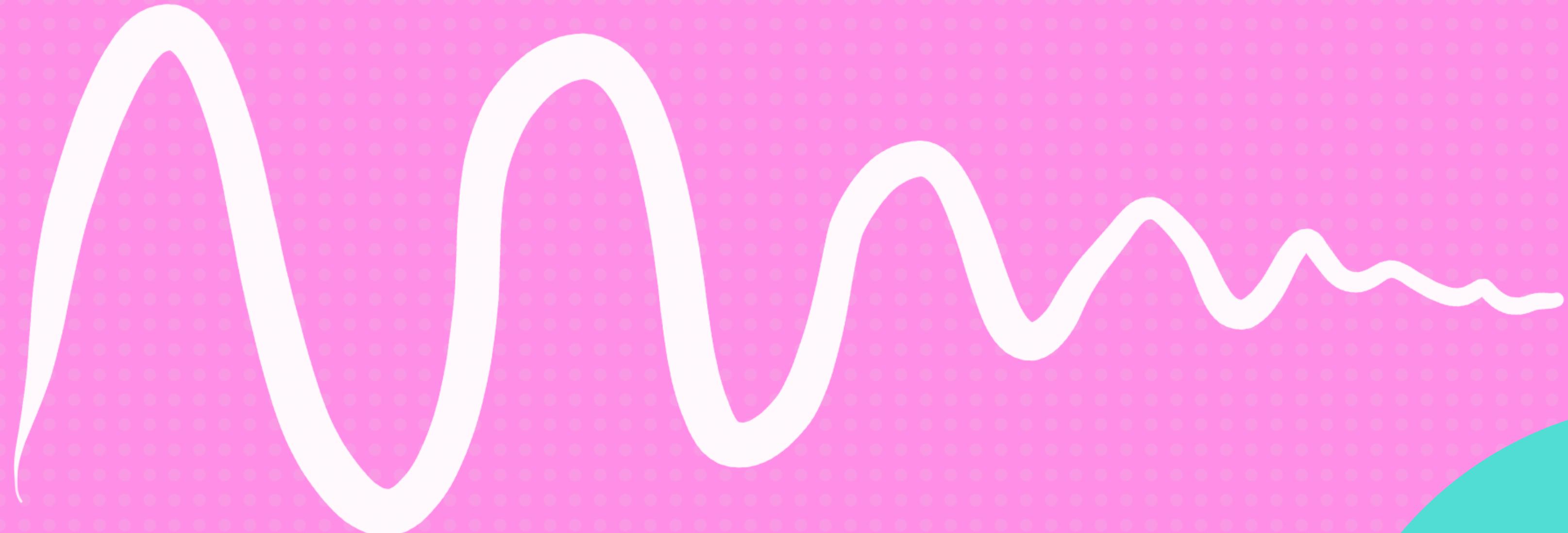
The level during the main sequence of the sound's duration, until the key is released.

# Release

The time taken for the level to decay from the sustain level to zero after the key is released.

other things that go into

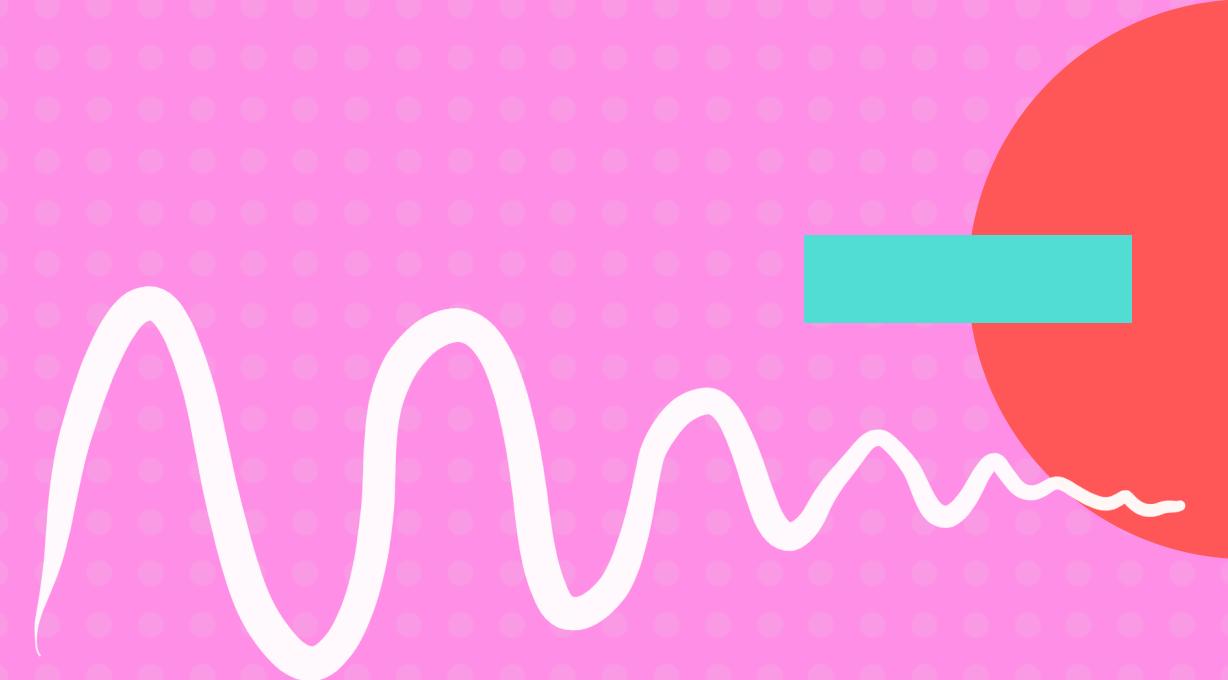
# The Sound Wave



# Timbre

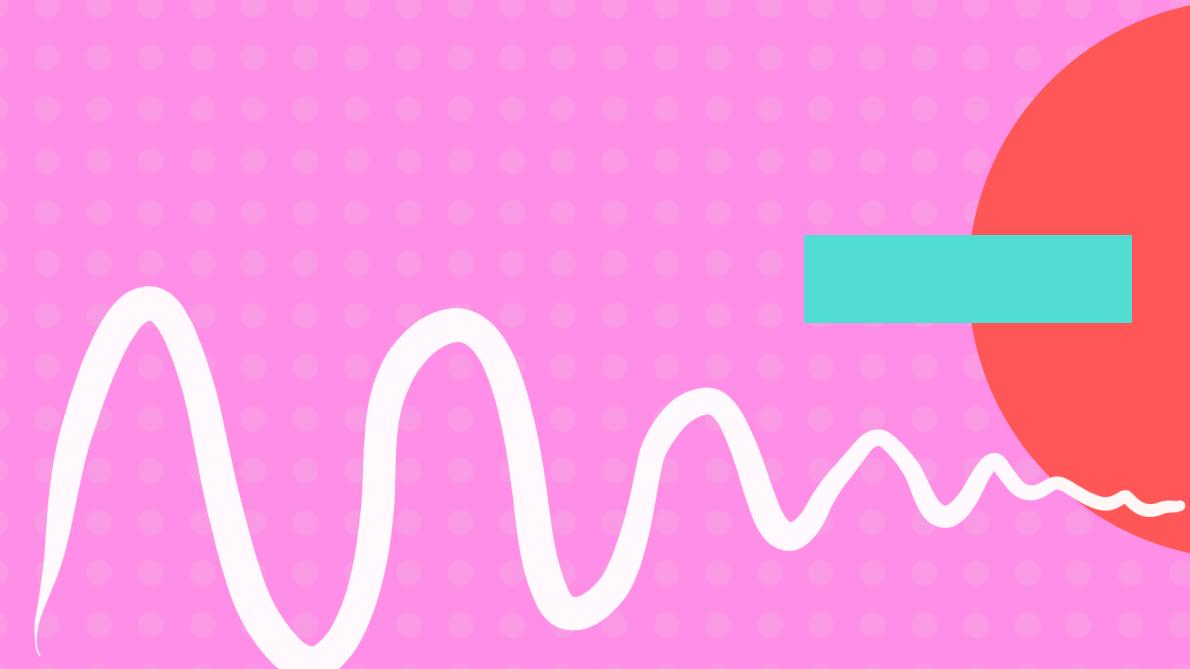
the perceived sound quality of a musical note, sound or tone.

Synonyms: Tone quality, Tone color



# Harmonics

The richness of a sound or note a musical instrument produces is sometimes described in terms of a sum of a number of distinct frequencies.

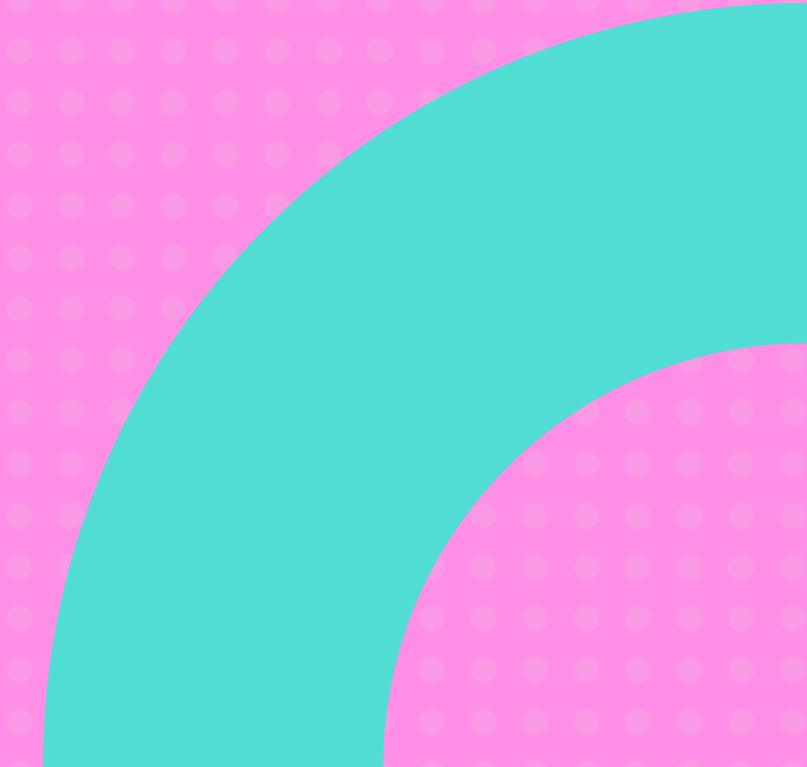
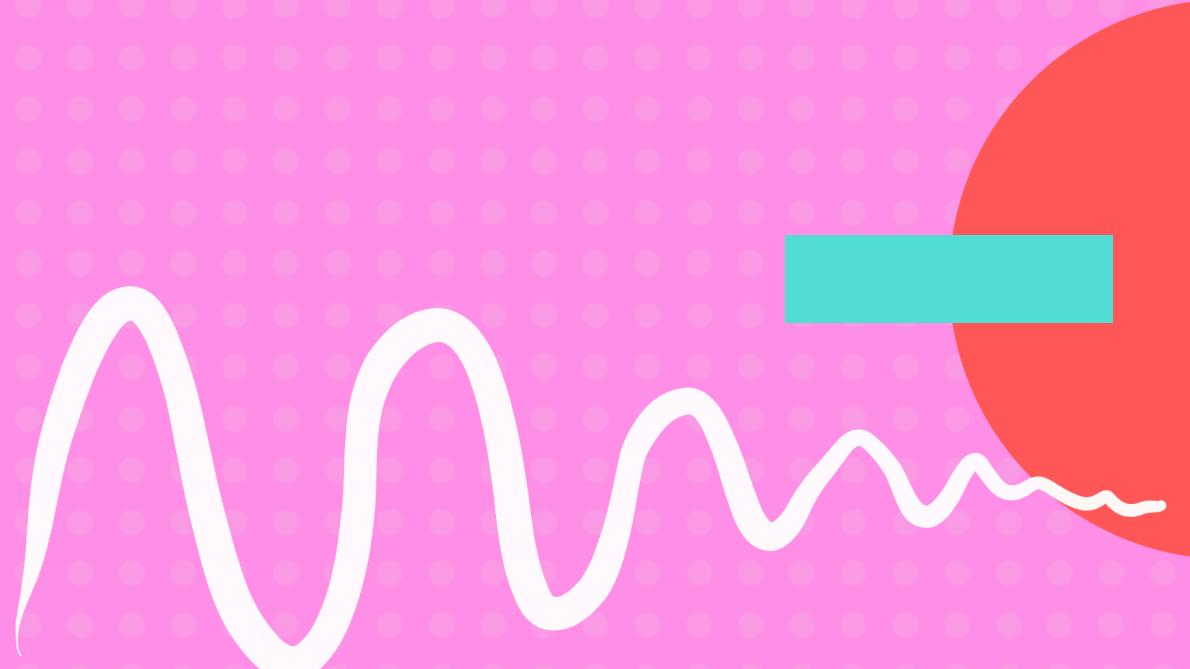


# Tone

A steady periodic sound.

Characterized by:  
its duration, pitch, intensity (or loudness),  
and timbre (or quality).

The notes used in music can be more complex  
than musical tones, as they may include  
aperiodic aspects, such as  
attack transients, vibrato, and envelope  
modulation.



# Pitch

The quality that makes it possible to judge sounds as "higher" and "lower" in the sense associated with musical melodies.



# Amplitude

The size of the vibration, and this determines how loud the sound is. We have already seen that larger vibrations make a louder sound



Low Amplitude

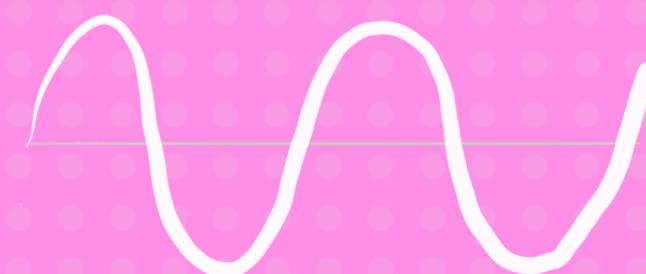


High Amplitude

# Frequency

The number of cycles per second (Hertz) (abbreviated as, hz) of anything that oscillates.

A low frequency sound (say, 50 hz) might sound like a low rumble, while a high frequency sound (say 12,000 hz), might sound more like a "sizzle".



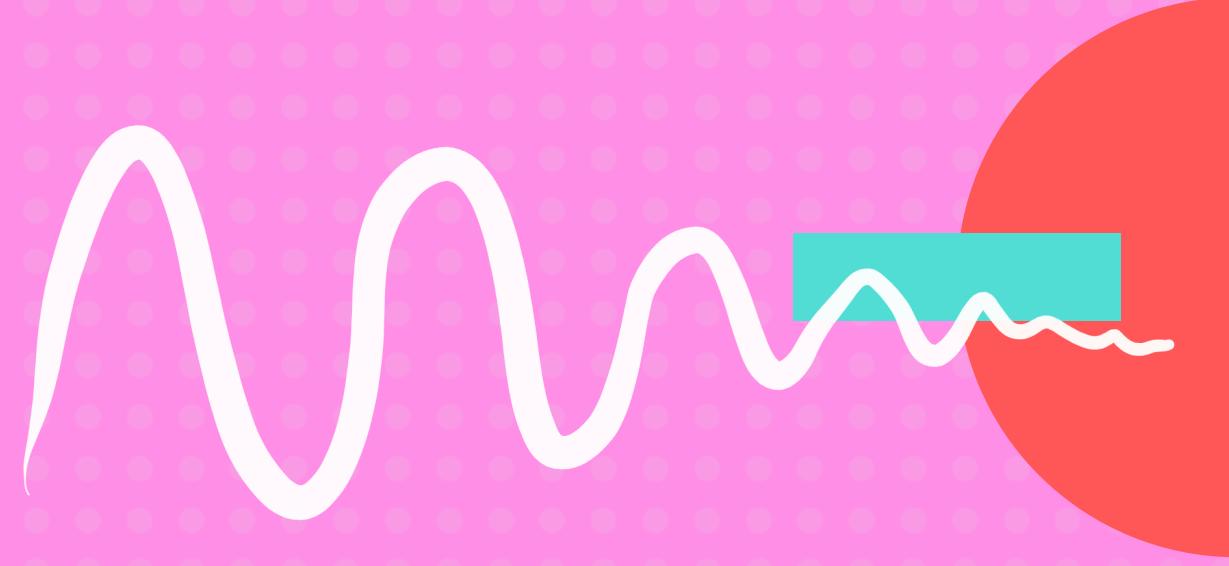
Low Frequency



High Frequency

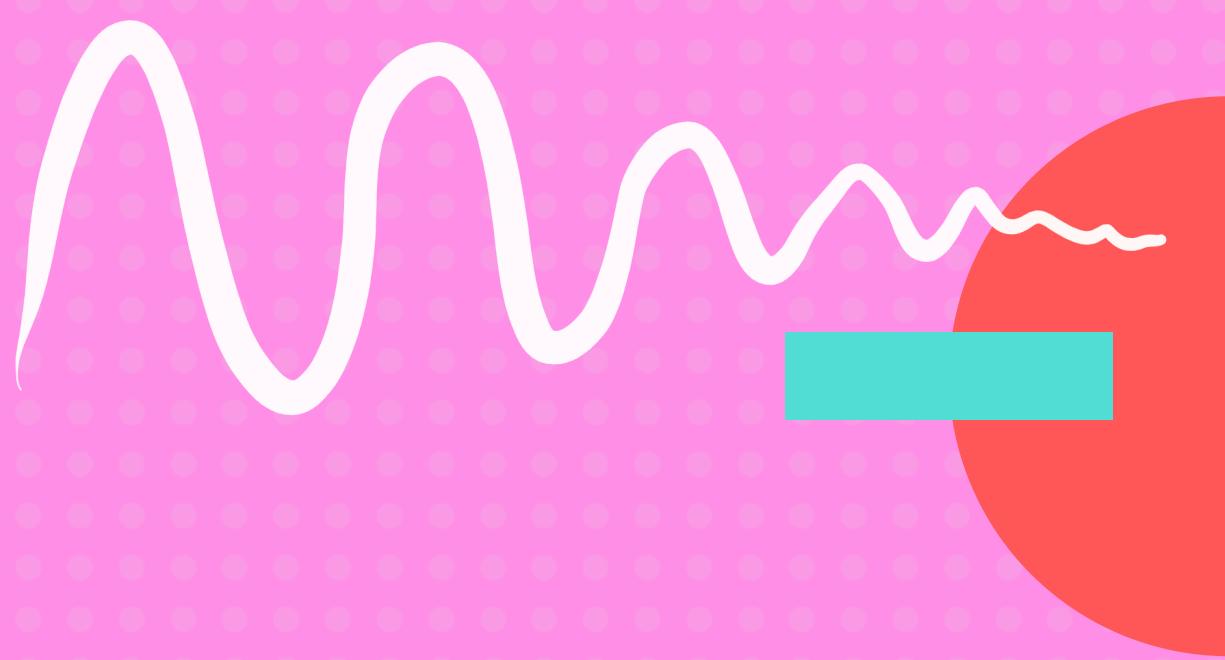
# Sound Wave

Created by vibrating objects and transmitted through a medium from one location to another.

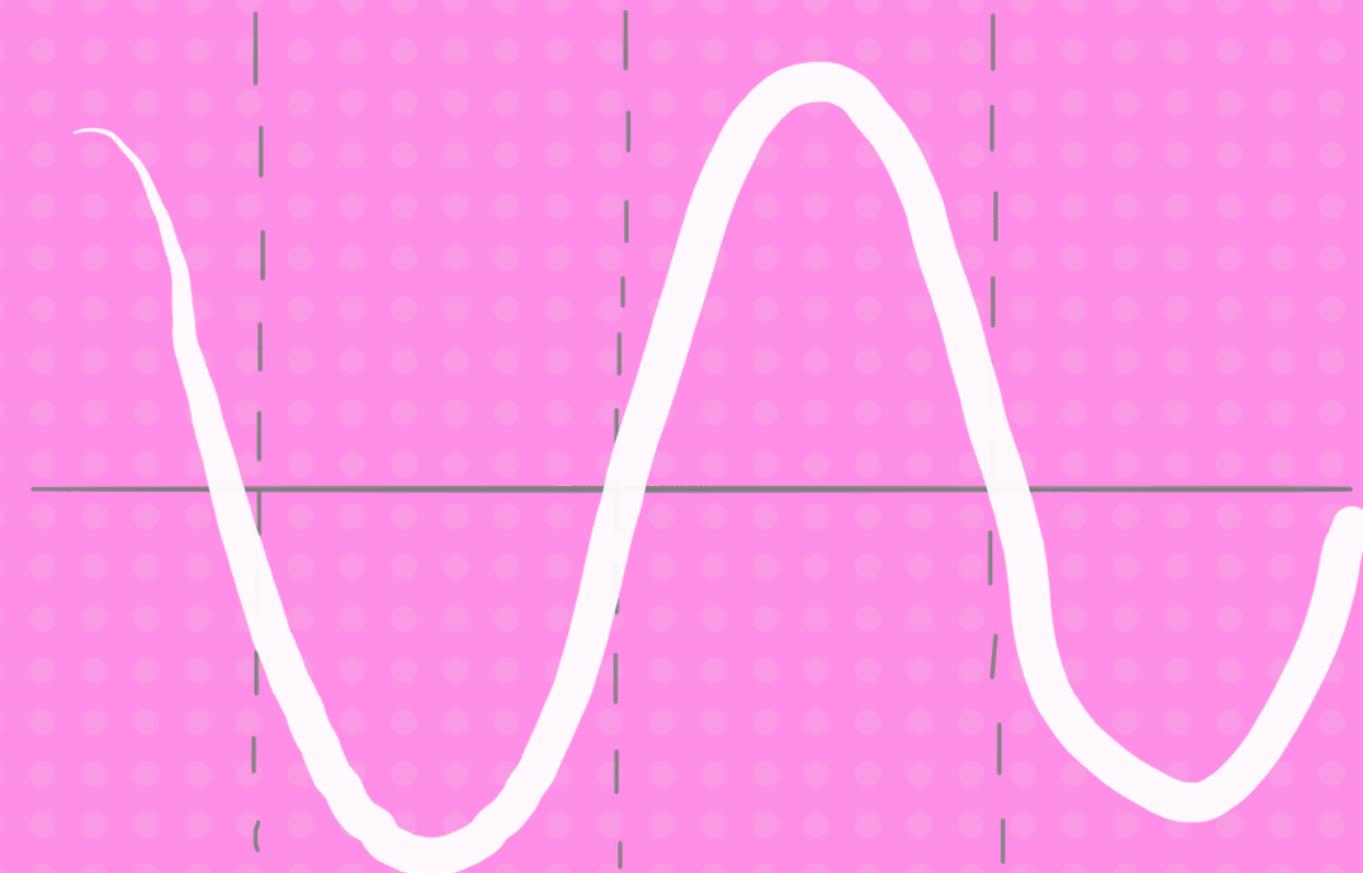


# Waveform

A depiction of the pattern of sound pressure variation (or amplitude) in the time domain.



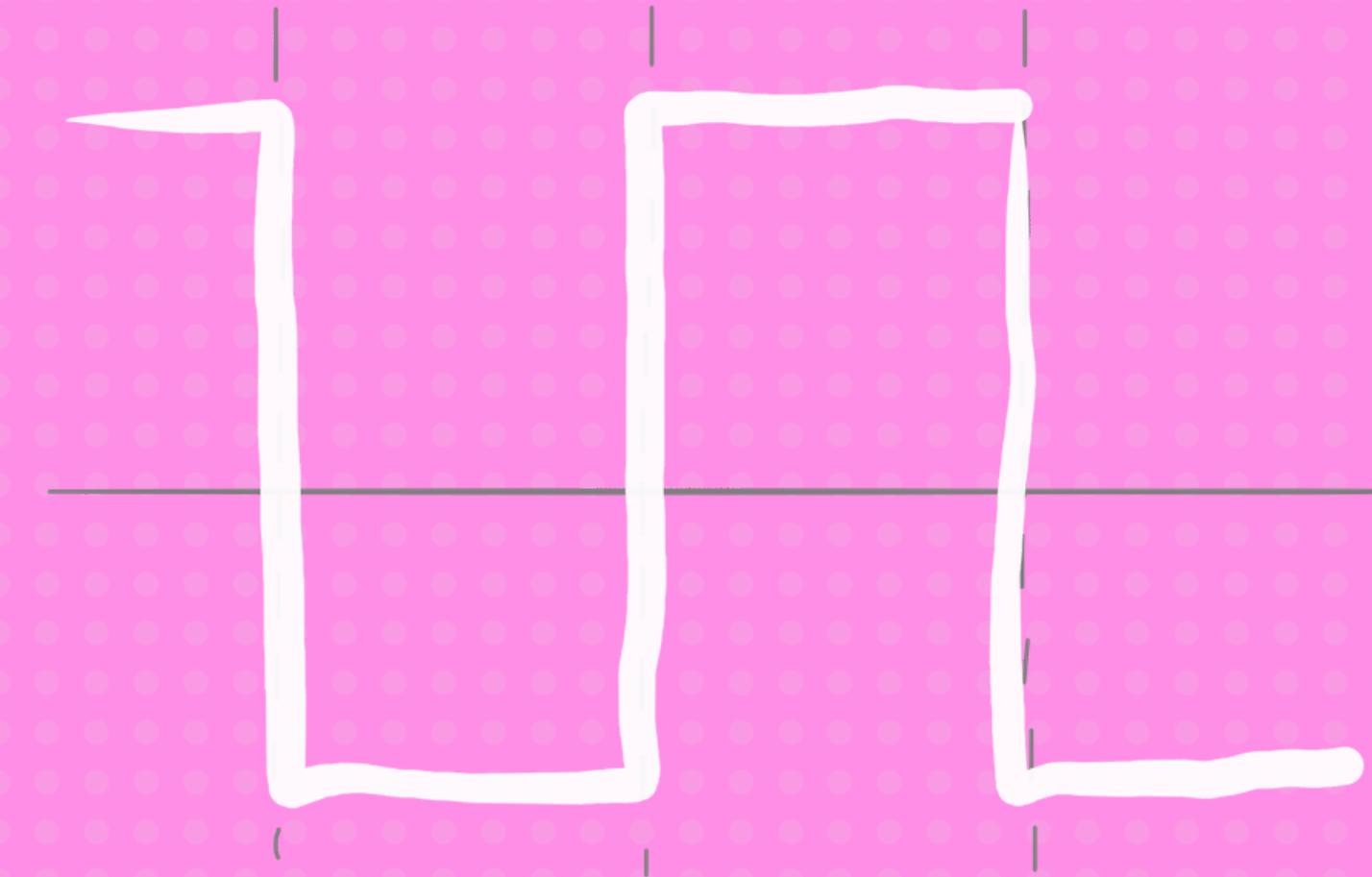
# Sine Wave



A sine wave is the simplest of all waveforms and contains only a single fundamental frequency and no harmonics.

It is the fundamental frequency that determines the pitch of a sound.

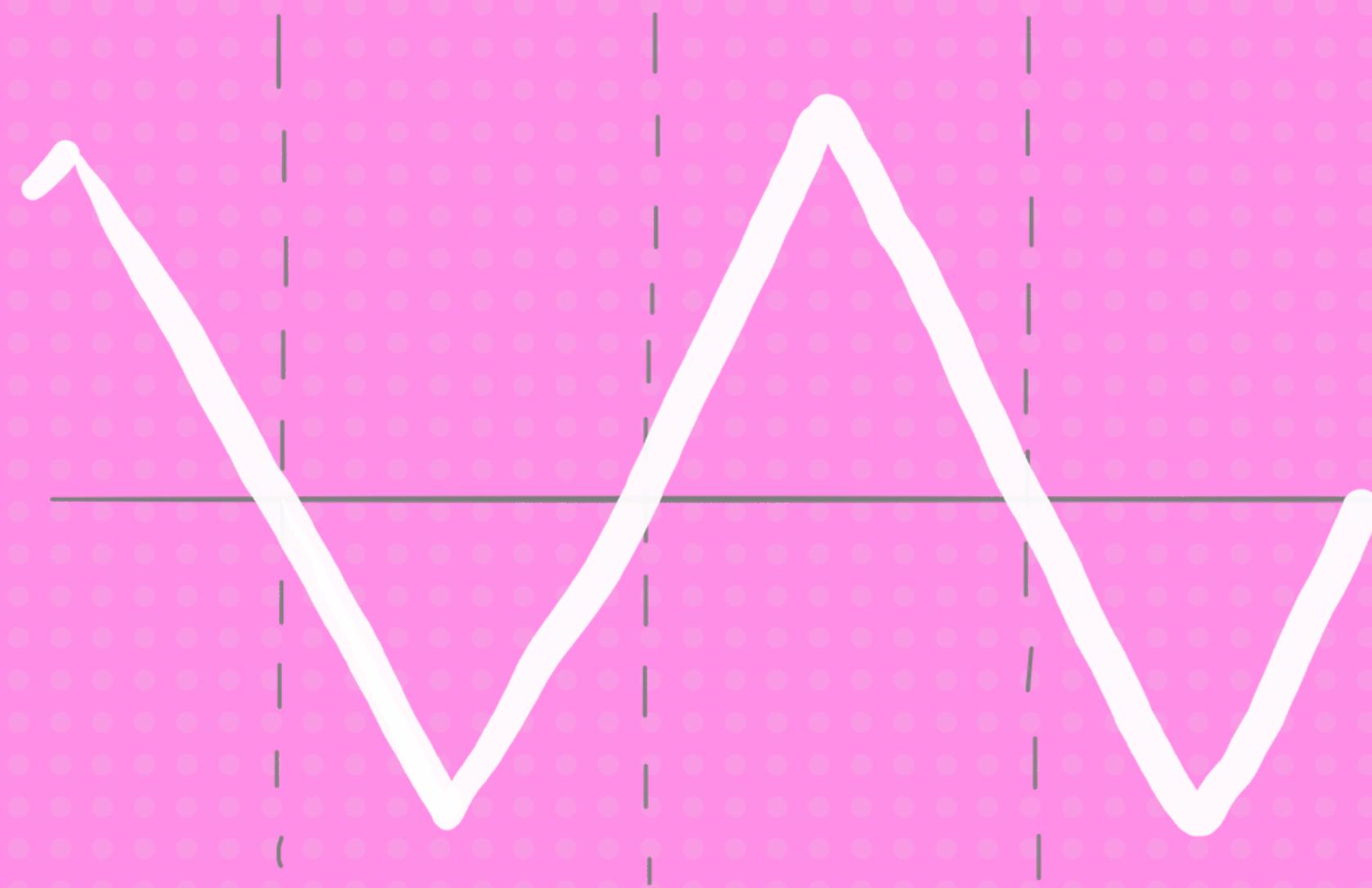
# Square Wave



More complex than a sine wave as it contains additional odd harmonic content.

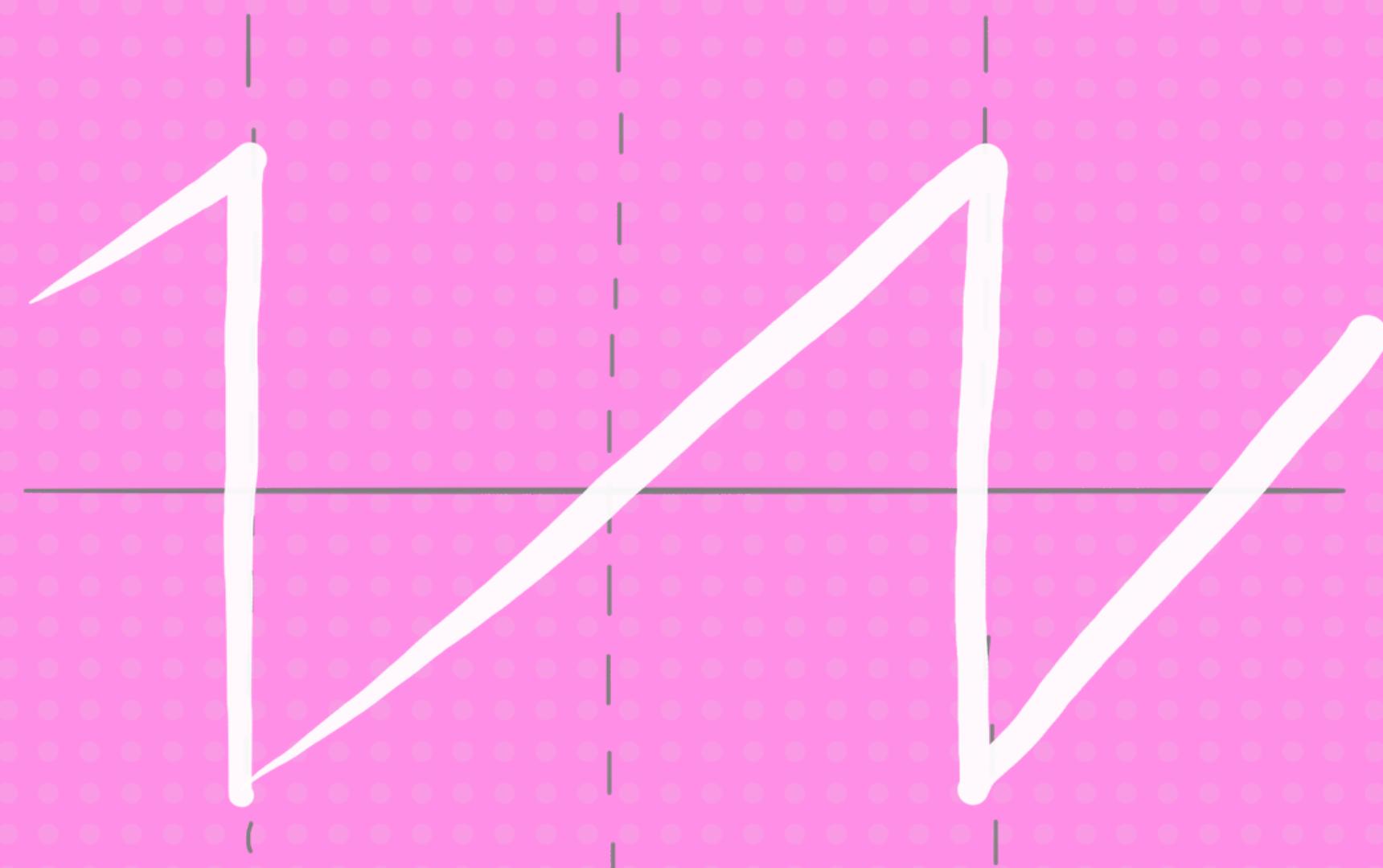
The amplitude instantly changes from its minimum to maximum value. There is no smooth transition as seen in the sine wave.

# Triangle Wave



Comparable to the square wave in that it contains a fundamental sound plus odd harmonics. However, the power of each harmonic in the triangle wave is twice as low as their counterparts in the square wave. Thus, the power of the harmonics in the triangle wave is reduced twice as fast as in the square wave.

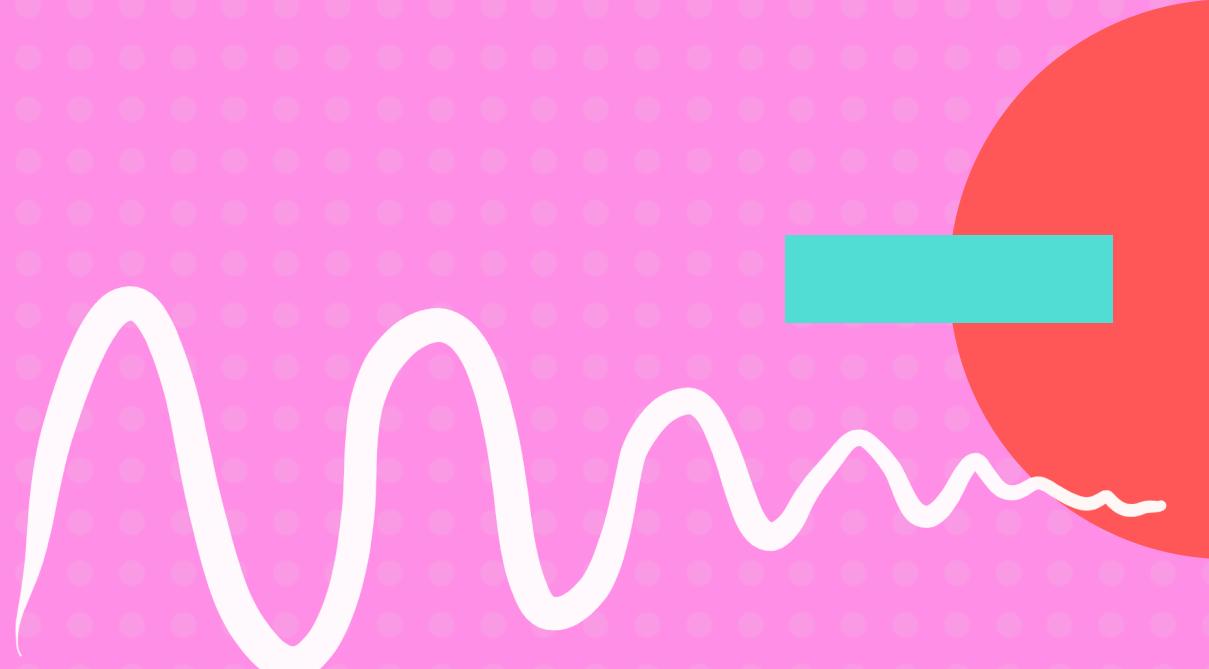
# Sawtooth Wave



Contains both odd and even harmonics and is said to be the richest in terms of timbre.

# Modulation

The change from one key to another.



# Audio Effects

In Ableton Live

# Core Effects:

**Modulation effects:** Chorus, Tremolo, Flanger and Phaser

Can give your sound a spatial and futuristic quality

**Time-based effects:** Reverb, Delay and Echo

Adds depth and space to sound

**Spectral effects:** EQ and Panning

Adds more definition, clarity and a sense of direction

**Dynamic effects:** Compression and Distortion

More even and levelled sound

& Filters

# Chorus

When similar sounds with slight variations in tuning and timing overlap and are heard as one.

# Tremolo

It varies the amplitude (volume) of a signal. It gives a trembling effect—the word ‘tremolo’ itself is Italian for trembling.

It's often confused with vibrato, which is a modulation of the pitch. Many Fender guitars have a misnamed ‘tremolo arm.’ Often that’s technically a vibrato arm because it varies the pitch, not the amplitude.

# Flanger and Phaser

When your original signal is modulated by another one, usually a Low Frequency Oscillator (LFO).

**Flanging**, while sonically similar to **Phasing**, is functionally closer to a **Chorus**. It uses a short delay (0.1ms - ~10ms) and modulates that against the dry signal with an LFO. If you kept extending the delay time on a flanger you'd end up with a chorus.

Flangers and phasers are recognizable for their 'swooshing' and swirling effect. These effects often have a watery quality to them at higher speeds. **Phasing** is generally more subtle than **flanging**. Both sound generally better (and less corny) if used with caution—but experimenting is key!

# Reverb

Short for reverberation.

Reverb is a bunch of echoes all happening at the same time, so you hear them as one single effect: reverb.

There's different kinds of reverb in many types of spaces. The most obvious examples of reverberant spaces are tunnels, cathedrals, halls and caves.

# Delays and Echo

Delay is an audio effect that records an audio signal for playback a set period of time after the original signal. Delay can be played back in different ways to achieve sounds such as **echoes** that decay over time, or a pronounced repeated doubling effect that adds new layers to a recording.

Normally used to describe more pronounced echo effects.

# Equalization (EQ)

Equalization (or EQ) is the cutting or boosting of a particular frequency (or range of frequencies) in the frequency spectrum.

Humans can hear audio frequencies roughly between 20 and 20 000 Hertz (Hz). Any sound that human ears perceive sits somewhere in that frequency spectrum.

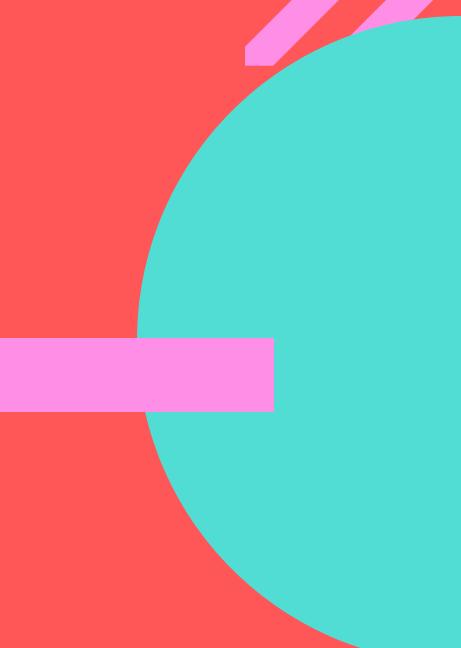
An Equalizer (EQ) divides that spectrum into sections (called 'bands') that you use to cut or boost parts of your sound.

# Panning

The distribution of a sound signal in a stereo (or multi-channel) field. Panning creates the illusion of a sound source moving from one part of the soundstage to another.

# Compression

The reduction of dynamic range—the difference between the loudest and quietest parts of an audio signal. When compression is applied, the quieter parts of the signal are boosted and the louder ones are attenuated (reduced of amplitude).



# Distortion

An overloading of the audio circuit that causes the signal to clip. It might sound like something you wanna stay away from—but when used right it's very effective as a creative tool. Bit-crushing is the lo-fi digital equivalent of the distortion effect.

# Filters

Attenuates (turns down) a set of frequencies above or below a determined threshold—called the ‘cutoff frequency.’ They’re often found inside of EQs or as stand alone plugins.

The most common types of filters are High-Pass Filters (HPF), Low-Pass Filters (LPF) and Band-Pass Filters (BPF). These are defined by their shape and ‘slope.’

**LPFs** let through all the frequencies below the cutoff frequency—and attenuate those above.

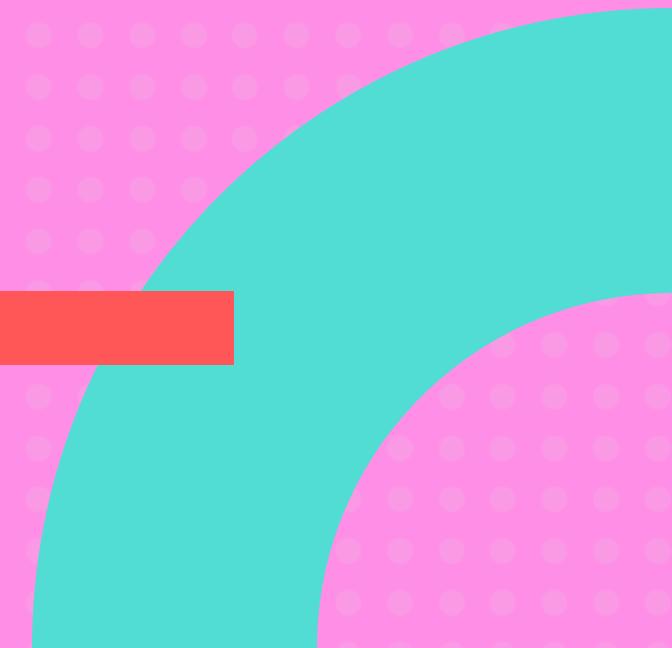
**HPFs** let through all the frequencies above the cutoff frequency—and attenuate those below.

**BPFs** let through all the frequencies in the determined band, and attenuate everything below and above.

# How to use Ableton Live



# How to use Korg Volca Machines



# Studio in Experimentation

List of resources at [www.github.com/Ariciano](https://www.github.com/Ariciano)

# Sharing our work

