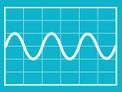
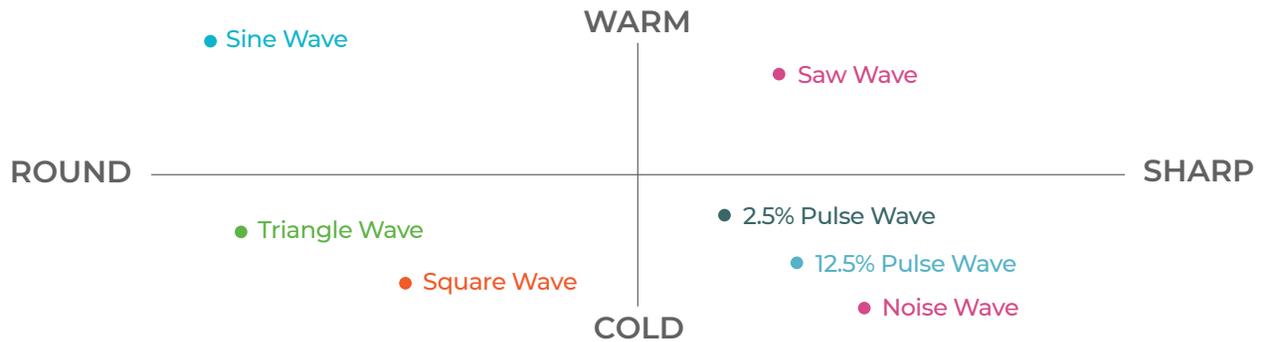
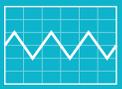


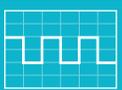
These are some of the most common waveforms out there. You'll see them in almost every synth you come across. It can be tricky to find the right sound for your synth, so we've made a graph ranking these sounds for warmth vs coolness and sharpness vs roundness.



**SINE WAVE** - The simplest sound possible. A sine wave is one single frequency and sounds very clean and round. Sine waves are useful when making all types of synth sounds.



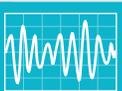
**TRIANGLE WAVE** - Also sounds very clear but with less warmth than a sine wave. Triangle waves are often used in pads and bass synths.



**SQUARE WAVE** - It looks like a square, and it sounds like one too. Square waves are kind of piercing, making them great for synth leads.



**SAW WAVE** - A very sharp sounding wave form. Good for making a synth sound more biting.

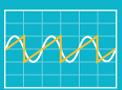


**NOISE WAVE** - Generates white noise static. Very noisy and chaotic but is very useful when quietly blended in with other sound waves. It's also useful for 8-bit style kick and snare drum sounds.



**PULSE WAVES** - Pulse waves are a lot like square waves, except they look like rectangles instead of squares. Different pulse waves have different percentages in their name. The lower the percentage, the sharper the pulse wave'll sound.

## COMMON COMBINATIONS



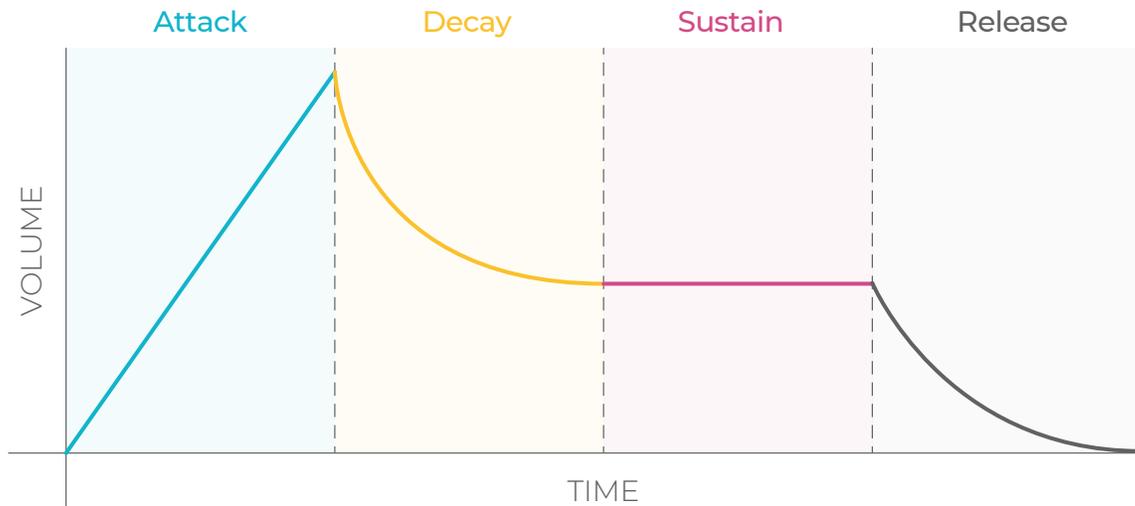
**SINE AND SAW WAVES** - This mixture of round and sharp tones is great for creating sounds that feel warm and full.



**SQUARE AND SAW WAVES** - A biting sound that cuts through the mix like a laser. Great for punchy leads.



**TRIANGLE AND NOISE WAVES** - Put these together for a retro drum sound reminiscent of early video game music. By playing lower notes, the triangle wave will sound like the bass-y "thud" of a kick drum, while the noise gives it the crunchy "pop" most drums have.



**ADSR** STANDS FOR ATTACK, DECAY, SUSTAIN, AND RELEASE. IT DESCRIBES HOW LOUD THE SYNTH IS AS TIME GOES ON.

**A**

**Attack** - How long it takes for the synth to reach full volume.

**D**

**Decay** - How long it takes for the synth to fade to its secondary volume.

**S**

**Sustain** - How loud the synth is after reaching secondary volume.

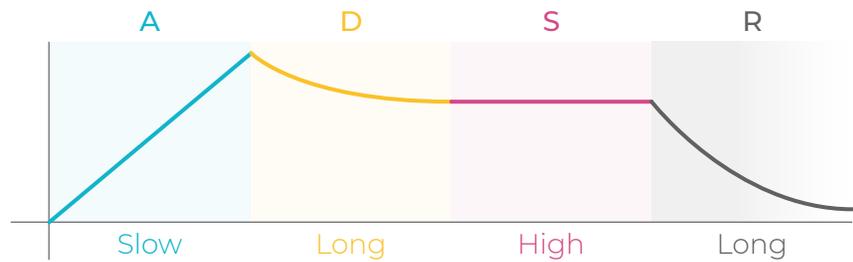
**R**

**Release** - How long it takes for the synth to completely fade out.

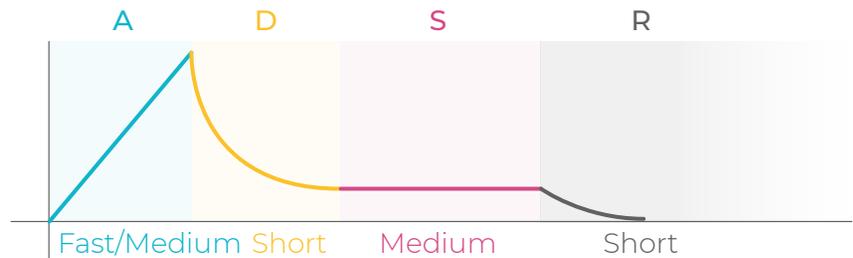
## ADSR EXAMPLES

Trying to make a particular type of sound? Check out this list of examples below to see how you should set the ADSR.

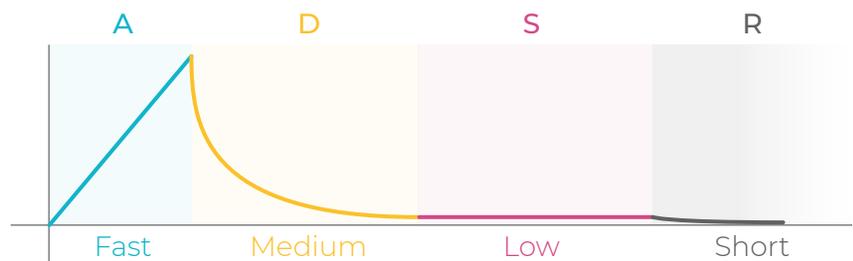
PAD



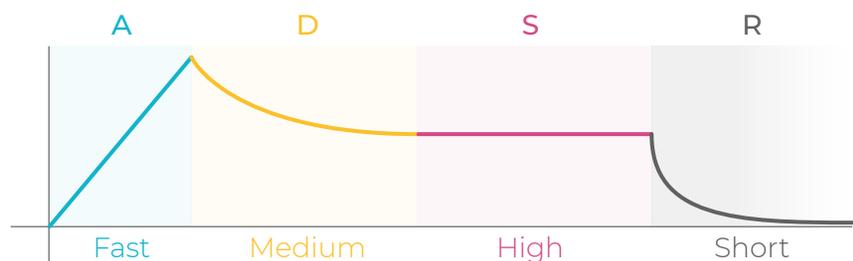
KEYBOARD



KICK  
+  
SNARE



BASS  
+  
LEADS



PLUCKS



## CORE COMPONENTS OF A SYNTH

### FILTER

Basically an EQ inside of a synth. Filters cut out unwanted frequencies in the synth.

### CUTOFF

The point in a frequency spectrum where a filter starts cutting out frequencies.

### RESONANCE

A sharp boost on a specific frequency, often just before the cutoff of a filter.

### LOW PASS FILTER (LPF)

Cut out high frequencies and allow low frequencies to pass through.

### HIGH PASS FILTER (HPF)

Cut out low frequencies and allow high frequencies to pass through.

### BAND PASS FILTER (BPF)

Cut out both low and high frequencies, leaving only midrange tones.

### ADSR (AMPLITUDE ENVELOPE)

How loud the synth is as time goes on. ADSR stands for attack, decay, sustain, and release.

### ATTACK

How long it takes for the synth to reach full volume.

### DECAY

How long it takes the synth to fade from the attack to the sustain.

### SUSTAIN

The volume of the synth after the initial attack.

### RELEASE

How long it takes for the synth to fade out completely. Sounds like a natural reverb at the end of the sound.

### LOW FREQUENCY OSCILLATOR (LFO)

A special oscillator that plays waveforms extremely slowly. Can't be heard by itself but is useful as an effect when placed on other parts of a synth.

### DEPTH

Decides how steep the effect of an LFO is.

### RATE

Decides how fast an LFO is.

### OSCILLATOR

The foundation of a synth. Oscillators create waveforms.

### OPERATOR

Another name for oscillators.

### WAVEFORM

The things you actually hear when playing a synth. Waveforms come in many different shapes, and waveforms of different shapes sound different from one another.

## TYPES OF SYNTHS

### ADDITIVE SYNTHESIS

Synths that make sounds by combining simple waveforms at different pitches.

### SUBTRACTIVE SYNTHESIS

Synths that use filters to shape the tone of a complex waveform.

### SAMPLER

Samplers are special synths that play back recordings. They usually have extra effects you can use to change the recording and make it sound different.

### MODULAR SYNTHESIS

Synths that are made up of a few different modules. Each module in a modular synth serves one specific purpose.

### MODULES

Individual pieces of a synth that can be connected to one another to create sound.

### WAVETABLE SYNTHESIS

Synths that play bite-sized samples of recordings on a loop.

### WAVETABLES

Tiny clips of recordings that can be loaded into a wavetable synth and played as single notes.

### WAVETABLE POSITION

Wavetable synths usually have multiple wavetables loaded at one time. The wavetable position knob allows you to scan through different wavetables.

### FM

Synths that use at least one oscillator to modulate another, creating a new sound.

### CARRIER OSCILLATOR

The oscillator of an FM synth that is actually heard.

### MODULATOR OSCILLATOR

The oscillator of an FM synth that modulates the carrier.

## MISCELLANEOUS SYNTH TERMS

### SEQUENCER

Sequencers are common synth tools. When a note is played, a sequencer will play it repeatedly in a rhythm decided by the musician.

### ARPEGGIATOR

A special type of sequencer found in many synths. An arpeggiator not only plays notes in a repeated rhythm but adds in a melodic pattern.

### PATCH CABLE

A fancy name for wires. These cables are used to connect different modules in a modular synth.

### PATCH

A fancy word to describe a synth sound. For example, many synths have an "electric piano" patch. Many synths come with preset sounds and also allow you to create and save your own.

### LEAD

A focal synth sound that is intended to play lead lines. Synth leads usually play the melody in instrumental pieces or the countermelody when vocals are present.

### PAD

A background synth that is intended to add atmosphere. Synth pads are usually very spacious, helping a song sound more full and lush.

### AMPLITUDE

Another word for volume.

### MONOPHONIC (MONO)

When a synth is monophonic, it can only play one note at a time. Mono synths are great for making basses and leads.

### POLYPHONIC (POLY)

When a synth is polyphonic, it can play multiple notes at a time. Poly synths are great for emulating keyboards and playing chords.