> "
> Once you've learned the basic food groups of synthesis, then there's no plugin, no synth that's going to completely mystify you. — *deadmau5*
> "

CHAPTER RECAP

Great producers don't just settle for using plug-in presets or out of the box sounds in their tracks. Learning the basic principles of how synthesizers produce sounds will help you build and tweak patches to generate sounds no one can replicate.

The best way to learn synths is by experimenting with them. Get yourself a cheap, simple synth and start twisting knobs and making noise until you get a feel for what each of the parameters does. Joel taught himself all the basics with a Roland MC-303. (You can also use a plug in like Serum.) Once you've got some experience, you'll be able to hear a sound, like the deadmau5 pluck and have a good idea of how to build it yourself.

The basic components of a synthesizer are sound sources (oscillators) and modifiers (filters, envelopes etc). Oscillators produce simple waveforms, and modifiers make these simple sounds more complex. In this lesson, Joel focuses on:

Oscillators: which produce the basic waveforms of sine, square, and sawtooth, each with its own distinctive sound. These waveforms can have different frequencies, usually from 0 to 20,000Hz (Hz = oscillations per second). Having two or more oscillators playing waveforms on top of each other is called "additive synthesis."

Unison: is a kind of additive synthesis, where the synth generates multiples of the same wave form, all slightly out of tune with each other, to create a broader, richer sound.

Filters: modify a sound by taking away certain frequencies and adding emphasis to others. A low pass filter (LPF) takes out

SUBCHAPTERS

‣ We're Here to Create Sounds No One's Ever Heard
‣ Synth Basics: Waveforms and Filters
‣ Using Envelopes and LFOs to Modulate Sound
‣ How to Build the Deadmau5 Pluck
‣ Your First Synth can Teach You Everything

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certain high frequencies (the low freqs "pass" through). A high pass filter (HPF) does the opposite. A band pass cuts out low and high frequencies around a certain middle band. The "cutoff" of a filter determines the frequency where the modification begins. The "resonance" affects the sharpness of the modification.

Envelopes: shape sounds over time. They usually control either the volume of a sound or the amount it is affected by the filter, from the time a note starts to the time it stops. The basic parameters of an envelope are: attack, decay, and release. If the envelope is effecting volume, attack determines how long it takes for the sound to reach full volume; decay determines how long it takes for the volume to start fading down; and release determines how long it take for the sound to go silent once the note is no longer being played. Those parameters together are often referred to as ADR. Sometimes an envelope will also have a sustain parameter (this is an ADSR envelope). Sustain determines how long a sound holds at a given volume after it has decayed.

LFO (low frequency modulation) and *Cross Modulation*: occurs when one waveform alters a parameter of another—usually either the pitch, the volume, or the action of the filter. This can produce tremolo-type effects (waveforms altering volume), vibrato (altering pitch), or sweeping sounds (altering the filter). If the modulation is happening at a rate of about 20hz or lower, it's considered LFO.

TAKE IT FURTHER

▸ Listen to The Prodigy's "Firestarter", and try to identify the preset sound from the Korg Prophecy.

▸ Listen to "The Veldt" for an example of the pluck sound you just learned how to build. Can you hear its parameters changing over the course of the track? What do you think is being altered?

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‣ For deeper dives into synth basics, try one of these websites:

 ▾ Synthesizeracademy.com

 ▾ Beausievers.com

ASSIGNMENT

‣ Now that you've watched Joel do it, try to build the deadmau5 pluck on your own, using the synth or plug-in of your choice. How close can you get it? Now play around with the parameters and make a totally new pluck sound that you find interesting and unique. You might want to try using it to play one of the melodic ideas in your bin.

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