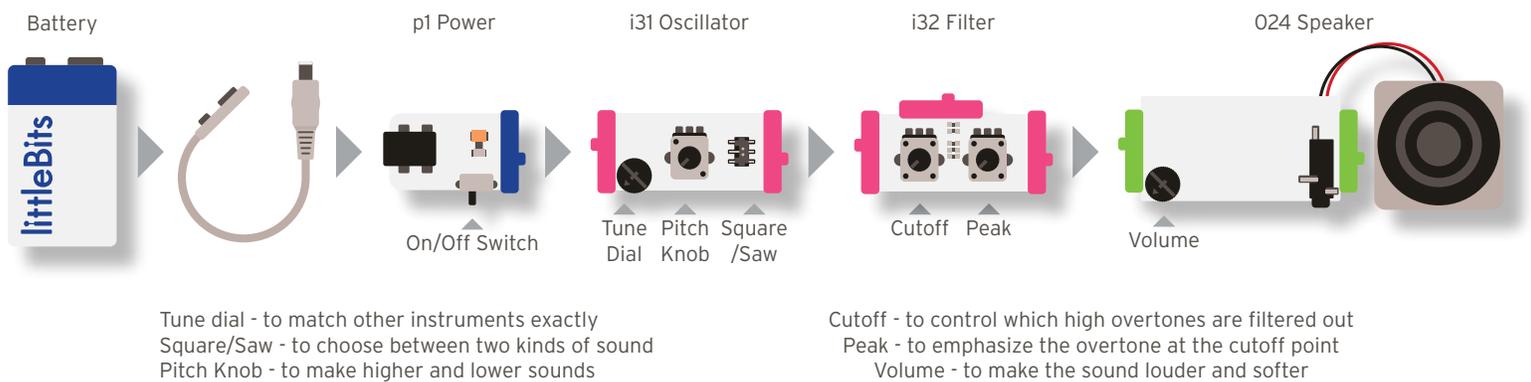


Filters are everywhere. The strainer in your kitchen at home is a filter. It lets some things pass through (like the hot water you from your pasta pot) and keeps other things inside (like your dinner).

You might think that the sound coming out of the **oscillator** is a simple tone, but it's actually a complex, multi-layered mixture of what musicians call frequencies. An example of high frequency would be the whistle of a not teapot. A low frequency sound would be like the rumble of thunder. **The low pass filter** in the Synth Kit allows you to subtract some of the higher frequencies from the sound, and allow lower frequencies to pass through the speaker.



Frequency Sweeps.

Start with the cutoff knob turned all the way to the right (clockwise) and the peak knob turned all the way to the left (counterclockwise). The filter is allowing all of the sound from the oscillator through. Next, turn the cutoff knob back and forth to perform frequency sweeps. As you turn the cutoff knob left, more and more of the high sounds are subtracted. Without using the peak knob, this will sound a lot like turning the volume up and down. Turn the peak knob up a bit to make the filter whistle part of the sound. This will make your frequency sweeps much more interesting and create more sound possibilities.

Explore the sounds you can make by changing:

- The oscillator's pitch
- The oscillator's square/saw switch
- The filter's cutoff
- The filter's peak

Can you create some of these sounds?

- Computer talk (wah-wahs, wows, and others)
- A rumbling spaceship engine



The Random Module (i34) in your Synth Kit can generate white noise, like a fan, waterfall, the ocean or wind. Slide the Random module's switch to "noise" and place it in your circuit where the oscillator is now.

i34 Random



Can you create some of these white noise sounds?

- Ocean waves
- A howling wind



What other sounds can you discover using the filter module?

Draw or find a picture that represents the sounds you've found.

Share your picture(s) and sound(s):

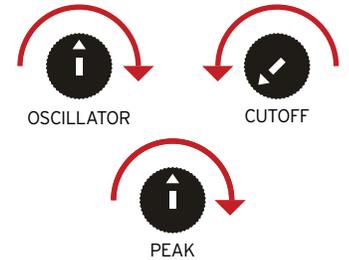
1. With a partner
2. With your teacher
3. Online in a blog post, tweet, or facebook post (with your teacher's permission)



Computer Talk

- Oscillator Set the switch to square and turn the knob to halfway.
- CUTOFF Turn the cutoff all the way counterclockwise and the peak to half way.

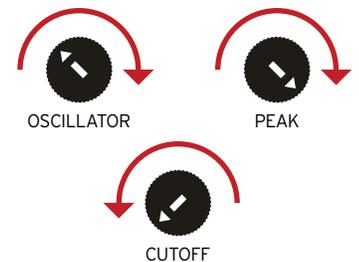
Turning the cutoff knob in the range just below halfway will create this effect.



Spaceship Engine

- Oscillator Set the switch to square and turn the knob to 1/3 (see lawn mower instructions from lesson 01).
- Filter Turn the peak knob all the way clockwise and the cutoff knob all the way counter clockwise.

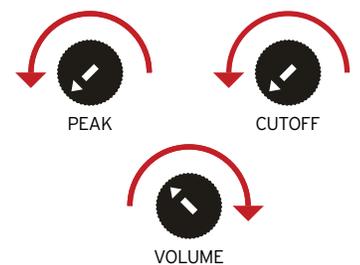
Turning the filter knob clockwise slowly, you will start to hear a low rumble. Adjusting all three knobs slightly while in this range will allow a bunch of different rumbly sounds.



Ocean Waves

- Random Set to noise.
- Filter Set both knobs all the way counterclockwise.
- Speaker Set the volume to medium low.

Turn the cutoff dial clockwise until you begin to hear white noise. Turning the knob up and down just above this point will create the ocean wave sounds.



Howling Wind

- Random Set to noise.
- Filter Set both knobs to halfway.

Turn the cutoff dial up and down in this range will create a howling wind effect.

