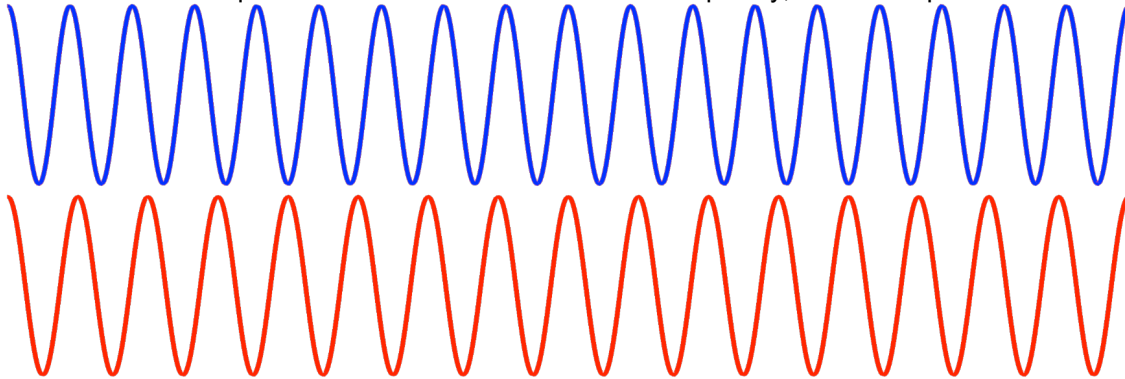
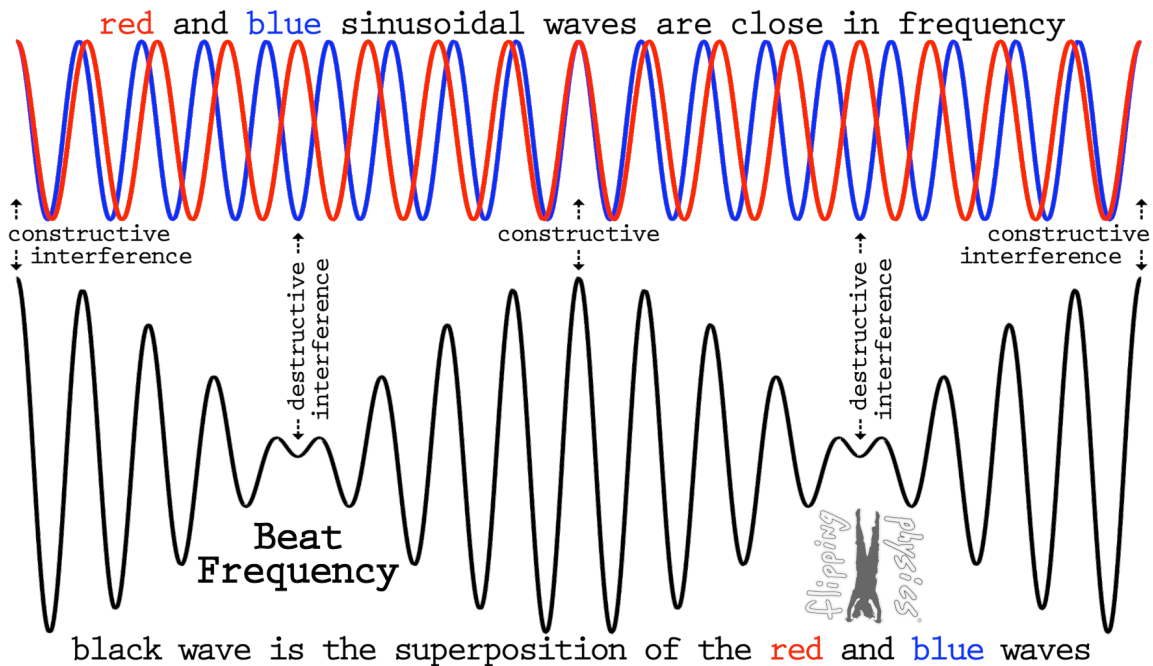


When two sinusoidal frequencies are close to one another in frequency, their wave patterns look like this:



When overlapped, you can see that the two waves alternate between being in phase and therefore constructively interfering with one another to create a larger amplitude and then being out of phase and therefore destructively interfering with one another to create a smaller amplitude. When this happens, the amplitude of the two combined waves increases and decreases at the beat frequency and that is why you hear "beats".



Beats can be used to tune musical instruments, like a guitar. The fourth harmonic of the low E string is the same frequency as third harmonic of the A string. If the two harmonics are played and the two frequencies are slightly off from one another, the beat frequency will be heard. You can adjust the frequency of one string until beats are no longer heard. When that occurs, the two strings are now in tune with one another.