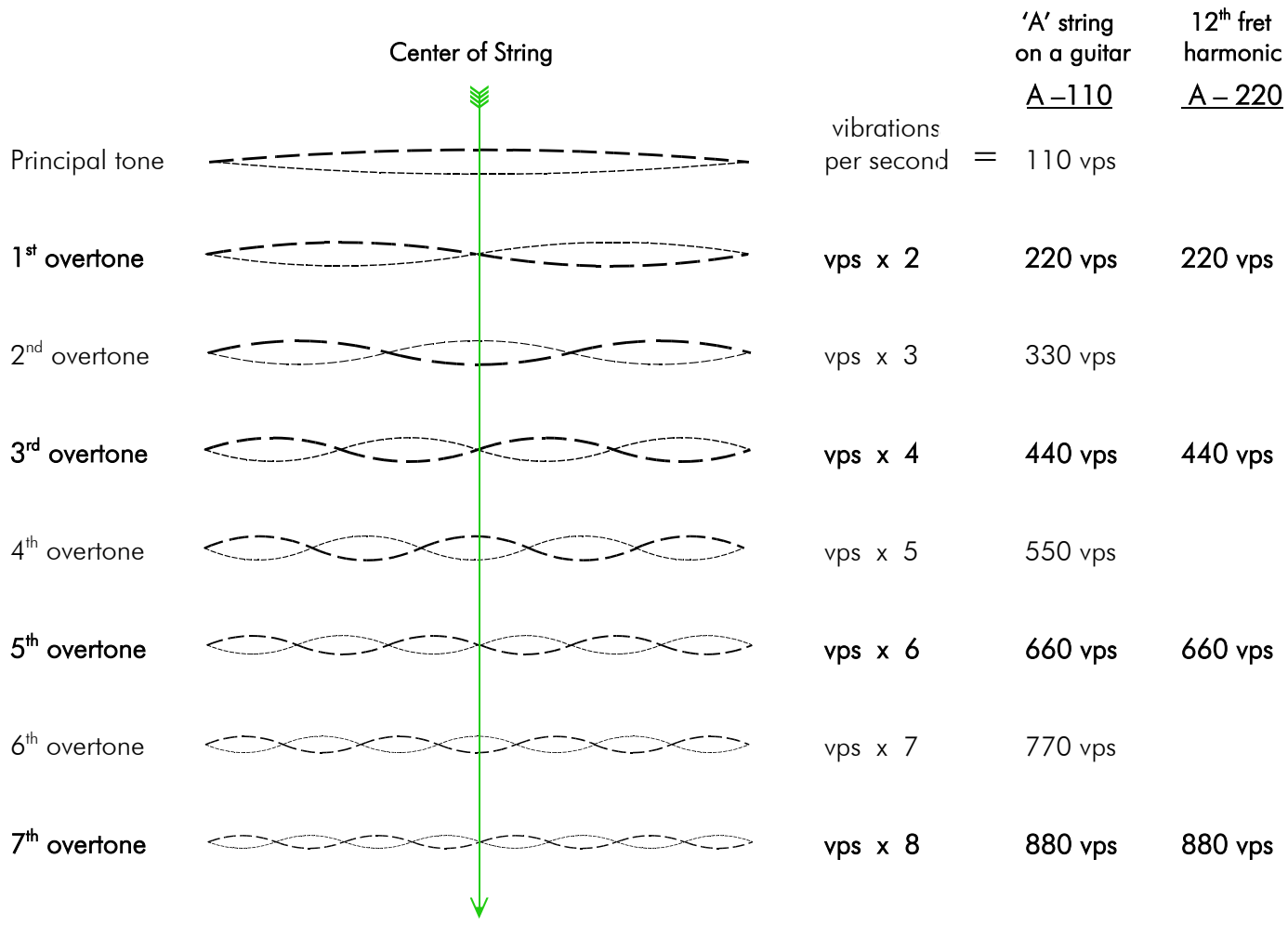
Understanding The Octave

The ratio between any two frequencies is what counts because this is what determines how well the sound waves match. In an octave every sound wave of the lower note will match every other sound wave of the higher note. The people of Ancient Greece called this interval the diason. It's the most consonant interval there is after the unison (ratio of 1 to 1).

Try this . . . fret any string at its 12th fret, then play its 12th fret N.H. If lightly touching an open string at its center eliminates the principal tone, then what happens to the other overtones? The open 'A' string has a frequency of 110 vps. This means each half will still vibrate at 220 vps. And every second overtone after that will also continue to vibrate.

This diagram should help to understand how this works.



When two notes are one octave apart, then all the overtones of the higher note will have the same frequency as half the overtones in the lower note. This means the higher note will actually be found within the lower note, so to speak. Pick any natural harmonic. Then fret the same note in any octave anyplace on the fretboard, and listen for similarities. While this provides a picture of how it is *possible* for two octave notes to have the same tonal color, it still doesn't explain why a rainbow of tonal color is found within the range of one octave to begin with.

Understanding interval ratios helps with more than just octaves. Ever wonder why the distances between the frets get smaller as they go up? As each note is fretted, the length of the string is shortened. As the string length gets shorter, the distance needed to go up one more semitone also gets shorter. Once more, it's the ratio that counts.