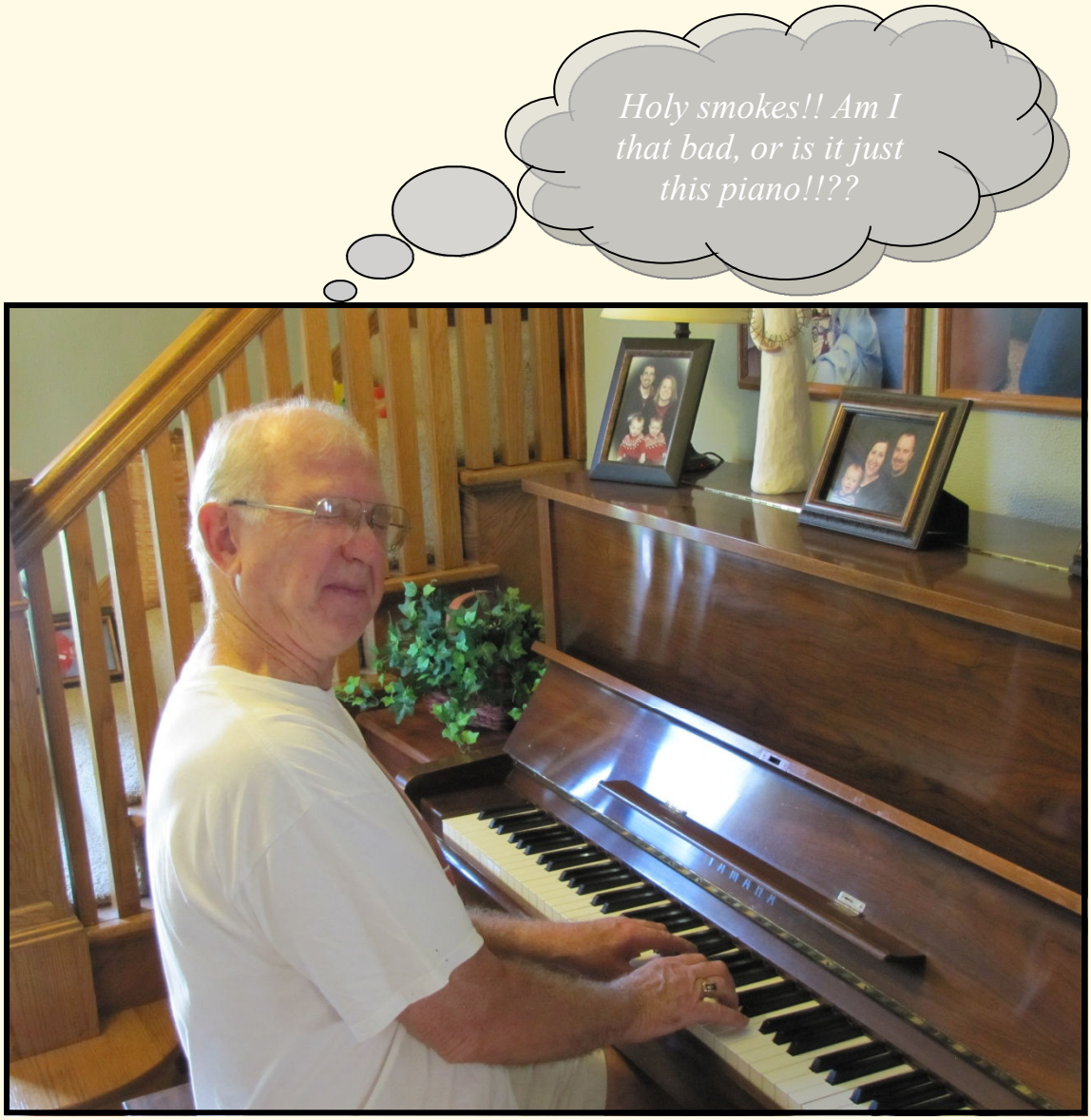
Is Your Piano Out of Tune?

(A Crash Course in Knowing When to Call in the Tuner)



Information provided courtesy of:

Apex Piano Tuning
Dayton 937-416-5166
Cincinnati 513-463-6386
www.apexpianotuning.com
support@apexpianotuning.com

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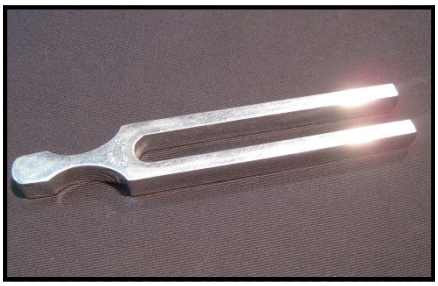
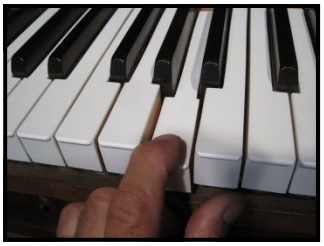
For the piano owner who wants to maintain his / her piano but doesn't want to throw good money away on work that's unnecessary, the question of whether or not the piano needs to be tuned is an important one. As a responsible owner you would like your piano to sound its best, especially if children are taking lessons on it. A piano that is in tune will invite one to play, even when the music is on a beginner's level. A piano that is out of tune will discourage even an avid student from sitting down to practice. So, as a non-technician, how do you know if your piano is out of tune and needs the attention of a tuner? Fortunately, you don't need to be a technician or an accomplished piano player to be able to decide whether or not your instrument need to be tuned. Apply the following 4 basic tests to your own piano and you will know whether it is in tune or out of tune. If it is out of tune, it's time to call your tuner / technician to schedule a service appointment.

Test I: Is your piano at the correct pitch? Whether or not a piano is at the correct pitch depends on the vibration rate of test notes and how they compare to a standard rate of vibration. One commonly used test note is that of A-440 (known as A4) which refers to the A in octave above middle C. When in tune, this note vibrates at a rate of 440 times per second. This is an important measure of whether your piano is in tune and is something you can easily check first.

(The reason this is important is because a piano that is either noticeably flat or sharp will not be as pleasant to play as a piano that is set at the correct pitch. The further flat a piano is, the less musical it will sound. If the tension on the strings is too low, the vibrancy of the strings will have decreased along with the pitch. A piano that is noticeably sharp is no better, in that it will not match other instruments, and will sound off to people trying to sing or play along with it.)

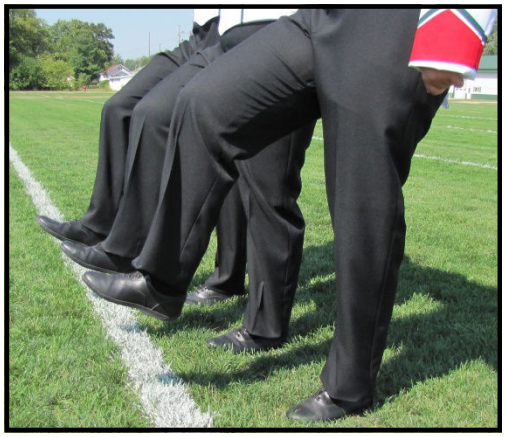


Test: To see if your piano is at standard pitch you need to compare it to an accurate reference, such as the tuning fork shown at left. If you don't have a tuning fork handy for use but you do have a computer with attached speakers try going online at **www.onlinetuningfork.com** . The middle tuning fork in the online picture is A-440. Click it for the correct tone, then compare that to A4 on your piano.



Helpful hint: If your computer is in one room and your piano in another, try humming the tone in between the two locations. Strike the A in the center of keyboard (photo) to see if the tones match. If your piano is either noticeably flat or sharp, it's not as musical as it should be.

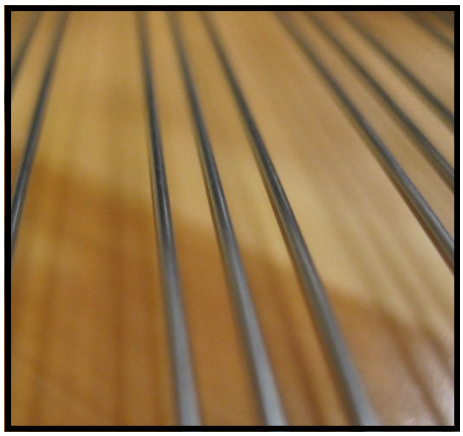
Test II: Are single notes in tune with themselves? Except for the very lowest bass notes, each note on your piano has more than one string. The upper bass section has two strings per note and from there on up each note has three strings. When a piano is in tune, each of the strings for any single note vibrate at exactly the same frequency (or pitch).



The three strings of single piano note could be compared to three members of a drum line marching down a football field. Each step taken is exactly the same for each of the three musicians. As they march from one end of the football field to the other, their cadence never varies, and at each yard line they hit the line at precisely the same time.

When three piano strings vibrate at the same rate, the sound produced seems to come from one single string. It is an absolutely level tone with no wavering. On the other hand, if the strings are not precisely matched unwanted beats are produced. A beat is detectable as a waa, waa, waa sound in the note.

In order to understand the reason that beats are produced in strings that are out of sync, consider two strings of a note that are not quite matched. When the strings are vibrating together, the volume of their sound is reinforced and you hear a swell. Then, as the more rapidly vibrating string pulls ahead, the strings will at a certain point be moving in opposite directions to one another and will tend to partially cancel one another out, producing a lull. Thus, a wavering tone results.



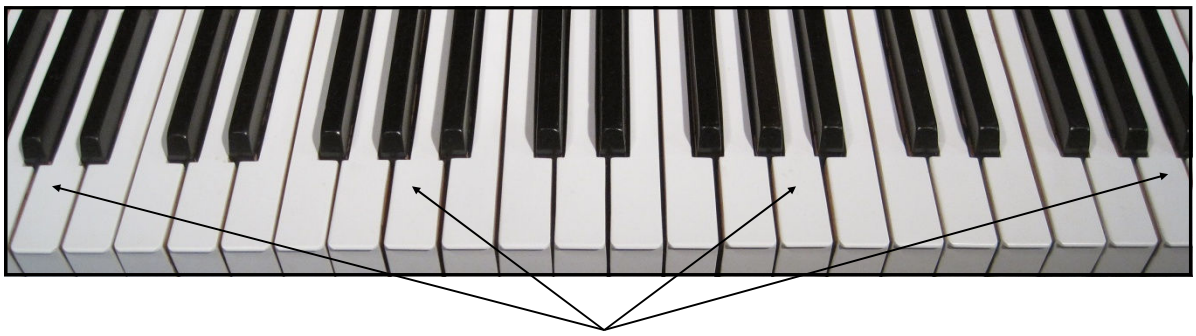
With piano notes that have three strings this phenomenon can produce a very complicated and unpleasant sound. If each of the strings were at a slightly different pitch, there would be a beat heard between the first and second string, another beat between the second and third string, and one more occurring between the first and third string. To the ear, the note would have a fuzzy, indistinct sound unpleasant to listen to. Imagine sitting through a movie at the theater in which the projector had not been properly focused. No fun at all!

Test: To determine if the strings of each individual note are matched, slowly play up the scale from left to right and listen to the tone produced by each note. The ideal is that each note has a level tone, with no wavering detected. The more unwanted beats that are heard within single notes, the more out of tune or "out of focus" the piano is.

Test III: Do the octaves of the piano blend into one another? When a piano is in tune with itself, the octaves line up with one another so that when you play a series of them together, they seem to blend into one another. The explanation for this has to do with the nature of octaves.

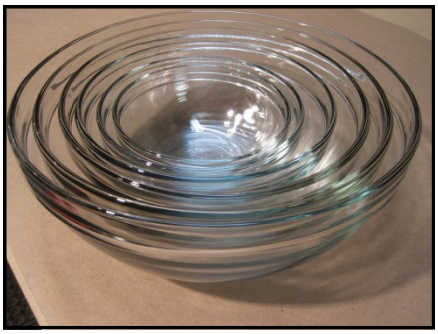
To put it simply, an octave of a note has a vibration rate double that of the beginning note. If you took A440, for example, which vibrates 440 times a second, the note an octave above it (A5) would vibrate at 880 times a second, and the note an octave higher yet (A6) would vibrate at a rate of 1760 times a second. Below A440, the note an octave down (A3) would be expected to vibrate at 220 times a second, and further down yet (A2) at 110 times per second. (In reality, the situation is actually a bit more complicated than described due to a factor known as "inharmonicity," but for the purposes of this discussion, this is a very close approximation of what would be observed.)

When a piano has been subjected to fluctuations of humidity, swelling or contraction of the soundboard will have resulted in the octaves from one end of the keyboard to the other of the piano not lining up well. This disparity in the octaves becomes obvious when both the left and the right hand are involved in the music. In such a situation, the piano will have an unbalanced, confusing sound.



Octaves of 'A'

Test: With your right foot, depress the sustain pedal (pedal to the far right). Softly play one note on the left hand side of the keyboard, such as the **A** that the left hand arrow is pointing to in the above photo. Then, keeping the sustain pedal down, softly play all the **A's**, moving towards the right hand side.



The better these notes blend into one another, the better the stability of the tuning. When a piano is in tune across the keyboard and the octaves of a note are played it is as if each note 'nests' in the note played before. (Compare how the matched set of glass bowls in the photo to the left nest into one another, to how a hodge-pot collection of storage bowls taken at random from your cupboard would not.)

Test IV: Are chords harmonious? When a piano is in tune, chords that are struck are beautiful in their harmony. Notes of a chord bear a mathematical relationship to one another, and as such the vibrations of the individual notes on a well-tuned piano blend together to produce beautiful music.

The notes of a chord played on an acoustic piano might be compared to the gears inside a transmission. In much the same way there is a mathematical relationship involved. When everything is in sync in the case of either a piano or a transmission, a smooth meshing occurs between the separate elements to create a unified effect.

The beauty of music played upon a piano depends on all the notes working together. When a piano is in tune, chords played will have a sweet, pure sound and will be pleasing to the ear. When a piano begins to go out of tune with itself, even simple chords will begin to have a sour sound.. Small differences between the ideal vibrational rate of a note and the actual rate will throw a chord out of kilter. It would be like adding an extra tooth into a gear on a transmission. The gears would grind against one another.

Test: To see for yourself if the piano is in tune to the point where the music played sounds its very best, play some chords slowly and listen to see if the sound seems sweet or sour. With a chord that is sweet everything will seem to blend—the notes will compliment one another. With a sour chord, the notes will seem discordant or harsh against one another.– like fingernails on a chalkboard.

If you are not a piano player, here's a simple chord for you to try. Find middle C (the white note (natural) before the set of 2 black notes (sharps) in the middle of the keyboard, and play it with the thumb of your right hand. With your next finger play the E. Your middle finger plays the G. Hold your ring finger up so that it doesn't play anything. Finally, with your pinkie, play the next C up, as shown in the photo.

Does the resulting chord make you smile, or does it make you cringe? For a piano player to become lost in the moment and enjoy the beauty of the music as its being played, the piano must first of all be capable of making beautiful music.