

Why does a piano go out of tune?

Have you ever noticed how a piano seemed to go out of tune, but then shortly thereafter, it sounded better again? Blame it on the weather, because changes in temperature and humidity cause a piano to go out of tune. This article explains exactly what goes on inside a piano that makes this to happen.

Wood, Steel & Iron

A piano is made out of wood, steel and cast iron. On a grand piano, when you lift up the lid, you can see the strings, which are made out of steel. The strings are attached to the cast iron plate, which is that large gold "harp." Underneath the strings you will see wood. That is called the soundboard. This is the soundboard that everybody worries about cracking. (That is a topic for discussion some other time).

The Soundboard

It is the soundboard that creates all the tuning problems. Something you can't see with the naked eye is that the soundboard is crowned, which means it is higher in the middle than at the edges. To give you an idea of how much of a crown there is: If the arc of the soundboard was part of a ball, that ball would be about 65 feet in diameter. It is this crown that amplifies the sound of the piano. If there were no crown on a soundboard, the tone of the piano would be very dull.

The Bridge

When you look inside the grand piano, you will see the strings crossing over a long piece of wood with little pins sticking out of it. This long piece of wood is called the bridge. The bridge transfers the vibrations of the strings, (which are set in motion by the hammers), to the soundboard, which in turn amplifies the vibrations of the strings. (That is basically how a piano creates sound). What you cannot see, however, is that because the soundboard is crowned, the strings actually go up and over this bridge. In other words, if you were a flea, you would need to go up hill to get to the

bridge, and down hill once you have crossed over the bridge.

Wood absorbs moisture

We all know that wood absorbs and releases moisture. During the moist months, wood absorbs moisture and expands. This is very evident when you have trouble opening windows and doors. When the soundboard absorbs moisture, it also wants to expand. And, like a door, which expands against the frame, the soundboard expands against the sides of the case. But because the soundboard cannot expand outwards, and because it is crowned, the only way the soundboard can expand is for it to raise up in the middle.

Why the piano goes out of tune.

The bridge is attached to the soundboard, and the strings cross over the bridge. So when the soundboard expands, and the crown of the soundboard increases, it will push up the bridge. When the bridge is pushed up, the strings are stretched tighter. When the strings are stretched tighter, the tension of the strings increases, which in turn, raises the pitch of the strings. But since the strings are of different lengths, they do not all raise their pitches identically. And that is when we hear a piano as being out of tune. This effect on the soundboard is reversed when there is less humidity.

Constantly changing weather

The greater the change in humidity, the greater the effect is on the soundboard. Since the humidity changes constantly, the piano never really stays in tune. Although some homes now have air conditioning, most people leave their windows open, so the changes in humidity and temperature are, in most homes, quite dramatic. And that is why pianos in Hawaii go out of tune so quickly.

Don't "blame" the tuner.

The next time your piano goes out of tune shortly after it was tuned, think back about the changes in temperature and humidity. Most likely the cause was the weather. But when you do hear the piano out of tune, the piano tuner should be called, because there is nothing worse than listening to, or playing on, an out of tune piano.