



composers like Bach or Mozart played. The evolution of the piano did not stop there, eventually splitting into the upright and grand families of piano. Figure 1 is of an upright piano, which has an action similar to a grand piano, except vertically, in order to conserve space. A concert grand piano is 9 feet long, but the sound is much more easily controlled at a grand piano.

**Process:**

1. The person presses a key on the piano. Depending on how hard and how long the key is pressed, the sound is different. This is a subjective quality of the sound, and depends on the pianist's touch. However, every key press eventually leads to the same events occurring. The piano action, the term for the mechanism that changes the press of a key to a hammer hitting the string is activated as soon as the key is pressed.
  - a. First, the key acts "like a seesaw but much longer at one end than at the other" [5], by converting the downward push of the key to a vertical upward force on a rod (#3 in Figure 1), by pivoting about a central point.
  - b. This rod then pushes on the rocker (#4 in Figure 1), which holds the hammer (#13) and damper (#9). The force of the push lifts the damper and simultaneously lowers the hammer.
  - c. The back-check lever (#14) lifts with the hammer, and when the hammer falls back down, it pushes the back-check lever, enabling the rocker and key to quickly return to their initial position, able to repeat the sound.
2. Because every note requires up to three strings, three hammers hit three strings, and they all vibrate at the same time. "The treble pitches have three unison strings, the tenor range uses two unison strings, and the bass strings use only one string. The end result is that for 88 notes, there can be as many as 236 strings" [5]. Each string vibrates at a different

frequency because of their different lengths, and the strings vibrate at the same time, creating one uniform harmony.

3. The soundboard resonates and amplifies the sound. “When the strings are linked, or coupled, to the soundboard by the means of the bridge, they are able to transmit their vibrations into this large wooden resonator, which is then able to displace a much larger amount of air than the string alone” [6].
4. The sound can be further modified through the use of pedals. They modify the action in various ways, changing the sound at the same time.
  - a. The sustain pedal lifts all the dampers on every single key, so that all strings resonate with the particular string being hit. “A side effect of this on an acoustic piano is that the strings of other, un-played notes will also resonate gently, adding richer harmonics to the overall sound. This is known as sympathetic resonance” [7]. As a result, the sound lasts longer and smoother (known as legato), allowing strings to continue vibrating after the key returns to its original position.
5. The lid reflects the sound to the audience.
6. The hammer falls against the hammer rest (#12) and the damper falls against the string, silencing it.

## **Conclusion**

From the press of a key to mesmerizing pieces of music, beneath the beautiful sound of the piano is an intricate and carefully designed system simplifying and enhancing the process of making music. From the clavichord and harpsichord to the modern piano, the piano’s history was fraught with trial and error, and to this day is still constantly evolving and improving along with music and will do so for generations of composers and pianists to come.

## Reference List

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