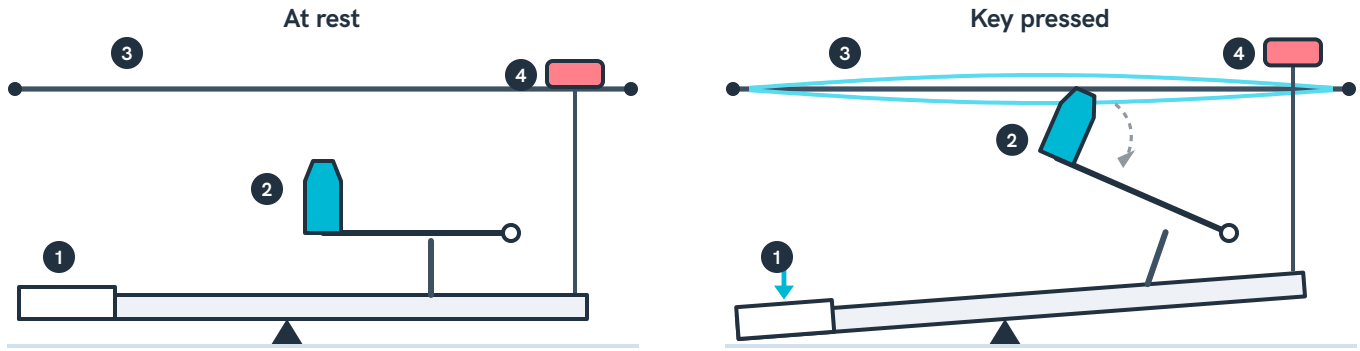
How the Piano Works

A piano is a **stringed instrument played with hammers**. Press a key and a felt hammer strikes a steel string. Because a faster key makes a harder hit, the piano plays soft and loud — its full name, *pianoforte*, means "soft-loud".

KEY → HAMMER → STRING



1 Key
A seesaw. Your finger pushes the front down, so the back end rises.

2 Hammer
Thrown up to hit the string, then it **bounces straight off** so the string can ring. Faster key = louder.

3 String
Vibrates. The wooden **soundboard** under the strings makes that vibration loud enough to hear.

4 Damper
Lifts off as the key goes down. Let go, and it drops back onto the string: **silence**.

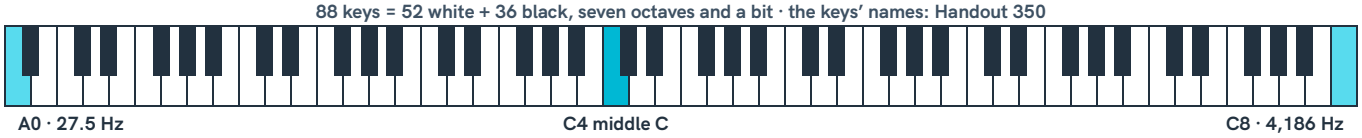
WHY LOW STRINGS ARE LONG AND THICK

Pitch is **how fast a string vibrates**. The lowest note, A0, vibrates 27.5 times a second; the top C, 4,186 times. Long, heavy strings vibrate slowly and sound low; short, thin ones vibrate fast and sound high.

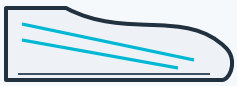
If length alone did the job, the lowest string would have to be about **150 times longer** than the highest — over 7 meters (25 feet)! So bass strings are **wrapped in copper wire**: extra weight without extra length. Most notes get three strings, the lowest notes just one or two: about 230 strings in all.



88 keys = 52 white + 36 black, seven octaves and a bit · the keys' names: Handout 350



GRAND, UPRIGHT, DIGITAL



seen from above

Grand

Strings lie **flat**; hammers strike upward and fall back by gravity, so notes repeat quickly. The concert hall piano.



seen from the front

Upright

Strings stand **up** to save floor space; hammers strike forward and springs pull them back. The home and school piano.



plus headphones

Digital

No strings: sensors measure how fast each key goes down and play a recorded piano sound. Never needs tuning; headphones welcome.

The pedals (Handout 58): the **right** one lifts every damper at once. The **left** one softens the sound (on a grand, the hammers slide over to hit fewer strings). The **middle** one holds notes on a grand (sostenuto) and is often a practice mute on uprights.

Try it With a grown-up, open the lid and play slowly: **watch a hammer hit and a damper lift**. Then the ghost note: press middle C down **silently** and hold it; strike the C below short and loud. Middle C keeps singing — its undamped string caught the vibration. That is **sympathetic resonance**; hold the right pedal and every string joins in.

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