8 Making a musical sound

A musical sound is made by a simple, regular vibration.

▲ **(Picture 1) A tuning fork vibrates to produce a single, pure sound.**

To most of us a musical instrument makes a pleasant sound. This is different from the unpleasant sounds that we call noise.

Music is made of regular vibrations

Our ears can pick up many kinds of sound, even complicated ones. But if the sound is very complicated, our brain often interprets it as unpleasant.

Most musical instruments produce fairly pure sounds called **NOTES**. A pure sound is produced, for example, when a guitar string is plucked and the string vibrates up and down in a simple, regular way.

A tuning fork

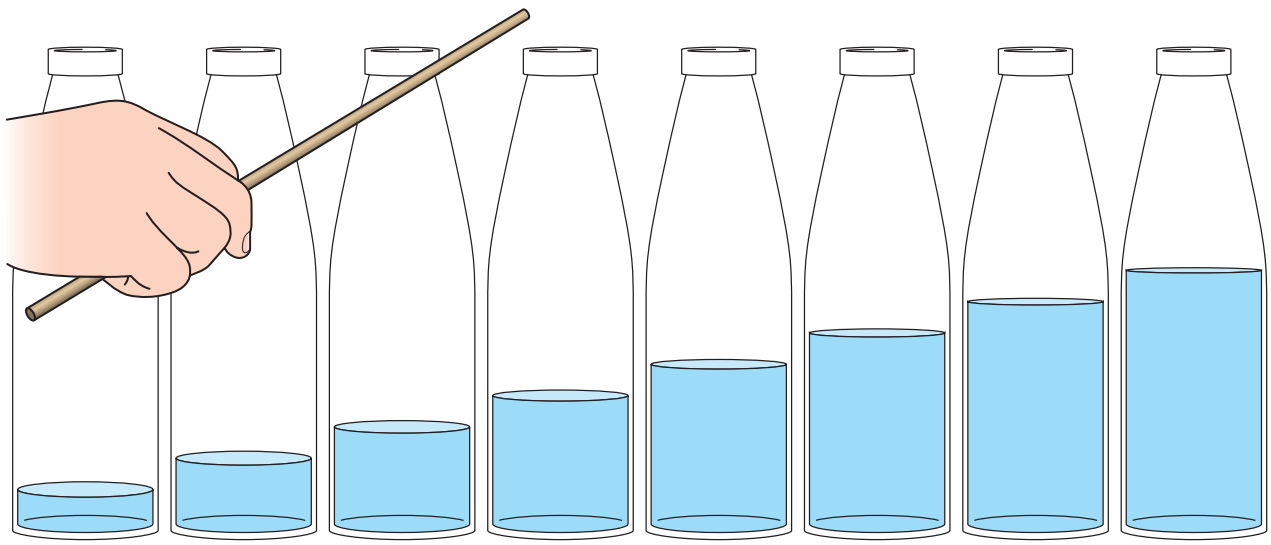
A tuning fork (Picture 1) produces just a single, pure musical sound. When one of the prongs is tapped on a hard surface, both prongs vibrate in a simple way to give a pure note.

Simple ways of making notes

Simple musical instruments can be made using the principle of the tuning fork.

For example, a musical instrument capable of playing eight notes (an **OCTAVE**) can be made from eight bottles (Picture 2). Each bottle is filled with a different amount of water. This changes the length of the air space in each bottle and affects the vibrations and the **PITCH** (highness or lowness) of the note.

▼ **(Picture 2) A set of bottles that can play a scale covering one octave.**



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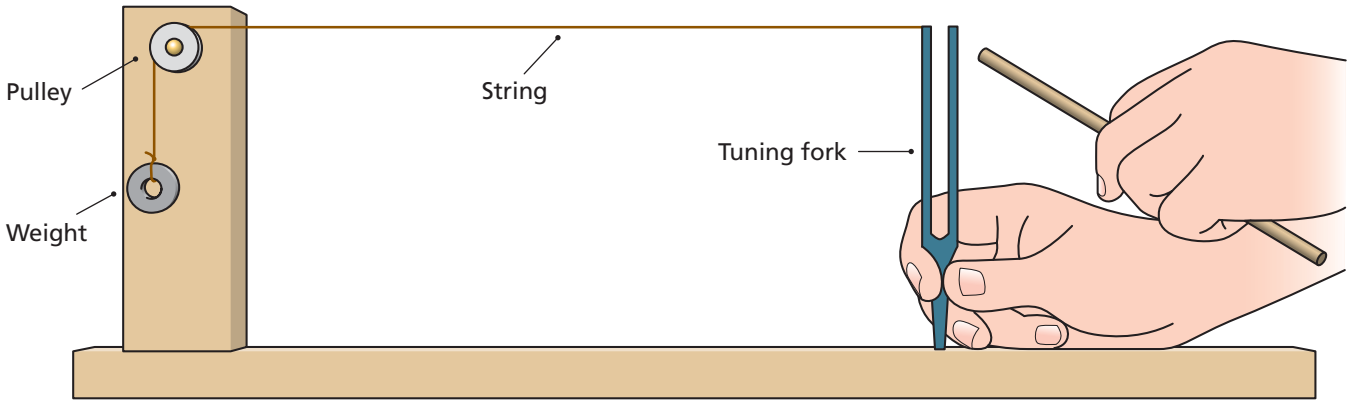
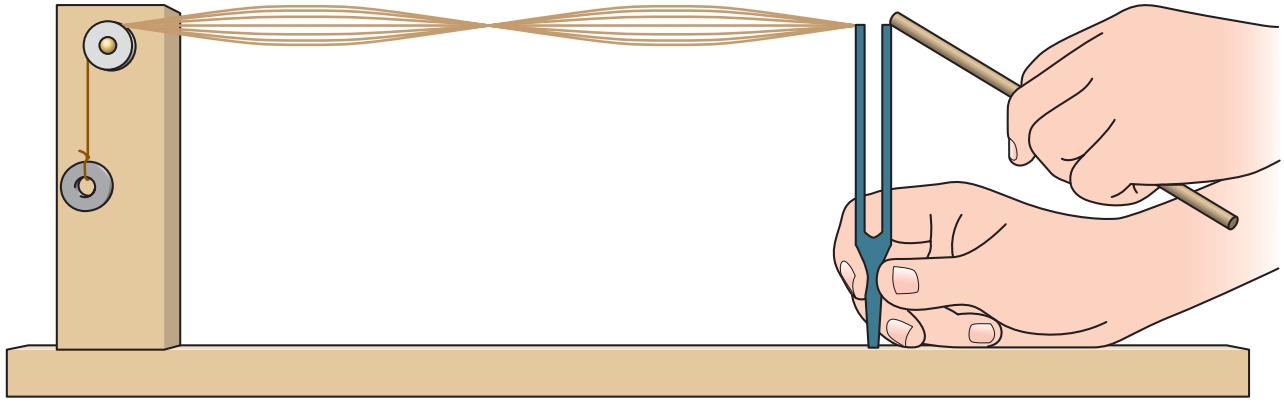


▲ **(Picture 3) How a tuning fork vibrates to produce a single, pure sound.**



▲ **(Picture 4) A resonating string.**

Each bottle is tapped with a drumstick or pen. By changing the amount of water in each bottle, the notes can be adjusted to match the notes on a piano. Once you have done this, the bottles will each produce a simple note and together they make a scale.

Musical string

To see how the vibrations work in a musical instrument, you can attach a thin length of string to a tuning fork and a weight (Picture 3). Tap the tuning fork and watch the string vibrate. There will be several places with no vibrations and other places where the string vibrates strongly. Waves are travelling back and forth along the string in time with the vibrations of the tuning fork, but the to and fro movements are in step and so the wave appears to be standing still (Picture 4). This is called **RESONATING** and it is the pattern of waves that occurs inside every musical instrument.

By changing the distance between fork and pulley, you can see and hear the sound for different patterns of vibration.

Summary

- **A musical sound is a regular vibration.**
- **A tuning fork is a single, pure note.**
- **You can change the note of a musical instrument by changing the length of the part that vibrates.**