

[illegible]

The top and bottom rows of numbers state frequencies in Hertz (periods per second) for each tone in the Western 12-tone equal-tempered scale, referenced to the standard pitch shown top center. The bottom row shows these frequencies to approximately four significant digits, while the top row rounds to the nearest integer.

The first graphical element divides the frequency range into named sub-ranges, such as "Bass" and "Treble", and indicates typical terms to express the subjective impression of too much (excess) or too little (deficit) energy in various frequency ranges. Note that too much energy in one range can sound similar to too little energy in a different range.

The main part of the diagram shows the frequency range of various instruments and voices. In some cases, there are lighter-colored extensions to the range to indicate that some instruments or voices may extend further, e.g., a seven-string vs six-string guitar or a Bösendorfer grand piano. For voices, this indicates the core repertoire for a voice and the additional range that is needed in some pieces. The extreme low bass range (55-60 Hz) is for certain Russian church singers only.

Finally, there is a row to indicate some characteristics of human voices. The words "Male" and "Female" locate the speech fundamentals of male and female voices, respectively. Vowel sounds add two or more overtones or formants that give the sound its identity. These are indicated with an upper case letter for the strongest formant and a lower case letter for the next strongest. Consonants have a single dominant frequency, which is shown with the

The content in this diagram are collected over some time from many different sources. The errors, if any, are all mine. At some point in the future, I might put together a time domain version of this chart to indicate the resolution of the ear-brain system and the subjective effect of deviations in the time domain.