Reference Section

• At room temperature (23° celsius), the velocity of sound is: **344 m/sec = 1,128 ft/sec = 769 miles/hr**

• *Quarter-comma Meantone temperament:*

C D−¼δ E−δ F+¼δ G−¼δ A−¾δ B−$\frac{5}{4}$δ C

$v = f\lambda$ • f = 1/T • f = v/2L • f = v/4L • end correction = 0.61r • v = 331.3 + 0.6t m/sec

f = $\frac{1}{2\pi}\sqrt{g/l}$ f = $\frac{1}{2\pi}\sqrt{k/m}$ $f = \frac{1}{2\pi}\sqrt{3k/m}$ $\lambda_n = \frac{4L}{n}$ $(n = 1,3,5 \ldots)$

f = $\frac{v}{2\pi}\sqrt{a/Vl}$ $f_n = n\frac{v}{2L} = nf_1$ $(n = 1,2,3 \ldots)$ $f_n = \frac{n}{2L}\sqrt{T/\mu}$ $v = \sqrt{T/\mu}$

$\lambda_n = \frac{2L}{n}$ $(n = 1,2,3 \ldots)$ $f_n = n\frac{v}{4L} = nf_1$ $(n = 1,3,5 \ldots)$

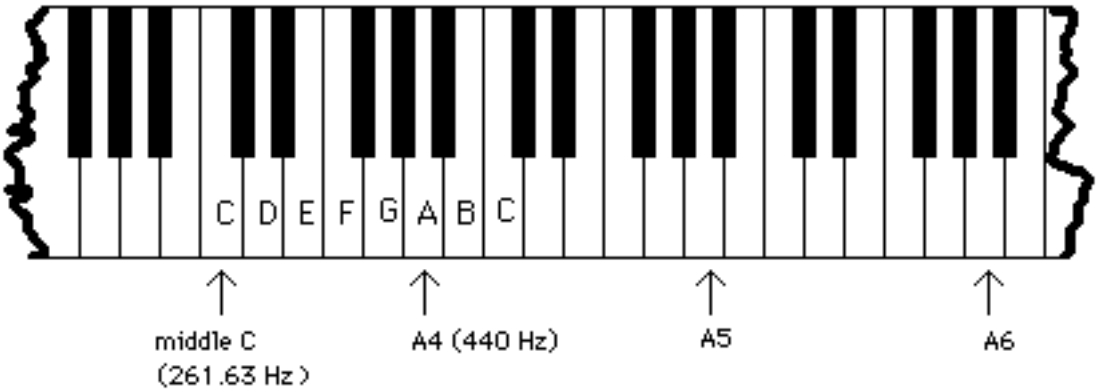
• dB = 10 $\log_{10}$ (I_1/I_2) dB = 20 $\log_{10}$(p_1/p_2) $ref \triangleq 2 * 10^{-5}\ N/m^2$ $ref \triangleq 10^{-12}\ W$

¢ = 1200 $\log_2$(f_1/f_2) or ¢ =1200 $\log_{10}$(R) / $\log_{10}$(2) $dB = 10 \log_{10}$ (ratio)

If the source of a sound is in motion relative to the observer of the sound, the apparent frequency f from the point of view of the observer will be: **$f = f_S * v / (v \pm v_S)$**
where f_S and v_S are the frequency and velocity of the source, respectively.
(v - v_S moving *toward*, v + v_S moving *away* from observer)

If the observer of a sound is in motion relative to the source, the apparent frequency f from the point of view of the observer will be: **$f = f_S * (v \pm v_O) / v$** (v + v_O moving *toward*, v - v_O moving *away* from source)

Sound intensity in a free field is 11 dB down at 1 meter from the source, dropping by 6 dB per doubling of distance. In a hemispheric field, it drops 8 dB at 1 meter and then 6 dB per doubling of distance.



(The piano goes down to A0, which is four octaves below A4)