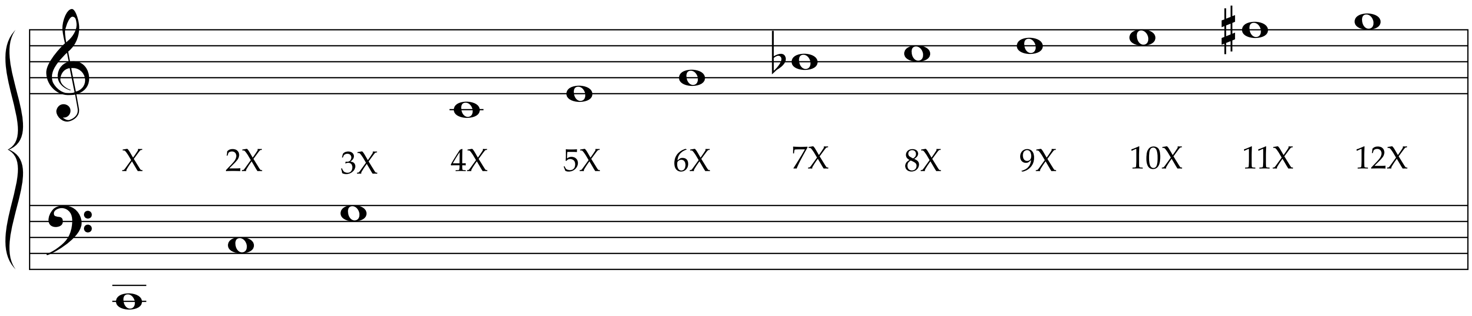
The Harmonic Series

Through the 12th Partial

Calculating from "A4" = 440, 6/5 x 440 = "C5" = 528, or 3/5 x 440 = 264 = "C4."
Equal-tempered frequencies appear in parentheses below.



Frequencies:	66	132	198	264	330	396	462	528	594	660	726	792
	(65.406)	(130.81)	(196)	(261.63)	(329.63)	(392)	(466.16)	(523.55)	(587.33)	(659.26)	(739.99)	(783.99)

The "Major Scale" can be derived from the 4th 5th and 6th partials of three harmonic series: the one on "X," in this case "C," the one on "3X/2" ("G") and "2X/3" ("F"), resulting in "Just Intonation."

Mathematics of the Frequency and Intervallic Ratios in Just Intonation:

pitch names:	do		re		mi		fa		sol		la		si		do
frequencies:	1		9/8		5/4		4/3		3/2		5/3		15/8		2
interval ratios:		9/8		10/9		16/15		9/8		10/9		9/8		16/15	
if "do" = 24 :	24		27		30		32		36		40		45		48

Arithmetic Mean: m - a = a - n
Harmonic Mean: 1/m - 1/h = 1/h - 1/n
therefore
a = 1/2(m+n)
h = 2mn/m+n

Both types of mean applied to the interval of an octave:
a = (1+2) / 2 = 3/2 (perfect fifth)
h = 2 X 1 X 2 / 1 + 2 = 4/3 (perfect fourth)

Both types of mean applied to the interval of a fifth:
a = (1 + 3/2) / 2 = 5/4 (major third)
h = 2 X 1 X 3/2 / 1 + 3/2 = 6/5 (minor third)

Major Triad is 1 : 5/4 : 3/2 = 40:50:60
Minor Triad is 1 : 6/5 : 3/2 = 40:48:60