Sound Demos

- Second part of Loudness (Sci. of Sound)
  The second part introduces the Loudness scale.

Loudness-Scale (Sone)

- Define Loudness Level of 40 phon to be equivalent to Loudness of 1 sone
- For each increase of 10 phon of the loudness level the loudness doubles:
  - 50 phon corresponds to 2 sone
  - 60 phon corresponds to 4 sone
  - 70 phon corresponds to 8 sone
  - 80 phon corresponds to 16 sone, and so on.
Loudness (Sone) Use Examples

**Ceiling Fan 110 CFM 672R/110 H-extra**
SKU: 723419 Retail Price: $85.99
Bath Fans Value Test CFM=110 Sones=4.0

Retail Value: $67.45
DeltYourself.com Price: $58.79
You Save: $8.66 (13 %)
Normally Leaves our Warehouse in 1 to 3 Business Days at Freight Saver
Subject To Rebates on Purchases of $50+

**Panasonic Ventilation Fan Model FV30 VQ3 - Free Shipping**
Panasonic Ventilation Fan Model FV30 VQ3 - Free Shipping
FV30VQ3
Available Usually ships the next business day.
Sale Price: $166.00

Description:
- Noise Level: 2.5 Sones
- Energy Star Listed: Yes
- Built in back draft damper
- Grille: Attaches directly to housing with torsion springs
- Washington State VIAC Code: Yes
- Fan UL Listed for Subfloor enclosure when used with GFCI branch circuit wiring
- Manufacturer’s Warranty: 5 Years

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Sound Demo

Loudness Scaling (can you do it?)

Loudness Scaling in Class (2/23/07)

Loudness $\propto p^{0.6}$
Loudness Scaling in Class (2/22/06)

Loudness of Complex Tones

- Complex tones consist of more than one frequency
  e.g., harmonic series, broadband noise

- Observation:
  A complex tone of two close frequencies appears not as loud as a complex tone of two widely separated frequencies
Loudness of Complex Tones

If sounds A, B, C, D are adjusted to have identical loudnesses when sounded alone, then the combination C+D would be expected to sound louder than A+B because C and D are not competing for the same nerve endings in the inner ear.