The Physics of Music

Fact Sheet

- **Sound**: Longitudinal waves that travel through the air and hit our ears. Produced by a vibrating object.

- What sounds “good” or “bad” musically is largely subjective

- **Dissonant** tones: When two sounds have *slightly offset* wavelengths, they create an unpleasant interference pattern.

- **Consonant** tones: When two sounds have a set of wavelengths that line up along a certain number of frequency intervals.

- **Frequency Intervals**: Double the frequency of any tone and get a **harmonic**, also known as the *same* note, but at a *higher pitch*.

- **Overtones:** Musical instruments don’t produce pure tones. Due to their physical design, each instrument will produce each note with a unique intensity of harmonic intervals.

- **Human Hearing**: Between 20Hz – 20,000Hz. Dog whistles go higher than that, and (technically) a tuba can go lower.

- **Phantom Tones:** Sound perception is dependent on your brain. Your brain isn’t always in touch with reality though, and may in fact hear sounds that were not physically produced.

- **Acoustics:** Destructive interference between sound waves may cause you to miss particular frequencies. Sounds can be reflected, transmitted, or absorbed by their medium.

- **Reverberation**: The delay between direct sound and early reflected sounds

- **Concert Halls:** Concerned with **room acoustics** and **noise control**. Must control level of echoes than can occur.

- **Theremin!:** Electronic instrument that uses electronic signals to determine the wavelength and intensity of the frequencies it produces. It’s also (sort of) hands-free.