

Acoustics, Production, and Reproduction of Stringed Instruments

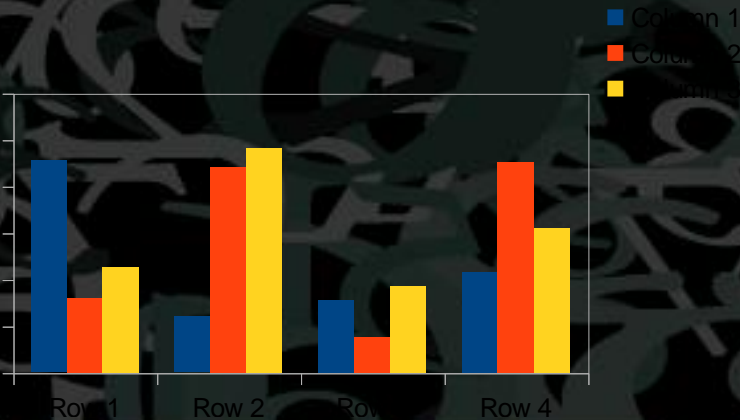


***A Most Chosen
Instrument:
GUITAR***

- Romantic
- Intimate
- Versatile
- Liberating
- Most Excellent
- Bodacious

Acoustic and Nylon String Guitars

- Guitar Body
- Air Cavity
- Strings
- Attack



Guitar Body



- Smooth
- Rounded
- Hollow
- Thin wood
- Medium-length neck
- Thin or Thick Neck

Air Cavity

- **Functions of the Sound Hole**
 - **Helmholtz Resonance**
 - **Resonates with Back and Face Plates**
- **Variables**
 - **Volume of Air**
 - **Size**
 - **Shape**



Strings

- Nylon

- Warm tone
- Less tension
- Clean

- Silk/Steel String

- Crisp
- Sharp
- More tension

- Other types of General Strings



- 80/20 Bronze

- Phosphor Bronze

- E low = 82 Hz, 110 Hz, 147 Hz, 196 Hz, 247 Hz, E High = 330 Hz

Electronic/Amplified Guitars



Guitar Body

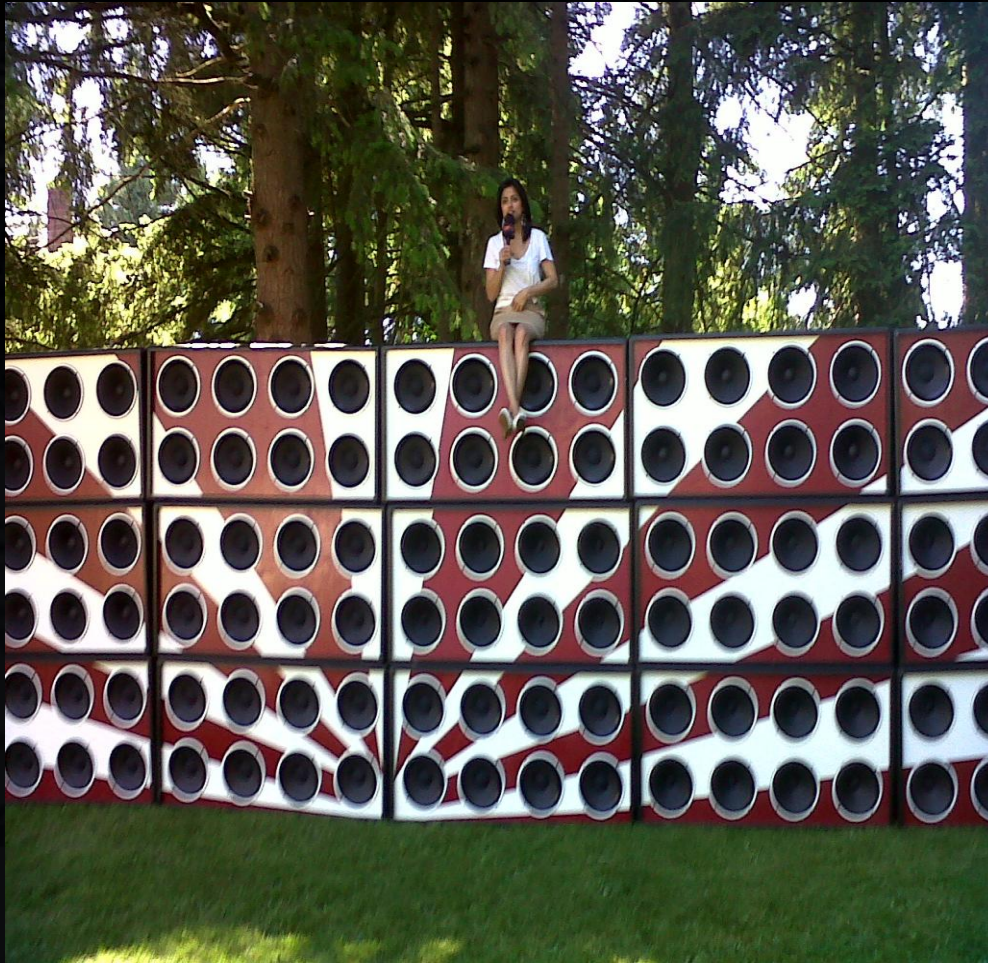
- Headstock
- Neck
- Nut
- Body
- Bridge
- Pickups



- “The pickups are a generator of electricity. The strings are an electro-conductive and vibrate around a wire and magnet coil, thus producing an alternating current. This matches the frequency of different pitches and the current is sent to an amplifier.” - Jeremy Gustafson



Amplification



- *“Each string sits above a pickup, which is a magnet with a coil wrapped around it (approximately 7,000 times).*
- *Vibrations in a string cause a change in flux, mostly by creating and changing an area.*
- *The change in flux creates an emf, causing current to flow from the pickup to the external amplifier.*
- *The amp boosts the signal from the guitar through a circuit of {transistors*}, {resistors*}, and {capacitors*}, and puts out enough current to vibrate the diaphragm of a speaker at the original frequency of the vibrating string.”* - [http://ffden-](http://ffden-2.phys.uaf.edu/211_fall2010.web.dir/crockett_cole/Physics%20of%20Guitar%20Electric%20Amplification.html)

[2.phys.uaf.edu/211_fall2010.web.dir/crockett_cole/Physics%20of%20Guitar%20Electric%20Amplification.html](http://ffden-2.phys.uaf.edu/211_fall2010.web.dir/crockett_cole/Physics%20of%20Guitar%20Electric%20Amplification.html)

Strings

- Nicklewound

- Crisper tone
- Less tension
- Easier to distort

Flatwound

Warmer tone, like
the nylon

More tension

Less attack

Attack





And now.. A Brief Demonstration of Sound Reproduction

