

**Overview:**

Make a slideshow about your electric guitar. For full credit, your slideshow must include everything in the slides listed below.

1. **Slide 1 (1pt): \_\_\_\_\_ Title Page** with group member names
2. **Slide 2 (2pts): Parts of The Electric Guitar**
  - a. \_\_\_\_\_ **(1)** Insert a photo of your electric guitar.
  - b. \_\_\_\_\_ **(1)** Use callouts to label the following parts:
    - c. Insert a photo of your electric guitar.
    - d. Use callouts to label the following parts:
      - i. String
      - ii. Nut
      - iii. Saddle
      - iv. At least one fret
      - v. Pickup
      - vi. Amplifier/Speaker
      - vii. Pickup leads (wires)
3. **Slide 3 (6 pts): How it works:** Insert links to one or more videos explaining how the guitar works. To decrease your upload time, you might want to break this up into three videos:
  - i. \_\_\_\_\_ **(3)** Explain how the pickup turns string vibrations into current (how it works as a generator).

A 2 point answer: Describes basic roles of string, magnet, and coil.  
A 3 point answer: Relates changing magnetic flux (or field strength) to induced current and field.
  - ii. \_\_\_\_\_ **(2)** Explain how the speaker turns electrical current into sound waves (how it works as a motor)
  - iii. \_\_\_\_\_ **(1)** Explain why amplification is necessary with this type of instrument.
4. **Slide 4 (7 pts) : Open String Waveform**
  - i. \_\_\_\_\_ **(1)** Take a nice screenshot of your highlighted 10 periods. Paste this into a Google Doc and print it out. Leave space for the calculations below, but make sure that the wave is large enough to see and label.
  - ii. \_\_\_\_\_ **(2)** Label the following...
    1. the waveform's period
    2. a crest
    3. a trough
    4. its largest amplitude
  - iii. \_\_\_\_\_ **(1)** Calculate and show:
    1. The wave's period (T)
    2. The wave's frequency (f)
  - iv. Create a drawing of the string vibrating in its first harmonic mode. On your diagram also show the length of a full wavelength. To do this, you will need to measure your guitar's string length, in meters.
    1. \_\_\_\_\_ **(1)** Label the string length (L)
    2. \_\_\_\_\_ **(1)** Label the wavelength ( $\lambda$ ).
    3. \_\_\_\_\_ **(1)** Calculate and show the the wave's speed

### Slide 5 (3pts): Open String Harmonics

Record your open string in Audacity (or use your earlier recording).

- i. \_\_\_\_\_ (1) Include a spectrum plot that is large and clear.
- ii. \_\_\_\_\_ (1) Label the first four peaks representing the individual sound waves that are adding together to create the sound of your open string. Label them with their harmonic names.
- iii. \_\_\_\_\_ (1) Create a drawing of the first four harmonics, positioned one below the other. Label them with their harmonic names and their frequencies. Make sure that the overall string length is the same for all of your drawings.

### Slide 6: Scale and Song Videos

#### b. Chromatic Scale Video:

- i. Make a video... Starting with the open string, play every fret on your guitar, up to the 12<sup>th</sup> fret. This should be 13 notes in all, and the overall interval should be one octave. Video yourself doing this. In your video, explain how the notes are spaced.
- ii. Insert a link to your video into the slideshow.

#### c. Song and Scale Videos: Choose a song to play. Determine whether it generally follows a major scale or a minor scale. Record the following videos, meeting the following requirements.

##### i. Scale Video:

1. In your video, explain the following before you play
  - a. Name the first note in the scale
  - b. Tell whether it is major or minor
2. Play your scale... Starting with the open string, play only the notes of your scale. For full credit, your open string and last note must be within one whole step of an octave (*to be perfect, your last note should have twice the frequency of your open string*).

##### ii. Song Video: (\*\*Each group member must play a different song.)

1. State the name and the key of your song (e.g. *Happy Birthday in A minor*)
2. Play your song. For full credit, your rendition of the song must include one full verse and must be easily recognizable.

### 5. Options for Bonus Points:

- a. Play a full length song of higher quality.
- b. Play harmony and sing melody
- c. Create a song with multiple simultaneous tracks (melody plus harmony)
- d. Win the “name that tune” contest.
- e. Show and explain how you can use your finger to “play a harmonic.” You must explain how this cancels out some harmonics while allowing others to continue.