Engineering Journal
Design a Stringed Instrument

The Engineering Design Process

Stringed Instruments of the World

 **Balalaika, Russia**	 **Berimbau, Brazil**	 **Gadulka, Bulgaria**
 **Kora, East & West Africa**	 **Liuqin, China**	 **Lyre Harp, Greece**

Guitar Parts

<table>
<tr>
<td colspan="2">The strings of the guitar vibrate to create sound waves.
  </td>
<td colspan="2">The body of the guitar amplifies the sound created by the vibrating strings. The sound waves move through the air.
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<tr>
<td>The bridge of the guitar raises the strings off the surface of the guitar so that they can vibrate freely and create better sound.
  </td>
<td>The neck of the guitar extends the strings and allows the player to change the pitch by pushing them with their fingers to change the length of the vibrating portion.
  </td>
<td>The sound hole is an opening cut into surface of the guitar body to amplify sound. The sound hole increases vibration in the surface of the instrument.
  </td>
<td>Tuning pegs are used to tighten or loosen the strings of a guitar. Tightening the string gives it a higher pitch while loosening it lowers pitch.
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Stringed Instrument Criteria

Your instrument must:

- Produce three different pitches (high, medium, low)
- Have one pitch that is adjustable
- Be between 3 and 36 inches long
- Include one additional feature of your choosing
  - ☐ Produces 5 notes instead of 3
  - ☐ Can be adjusted for volume
  - ☐ Has a sound hole in the body to help project sound
  - ☐ Includes a bridge that elevates the strings to vibrate
  - ☐ Is collapsible for storage
  - ☐ Is environmentally friendly (made of recycled/recyclable materials)
  - ☐ Includes a pick for plucking strings
  - ☐ Includes a storage case
  - ☐ identify: My instrument will: _____.

Testing Procedure and Results

Criteria & Constraints	How I will test	Test results
Produces three different notes	Play each pitch for a friend and see if they can hear the differences	Circle the pitches your friend correctly identified: High Medium Low
Has one pitch that is adjustable	Show a friend how you change the sound. See if they can describe how the pitch changes.	My friend described that I changed the pitch by: This is: Accurate Inaccurate
Be less than 36 inches.	Measure to see if its less than 36 inches.	
Additional criteria here:	*Additional test here:*	

Instrument Design Ideas

Sketch 1	Sketch 2

Instrument Plan

Label the materials you will use.

Think about how many of each item you need.

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