School name

Place a checkmark or X in all circles (○) when you have inspected that the instruments satisfy the stated conditions. Score the students by entering a number before the slash in each scoring box / n where n is the maximum number of points for that category.

Team member name A  Grade

Instrument type  Senior?

○ No electric or electronic parts
○ No toys or professional instruments or their parts
○ No purchased items: bells, whistles, mouthpieces, reeds, audio oscillators (metal instrument strings okay)
○ Energy supplied solely by student, no electricity
○ Built by student within the last year

Play the lowest and highest notes. How many octaves?

/ 5

1 Less than a fifth
2 Between a fifth and an octave
3 One octave exactly
4 Up to an octave and a fifth
5 More

Sound quality compared to standard instruments:

/ 3

0 Pathetic
1 Poor
2 Adequate
3 Pretty good

Pitch accuracy for F₅

/ 2

0 Could not tell pitch
1 More than a quarter-tone off
2 Within a quarter-tone
Team member name B      Grade

Instrument type      Senior?

- No electric or electronic parts
- No toys or professional instruments or their parts
- No purchased items: bells, whistles, mouthpieces, reeds, audio oscillators (metal instrument strings okay)
- Energy supplied solely by student, no electricity
- Built by student within the last year

/ 5 Play the lowest and highest notes. How many octaves?
1. Less than a fifth
2. Between a fifth and an octave
3. One octave exactly
4. Up to an octave and a fifth
5. More

/ 3 Sound quality compared to standard instruments:
0. Pathetic
1. Poor
2. Adequate
3. Pretty good

/ 2 Pitch accuracy for $F_5$
0. Could not tell pitch
1. More than a quarter-tone off
2. Within a quarter-tone

Theory

Ask questions as necessary to establish their understanding of music science. (30 points total; either student can answer)

/ 6 What is sound, and how do your instruments produce it? (Full-credit answer must mention vibration and resonance)

/ 4 How do you change the pitch?

/ 2 How do you change the volume?

/ 5 Show two waveforms with different amplitude and the same frequency. How do they sound different?
Show two waveforms with different frequency and the same amplitude. How do they sound different?

If $A_4$ is 440 Hz, what is the frequency of $A_5$?

If a guitar string is tuned to $C_6$, what note will that same string produce at the same tension if it is $\frac{1}{3}$ as long?

**Team performance of Ode to Joy (3 minutes total)**

- / 1 Range as given, or transcription provided if transposed
- / 1 Steady tempo
- / 2 Tempo matching between players
- / 3 Intonation
- / 3 Expression

**Team performance, student’s choice (3 minutes total)**

- / 1 Legible transcription
- / 1 Tempo steady
- / 1 Tempo matching between players
- / 2 Intonation
- / 2 Expression
- / 3 Difficulty
  
  1 Mary had a little lamb or easier
  2 Reasonable
  3 Complex
**Team scoring**

<table>
<thead>
<tr>
<th>/ 10</th>
<th>Originality/creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fundamentally flawed</td>
</tr>
<tr>
<td>0–4</td>
<td>Fundamental design flaws</td>
</tr>
<tr>
<td>5</td>
<td>Decent copies of an existing design in the same material</td>
</tr>
<tr>
<td>10</td>
<td>Would require all of: novel or unique materials (2); novel or unique design (3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/ 10</th>
<th>Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Same instrument type</td>
</tr>
<tr>
<td>4</td>
<td>Same family, different type</td>
</tr>
<tr>
<td>10</td>
<td>Different families</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/ 10</th>
<th>Workmanship</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>Did not survive the demonstration in working order</td>
</tr>
<tr>
<td>5</td>
<td>Ugly but it worked</td>
</tr>
<tr>
<td>10</td>
<td>Would require all of: high quality materials (1); beautiful fabrication and finish (3); decorative touches (1)</td>
</tr>
</tbody>
</table>

Judge’s signature