

# Science Olympiad, February 26, 2000

## Sounds of Music III: Judging sheet

\_\_\_\_\_ 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 

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 /  $n$  where  $n$  is the maximum number of points for that category.

### Individual instrument inspections and demonstrations (3 minutes total)

Ask questions as necessary to establish their understanding of music science:

- For middle school, to get full credit for theory, students must know that pitch gets higher as a string or other vibrating element gets smaller (or, for strings, tighter). They should also know that music is always caused by something vibrating (wiggling back and forth).
- For high school, to get full credit for theory, students must know the relationship between pitch, wavelength and frequency: that if the pitch goes up an octave, wavelength is cut in half and frequency doubles. They must also know that loudness amounts to increase in the amplitude of the wave.

\_\_\_\_\_ Team member name A \_\_\_\_\_ Grade

\_\_\_\_\_ Instrument type

- ☐ No electric or electronic parts
- ☐ No toys or professional instruments or their parts
- ☐ No purchased items: bells, whistles, mouthpieces, reeds, instrument strings, audio oscillators
- ☐ Energy supplied solely by student, no electricity
- ☐ Built by student within the last year
- ☐ Ask student to explain how the instrument produces sound

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 / 4 Play the lowest and highest notes. How many octaves?

- |   |  |
|---|--|
| 1 | Not enough to play <i>America the Beautiful</i>  |
| 2 | Just enough to play <i>America the Beautiful</i> |
| 3 | 2 octaves or less                                |
| 4 | More than 2 octaves (or not applicable)          |

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 / 3 Sound quality compared to standard instruments (play a scale if applicable)

\_\_\_\_\_ Team member name B \_\_\_\_\_ Grade  
\_\_\_\_\_ Instrument type

- ☐ No electric or electronic parts
- ☐ No toys or professional instruments or their parts
- ☐ No purchased items: bells, whistles, mouthpieces, reeds, instrument strings, audio oscillators
- ☐ Energy supplied solely by student, no electricity
- ☐ Built by student within the last year
- ☐ Ask student to explain how the instrument produces sound

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|---|--|
| 1 | Not enough to play <i>America the Beautiful</i>  |
| 2 | Just enough to play <i>America the Beautiful</i> |
| 3 | 2 octaves or less                                |
| 4 | More than 2 octaves (or not applicable)          |

/ 3 Sound quality compared to standard instruments (play a scale if applicable)

\_\_\_\_\_ Team member name C \_\_\_\_\_ Grade  
\_\_\_\_\_ Instrument type

- ☐ No electric or electronic parts
- ☐ No toys or professional instruments or their parts
- ☐ No purchased items: bells, whistles, mouthpieces, reeds, instrument strings, audio oscillators
- ☐ Energy supplied solely by student, no electricity
- ☐ Built by student within the last year
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/ 3 Sound quality compared to standard instruments (play a scale if applicable)

## *Team performance (3 minutes total for both tunes)*

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Points are assigned on overall musical quality and how well the members play together.

/ 10 Play *America the Beautiful*. All three members must play. The last four bars of the music they were given is wrong; they may play either what is shown on the contest directions, or the standard tune we all know.

/ 10 Play a song of the team's choosing.

## *Team scoring*

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Evaluate the instrument designs, performances, and the team's understanding of theory as a whole:

/ 30 Understanding of the science of music

/ 10 Originality/creativity

- |     |   |
|-----|---|
| 0–4 | Fundamental design flaws  |
| 5   | Decent copies of an existing design in the same material                        |
| 10  | Would require all of: novel or unique materials (2); novel or unique design (3) |

/ 10 Variety—How many of the standard instrument families: strings; woodwinds; brass; percussion; piano (struck strings)

- |    |                |
|----|----------------|
| 5  | One family     |
| 8  | Two families   |
| 10 | Three families |

/ 10 Workmanship

- |     |  |
|-----|--|
| 0–4 | Did not survive the demonstration in working order   |
| 5   | Ugly but it worked   |
| 10  | Would require all of: high quality materials (1); beautiful fabrication and finish (3); decorative touches (1) |

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Judge's signature