4th Grade Engineering Design Challenge Rubric

Criteria	Advanced (4)	Intermediate (3)	Novice (2)	In Progress (1)
Engineering Design Process	Demonstrates complete understanding of all steps in the engineering design process. Clearly shows each stage from problem identification to final solution with exceptional detail, logical progression, and integration of artistic design elements.	Follows most steps of the engineering design process with clear understanding and minimal gaps in explanation. Shows some attempt to incorporate artistic elements in the design stages.	Partially follows the engineering design process with some confusion or missing steps. Limited or unclear inclusion of artistic design considerations.	Minimal understanding of the engineering design process with significant steps overlooked. Artistic elements absent or unrelated.
Iterations and Problem-Solving	Shows multiple thoughtful iterations with clear evidence of refinement. Provides detailed explanations of how each iteration improved pitch and volume. Explains how artistic expression influenced and strengthened the engineering solution. Demonstrates advanced interdisciplinary problem-solving skills combining engineering and art.	Completes at least two iterations with clear improvements. Provides reasoning for design changes, including some connection to artistic design principles.	Attempts one iteration with limited explanation of improvements. Artistic aspects are mentioned but not clearly connected to problem-solving.	Minimal or no iterations attempted. No explanation of design modifications.
Innovation	Design shows exceptional creativity and innovative thinking. Artistic elements are thoughtfully integrated to strengthen the function and appeal.	Design shows original thinking with good problem-solving ideas and some artistic creativity.	Design shows some innovation but relies on common or basic ideas.	Design lacks innovation and shows little evidence of creative problem solving.
Reflection and Learning	Provides a deep, insightful reflection that demonstrates critical thinking about the entire design process, including artistic expression. Clearly articulates learning, challenges, and personal growth.	Offers a clear and thoughtful reflection on the design process with good insights into learning and expression.	Provides a basic reflection with limited depth or insights.	Minimal or no reflection on the design process and learning.
Technical Execution **Pitch** and **Volume** addressed	Solution completely meets all technical requirements with precision and excellence. All components of the instrument work flawlessly with artistic design enhancing usability.	Solution meets most technical requirements with minor areas for improvement.	Solution partially meets technical requirements with significant challenges.	Solution fails to meet most technical requirements.

Scoring Guide:

- **4 (Advanced):** Exceptional understanding and execution

- **3 (Intermediate):** Solid understanding with room for growth

- **2 (Novice):** Basic understanding with significant support needed

- **1 (In Progress):** Minimal understanding, requires substantial guidance

Total Possible Score: 20 points

Point Breakdown:

- 18-20 points: Advanced

- 14-17 points: Intermediate

- 10-13 points: Novice

- 0-9 points: In Progress

Notes for Teachers:

- Encourage students to document their entire design process

- Emphasize the importance of reflection and learning as well as artistic merit

- Support creativity and innovative thinking by providing opportunities for multiple iterations