By the time students reach middle school they should have had numerous experiences in engineering design. The goal for middle school students is ***to define problems more precisely, to conduct a more thorough process of choosing the best solution, and to optimize the final design***.

**Middle Level Engineering Design Rubric**

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|  | **Define the criteria and constraints of a design** | **Evaluate competing design solutions.** | **Improving the design.** |
| **Novice(1)** | absent or no evidence of criteria used | absent-or no evidence used | No changes were made, or the changes were not based on any criteria. |
| **Apprentice(2)** | attempts to define criteria, but the criteria do not match well with the goal. | attempts to evaluate, but based on subjective thoughts | attempts to improve, but is very loosely based on the evaluative process. |
| **Practitioner (3)** | * Addresses the intended goals with multiple criteria. * Missing one of the following: trade-offs, scientific principles | * Evaluates based on established criteria. * One or more of the criteria is not used or data is analyzed with errors. | * Improves the design based on results from evaluation. * Makes no attempt to reevaluate. |
| **Expert (4)** | * Anticipates the trade-offs.(ie. cost, safety,ethical, aesthetics) * Addresses the audience. (who is the product intended for) * Considers scientific principles. (ie. understands digestion if developing a new medicine) | * Establishes multiple criteria for optimal design. * Uses a systematic process for evaluating different designs. (ie. table or checklist) * Uses basic statistical techniques of data and error analysis. (averaging, graphs) * Distinguishes between data analysis correlation and causation. | * Uses models to test designs. * Identifies the best characteristics of each design. * Combines characteristics of each design. * Continues to evaluate |