2011-12 Official Engineering Design Scoring Guide

Grades 4 and 5

	ED- Identifying and Defining a Problem to be Solved *Based on observations and scientific principles, formulate the statement of a problem or a need that can be addressed through the process of engineering design.*	ED- Generating Possible Solutions *Select an engineering solution, and evaluate that solution using criteria and constraints.*	
5/6**	• Clearly identifies a problem that needs to be addressed, and defines and prioritizes design criteria and constraints. • Clearly connects prior knowledge, observations, or scientific principles to clarify and explain the problem.	• Proposes and describes a variety of possible engineering solutions that are distinctly and individually different. • Evaluates the proposed solutions in terms of the degree to which they meet design and performance criteria, constraints and priorities. • Selects and justifies a proposed solution for testing.	**5/6****
4	• Identifies a problem that needs to be addressed, and specifies design criteria and constraints. • Uses prior knowledge, preliminary observations, or scientific principles to clarify the problem.	• Proposes an engineering solution to the identified problem. • Evaluates the proposed solution in terms of design criteria and constraints.	**4**
3	• Identifies a problem that needs to be addressed, and partially identifies design criteria and constraints. • Uses limited and/or some irrelevant prior knowledge, preliminary observations, or scientific principles to clarify the problem.	• Proposes an engineering solution that incompletely addresses the problem. • Partially evaluates the proposed solution in terms of design criteria and constraints.	**3**
1/2*	• Identifies a problem that needs to be addressed, but design criteria and constraints are minimal or lacking. • Uses only irrelevant prior knowledge, preliminary observations, or scientific principles to clarify the problem.	• Proposes an impractical engineering solution to the problem identified. • Evaluates the proposed solution without consideration of design criteria and constraints.	**1/2***

**5 for preponderance (most) completed, 6 for all completed.
* 2 for preponderance (most) completed, 1 for less completed or missing.
Observations may include background information.

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	ED- Testing Solution(s) and Collecting Data *Test solution(s) by collecting, organizing, and displaying data to facilitate the analysis of test results.*	ED- Analyzing and Interpreting Results *Summarize and analyze test results to evaluate the success of the proposed solution in terms of criteria, constraints, and other factors.*	
5/6**	• Design and build a prototype of a solution that addresses the criteria and constraints and can be tested with appropriate tools, materials and resources. Design may incorporate modifications made during construction. • Thoroughly records the results from testing the solution and identifies unexpected outcomes. • Presents complete results in a format that facilitates analysis, informs conclusions and addresses the criteria and constraints.	• Comprehensively summarizes results from testing with attention to whether criteria and constraints were met. • Makes a detailed determination as to whether the proposed solution is feasible in terms of factors such as cost, safety, appearance and environmental impact. • Explains the degree to which the solution may create other problems and/or suggests implications if the solution fails and suggests design modifications to address negative outcomes.	**5/6****
4	• Design and build a prototype of a solution that addresses the problem and can be tested with appropriate tools, materials and resources. • Records the results from testing the solution. • Presents results in a format that facilitates analysis.	• Summarizes results from testing with attention to whether criteria and constraints were met. • Makes a determination as to whether the proposed solution is feasible in terms of factors such as cost, safety, appearance and environmental impact. • Explains how the solution may create other problems and/or suggests implications if the solution fails.	**4**
3	• Design and build a prototype of a solution that partially addresses the problem and can be tested with appropriate tools, materials and resources. • Records limited results from testing the solution. • Presents results that are incomplete or in a format that does not facilitate analysis.	• Summarizes results from testing with limited attention to whether criteria and constraints were met. • Makes a limited determination as to whether the proposed solution is feasible in terms of factors such as cost, safety, appearance and environmental impact. • Demonstrates some understanding that the solution may create other problems or the implications if the solution fails.	**3**
1/2*	• Design and build a prototype of a solution that does not address the problem or cannot be tested with appropriate tools, materials and resources. • Records inaccurate or irrelevant results from testing the solution. • Presents results that are incomplete or inaccurate and do not facilitate analysis.	• Summarized results from testing are presented without consideration of criteria and constraints. • Determination of the proposed solution's feasibility does not consider cost, safety, appearance or environmental impact. • Demonstrates little understanding that the solution may create other problems or the implications if the solution fails.	**1/2***

**5 for preponderance (most) completed, 6 for all completed.
* 2 for preponderance (most) completed, 1 for less completed or missing.
(Teacher guidance in safety and ethics is necessary.