2011-12 Official Engineering Design Scoring Guide
Grades 6, 7 and 8

	ED- Identifying and Defining a Problem to be Solved *Based on observations and scientific principles, formulate the statement of a practical problem that can be addressed through the process of engineering design.*	**ED- Generating Possible Solutions** *Evaluate and select an engineering solution from a range of possible options, and defend that solution for testing using trade-offs, criteria, and constraints.*	
5/6**	• Describes in detail a problem to be solved through the process of engineering design. The solution addresses a specific need identified through research. • Uses and applies relevant background information and science principles to identify potentially viable solutions to the problem. • Explains criteria and constraints or limits to be applied to a solution based on science principles, with supporting rationale.	• Describes a variety of possible engineering solutions that are distinctly different. • Uses the concept of trade-offs to compare and evaluate possible solutions in terms of criteria, constraints and priorities. • Selects and defends a solution for testing based on a comprehensive review of the design and performance criteria and constraints.	**5/6****
4	• Describes a problem to be solved through the process of engineering design. • Describes relevant background information and science principles that relate to the problem. • Identifies criteria and constraints to be applied to the solution.	• Describes possible engineering solutions to the problem identified. • Evaluates the proposed solutions in terms of design and performance criteria, constraints, priorities, and trade-offs. • Selects and explains why a proposed solution was selected for testing based on criteria and constraints.	**4**
3	• Partially describes a problem to be solved through the process of engineering design. • Describes background information and/or science principles that partially relate to the problem. • Identifies given criteria and constraints to be applied to a solution in an overly general way.	• Describes only one possible engineering solution. • Makes limited use of design and performance criteria, constraints, priorities, and trade-offs to evaluate the solution. • Presents a solution for testing that partially relates to criteria and constraints.	**3**
1/2*	• Describes a problem that is unable to be solved through the process of engineering design. • Describes background information or science principles that do not relate to the problem. • Identifies unrelated criteria and constraints to be applied to a solution.	• Gives an incomplete description of an engineering solution. • Incorrectly uses of the concept of trade-offs to evaluate possible solutions in terms of criteria and constraints. • Presents solution for testing with unrelated criteria.	**1/2***

**5 for preponderance (most) completed, 6 for all completed.
*2 for preponderance (most) completed, 1 for less completed or missing.
An engineering design problem addresses a need with a solution that uses relevant science principles.

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	ED – Testing Solution(s) and Collecting Data *Test solution(s) by collecting, organizing, and displaying data to facilitate the analysis and interpretation of test results.*	**ED- Analyzing and Interpreting Results** *Summarize and analyze data, evaluate the proposed solution in terms of design criteria and constraints and trade-offs and suggest design improvements.*	
5/6**	• Constructs a solution that thoroughly addresses the criteria and constraints and is appropriate for testing. Design may incorporate modifications made during construction. • Collects accurate, detailed and complete data relevant to the criteria and constraints using effective and/or advanced techniques to test or analyze a solution. • Displays data that is complete and facilitates a thorough evaluation of the solution.	• Thoroughly evaluates the tested solution and testing process referencing design and performance criteria, constraints, priorities, and trade-offs. • Thoroughly explains to what extent the solution addressed the criteria and constraints. • Identifies and explains in detail possible design improvements using scientific and engineering principles and trends in the data collected.	**5/6****
4	• Constructs a solution that adequately addresses the criteria and constraints and is appropriate for testing. • Collects accurate data relevant to the criteria and constraints using appropriate techniques to test or analyze a solution. • Displays data that is complete and facilitates evaluation of the solution.	• Evaluates the tested solution in terms of design and performance criteria, constraints, and identifies priorities and trade-offs. • Describes to what extent the solution addressed the criteria and constraints. • Identifies and explains possible design improvements.	**4**
3	• Constructs a solution that does not adequately address the criteria and constraints and/or can only be partially tested. • Collects data partially relevant to the criteria and constraints and/or used partially appropriate techniques to test or analyze a solution. • Displays data that is incomplete or does not facilitate evaluation of the solution.	• Partially evaluates the tested solution in terms of design and performance criteria, constraints, and identifies some priorities and trade-offs. • Incompletely describes to what extent the solution addressed the criteria and constraints. • Identifies simplistic design improvements.	**3**
1/2*	• Constructs a solution that does not address the criteria and constraints and cannot be tested. • Collects data that is not relevant to the criteria and constraints and does not use appropriate techniques to test or analyze a solution. • Displays data that is incorrect and does not facilitate evaluation of the solution.	• Inaccurately or incompletely evaluates the tested solution in limited terms of design and performance criteria, constraints, priorities, and/or trade-offs. • Little evidence provided regarding how the solution addressed the criteria and constraints. • Identifies irrelevant design improvements.	**1/2***

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*2 for preponderance (most) completed, 1 for less completed or missing.
Data means evidence or record which may or may not require transformation to communicate results.