Official Engineering Design Scoring Guide
High School

	ED- Identifying and Defining a Problem to be Solved	ED- Generating Possible Solutions	
	Based on observations and scientific principles, formulate the statement of a practical problem that can be addressed through the process of engineering design.	*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. • Thoroughly explains relevant science principles that relate to the problem. • Specifies appropriate criteria within constraints or limits for a solution based on science principles with supporting rationale.	• Describes multiple viable solutions based on scientific or engineering principles. • Uses and clearly articulates the concept of trade-offs to compare and evaluate possible solutions in terms of criteria and constraints. • Selects and defends a solution for testing based on a comprehensive review of the criteria and constraints. Uses initial testing, data and/or research to support decision.	**5/6****
4	• Describes a problem to be solved through the process of engineering design. • Describes the relevant science principles that relate to the problem. • Identifies appropriate criteria and constraints for a solution.	• Describes several possible solutions based on scientific or engineering principles. • Uses the concept of trade-offs to evaluate possible solutions in terms of criteria and constraints. • Selects and defends a solution for testing based on the criteria and constraints.	**4**
3	• Partially describes a problem to be solved through the process of engineering design. • Describes some relevant science principles that partially relate to the problem. • Identifies limited criteria and constraints for a solution.	• Describes solutions which are similar in nature and are partially based on scientific or engineering principles. • Makes limited use of the concept of trade-offs to evaluate possible engineering solutions in terms of criteria and constraints. • Selects and defends a solution for testing partially based on the criteria and constraints.	**3**
1/2*	• Describes a problem that is unable to be solved through the process of engineering design. • Describes science principles that do not relate to the problem. • Identifies unrelated criteria and constraints for a solution.	• Describes only one possible solution. • Incorrectly uses of the concept of trade-offs to evaluate possible solutions in terms of criteria and constraints. • Defends 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	ED- Analyzing and Interpreting Results	
	Create and test or otherwise analyze solution(s) by collecting, organizing, and displaying data to facilitate the analysis and interpretation of results.	*Summarize and analyze data, evaluate the proposed solution, identify uncertainties, and suggest design improvements.*	
5/6**	• Creates and modifies a prototype, model, or process description that completely addresses and explains criteria and constraints and supports testing or analysis. • Collects and processes multiple types of data relevant to criteria and constraints and uses the data to support modifications in the solution. • Displays relevant data that is appropriately formatted for analysis and clearly supports the degree of effectiveness of the solution and any modifications of the original solution that have occurred.	• Based on the results, draws relevant conclusions about the viability of the tested/analyzed solution, makes a recommendation based on criteria and constraints and describes the process by which design modifications were made. Defends modifications and conclusions in terms of scientific and engineering principles and demonstrates how they fulfill criteria and constraints. • Uses data analysis to describe and explain strengths, weaknesses and uncertainties of the solution. • Describes design modifications or further engineering based on analysis of data and supported by science and engineering principles.	**5/6****
4	• Creates and may modify prototype, model, or process description that adequately addresses criteria and constraints and supports testing or analysis. • Collects and processes sufficient data relevant to criteria and constraints. • Displays relevant data that is appropriately formatted for analysis.	• Based on the results, draws relevant conclusions about the viability of the tested/analyzed solution and makes a recommendation. • Analyzes data and identifies strengths, weaknesses and uncertainties of the solution. • Describes design modifications or further engineering based on the information gathered.	**4**
3	• Creates a prototype, model, or process description that partially addresses criteria and constraints and can be tested or analyzed. • Collects and processes insufficient data relevant to criteria and constraints. • Displays data that is not effectively formatted for analysis.	• Based on the results, draws incomplete conclusions about the viability of the tested/analyzed solution and makes a recommendation. • Analyzes data and partially identifies strengths, weaknesses and uncertainties of the solution. • Suggests insufficient design modifications or further engineering based on the information gathered.	**3**
1/2*	• Creates a prototype, model, or process description that incorrectly addresses criteria and constraints or cannot be tested or analyzed. • Collects and processes data irrelevant to criteria and constraints. • Displays incomplete or irrelevant data that is not effectively formatted for analysis.	• Based on the results, draws incorrect conclusions about the viability of the tested/analyzed solution and/or makes a disconnected recommendation. • Superficially analyzes data and incorrectly identifies strengths, weaknesses and/or uncertainties of the solution. • Suggests unrelated design modifications or further engineering not based on the information gathered.	**1/2***

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Data means evidence or record which may or may not require transformation to communicate results.