

Engineering Design Performance Expectations Progression K-12

	PRIMARY LEVEL	INTERMEDIATE LEVEL	MIDDLE SCHOOL LEVEL	HIGH SCHOOL LEVEL
ETS1-1	<p><i>Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</i></p>	<p><i>Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</i></p>	<p><i>Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</i></p>	<p><i>Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</i></p>
ETS1-2	<p><i>Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</i></p>	<p><i>Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</i></p>	<p><i>Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</i></p>	<p><i>Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</i></p>
ETS1-3	<p><i>Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</i></p>	<p><i>Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</i></p>	<p><i>Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</i></p>	<p><i>Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.</i></p>



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ETS1-4			<i>Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</i>	<i>Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</i>
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