

MS-ETS1-2 Engineering Design

Students who demonstrate understanding can:

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world.

- Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

Crosscutting Concepts

Observable features of the student performance by the end of the course:

1	Identifying the given design solution and associated claims and evidence
a	Students identify the given supported design solution.
b	Students identify scientific knowledge related to the problem and each proposed solution.
c	Students identify how each solution would solve the problem.
2	Identifying additional evidence
a	Students identify and describe additional evidence necessary for their evaluation, including: <ol style="list-style-type: none"> Knowledge of how similar problems have been solved in the past. Evidence of possible societal and environmental impacts of each proposed solution.
b	Students collaboratively define and describe criteria and constraints for the evaluation of the design solution.
3	Evaluating and critiquing evidence
a	Students use a systematic method (e.g., a decision matrix) to identify the strengths and weaknesses of each solution. In their evaluation, students: <ol style="list-style-type: none"> Evaluate each solution against each criterion and constraint. Compare solutions based on the results of their performance against the defined criteria and constraints.
b	Students use the evidence and reasoning to make a claim about the relative effectiveness of each proposed solution based on the strengths and weaknesses of each.