

Engineering

KINDERGARTEN - GRADE

2 **K2**

1 Engineering Design **ETS1**

- 1 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. **K2.ETS1.1**
 - 2 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. **K2.ETS1.2**
 - 3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. **K2.ETS1.3**
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Grade 3 - Grade 5 **G35**

1 Engineering Design **ETS1**

- 1 Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost. **G35.ETS1.1**
 - 2 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. **G35.ETS1.2**
 - 3 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. **G35.ETS1.3**
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Middle School **MS**

1 Engineering Design **ETS1**

- 1 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. **MS.ETS1.1**
 - 2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS.ETS1.2**
 - 3 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. **MS.ETS1.3**
 - 4 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. **MS.ETS1.4**
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High School **HS**

1 Engineering Design **ETS1**

- 1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. **HS.ETS1.1**

- 2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. [HS.ETS1.2](#)
- 3 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.
[HS.ETS1.3](#)
- 4 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. [HS.ETS1.4](#)