

# Core Concept: Design Methods

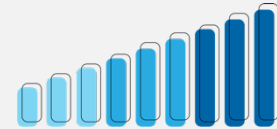
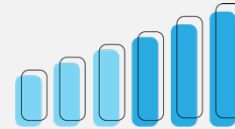
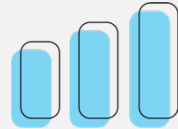
**Engineering Literacy Dimension:** Engineering Practices

**Practice:** Engineering Design

**Overview:** *Design Methods* are the processes that people apply to devise novel solutions to a broad range of problem scenarios that have an identified goal and one or more reasonable pathways toward resolution. This core concept includes knowledge related to (a) *iterative design cycles*, (b) *user-centered design*, (c) *systems design*, (d) *reverse engineering*, and (e) *troubleshooting*. Design Methods are important to the practice of Engineering Design as engineering professionals take a more disciplined, informed, and organized approach to solve problems rather than general trial-and-error tactics. This makes it important to know and understand what design methodologies are available and how to use them.

## Performance Goal for High School Learners

I can successfully develop a plan to manage an engineering project through the appropriate application of a specified design strategy.



### ITERATIVE DESIGN CYCLES

I can distinguish between different types of iterative cycles (e.g. closed or open loop).

I can utilize an iterative cycle in the design process.

I can organize and manage an iterative cycle to improve my design.

### USER-CENTERED DESIGN

I can describe a certain design with potential users' perspective.

I can define who can be my potential users and what information I need from them to identify their needs and environment.

I can plan and conduct a test with potential users to optimize my design with their specific needs and environment.

### SYSTEMS DESIGN

I can describe inputs, outputs, process, and feedback of a system with an example.

I can identify the inputs, outputs, process, and feedback of my design.

I can analyze the inputs, outputs, process, and feedback of my design to improve it.

### REVERSE ENGINEERING

I can explain the process of general reverse engineering.

I can identify components of an existing system through disassembling the system.

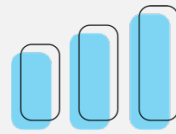
I can identify and analyze each component of an existing design and the relationships of different components.

## Core Concept: Design Methods Cont.

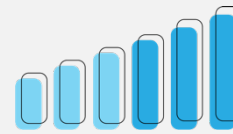
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### Performance Goal for High School Learners

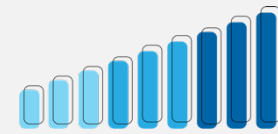
I can successfully develop a plan to manage an engineering project through the appropriate application of a specified design strategy.



Basic



Proficient



Advanced

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### TROUBLESHOOTING

I can explain the process of general troubleshooting.

I can identify a troubleshooting method that is needed to identify, analyze, and solve a problem of my potential solution.

I can systematically plan and implement troubleshooting in a variety of problematic situations.