Introduction: The Massachusetts Department of Education worked with teachers and engineers from across their state to create this engineering design model. It’s a very useful model in many different engineering situations.

**Identify a need or a problem.** To begin engineering design, a need or problem must be identified that an attempt can be made to solve, improve and/or fix. This typically includes articulation of criteria and constraints that will define a successful solution.

**Research.** Research is done to learn more about the identified need or problem and potential solution strategies. Research can include primary resources such as research websites, peer-reviewed journals, and other academic services, and can be an ongoing part of design.

**Design.** All gathered information is used to inform the creations of designs. Design includes modeling possible solutions, refining models, and choosing the model(s) that best meets the original need or problem.

**Prototype.** A prototype is constructed based on the design model(s) and used to test the proposed solution. A prototype can be a physical, computer, mathematical, or conceptual instantiation of the model that can be manipulated and tested.

**Test and evaluate.** The feasibility and efficiency of the prototype must be tested and evaluated relative to the problem criteria and constraints. This includes the development of a method of testing and a system of evaluating the prototype’s performance. Evaluation includes drawing on mathematical and...
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scientific concepts, brainstorming possible solutions, testing and critiquing models, and refining the need or problem.

**Provide feedback.** Feedback through oral or written comments provides constructive criticism to improve a solution and design. Feedback can be asked for and/or given at any point during engineering design. Determining how to communicate and act on feedback is critical.

**Communicate, explain, and share.** Communicating, explaining, and sharing the solution and design is essential to conveying how it works and does (or does not), solving the identified need or problem, and meeting the criteria and constraints. Communication of explanations must be clear and analytical.