

**Example Design Process**

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| Project Lead The Way, Inc. has adopted this design process from Standards for Technological Literacy Standard 8, Benchmark H. This design process will be used for all courses. The design process includes:1. Define a Problem
* Identify a problem that exists.
* Determine the root cause.
* Gather information.
1. Brainstorm
* Present ideas in group.
* Generate and record ideas.
* Seek quantity, not quality.
* Keep the mind alert through rapidly paced sessions.
1. Research and Generate Ideas
* Analyze the reasons for the need, want, or problem.
* Investigate who or what is affected, and consider the need, want, or problem from their perspective.
* Research any existing solutions, and identify why they are not adequate or appropriate.
* Listen to clients to solve problems that they have discovered.
* Perform market research to determine if a want or need exists and warrants the development of a design solution.
1. Identify Criteria and Specify Constraints
* Identify the end user if it is different than the client.
* Redefine the problem to the agreement of both client and engineer.
* Identify what the solution must do, and the degree to which it will be pursued.
* Identify the limitations within which the engineer must perform his/her duties.
* Compile the information into a design brief.
1. Explore Possibilities
* Initiate further development of brainstorming ideas with constraints and tradeoffs considered.
* Explore alternative ideas based on further knowledge and technologies.
1. Select an Approach
* Create a decision-matrix to compare the attributes of the various ideas and analyze the trade-offs associated with each one.
* Verify alignment between the idea selected and the criteria and constraints.
1. Develop a Design Proposal
* Develop detailed and annotated sketches.
* Determine the type(s) of material from which the solution will be constructed.
* Make computer models.
* Create technical drawings from the computer model(s).
1. Make a Model or Prototype
* Make study models (scaled models or mock-ups).
* Fabricate a functional prototype.
1. Test and Evaluate the Design using Specifications
* Test the prototype under controlled conditions.
* Test the prototype under actual conditions.
* Record the results.
* Evaluate results to determine if problems exist and further work is needed.
1. Refine the Design
* Reassess the validity of the design criteria and make adjustments to the design brief, if necessary.
* Work through the design process until the solution satisfies the design criteria.
* Update the documentation of the final solution.
1. Create or Make Solution
* Determine custom/mass production.
* Consider packaging.
1. Communicate Processes and Results
* Present oral presentations with visual aids (computer-generated slide show, models, prototype).
* Develop written reports with appropriate graphic documentation (charts, graphs, technical drawings, renderings, etc.).
* Market the Product.
* Distribute.
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