

### Introduction/Motivation

Scientists, engineers, and ordinary people use problem solving each day to work out solutions to various problems. Using a systematic and iterative procedure to solve a problem is efficient and provides a logical flow of knowledge and progress.

"The Technological Method of Problem Solving." is a seven-step procedure that is highly iterative—you may go back and forth among the listed steps, and may not always follow them in order. Remember that in most engineering projects, more than one good answer exists. The goal is to get to the best solution for a given problem.

### Background and Concepts

The overall concept that is important is: **Using a standard method or procedure to solve problems makes the process easier and more effective.**

The process can skip ahead and go backwards (learn more about the problem or potential solutions if early ideas do not work well).

This process provides a reference that can be reiterated throughout to learn new material or ideas that are relevant to the solution.

Brainstorming about what we know about a problem or project and what we need to find out to move forward is often a good starting point when faced with a new problem. This type of questioning provides a basis and relevance that is useful in other science and technology solutions.

### 1. Identify the problem

Clearly state the problem. (Short, sweet and to the point. This is the "big picture" problem, not the specific project you have been assigned.)

### 2. Establish what needs to be achieved

■ **Completion of a specific project that will help to solve the overall problem.**

■ **In one sentence answer the following question:** How will I know I've completed this project?

■ **List criteria and constraints:** Criteria are things you want the solution to have. Constraints are limitations, sometimes called specifications, or restrictions that should be part of the solution. They could be the type of materials, the size or weight the solution must meet, the specific tools or machines you have available, time you have to complete the task and cost of construction or materials.

### 3. Gather information and research

■ Research is sometimes needed both to better understand the problem itself as well as possible solutions.

■ Don't reinvent the wheel – looking at other solutions can lead to better solutions.

■ Use past experiences.

### 4. Brainstorm possible solutions

■ List and/or sketch as many solutions as you can think of.

### 5. Choose the best solution

Evaluate solution by:

- 1) **Comparing possible solution against constraints and criteria**
- 2) **Making trade-offs to identify "best."**

### 6. Implement the solution

■ Develop plans that include (as required): drawings with measurements, details of construction, construction procedure.

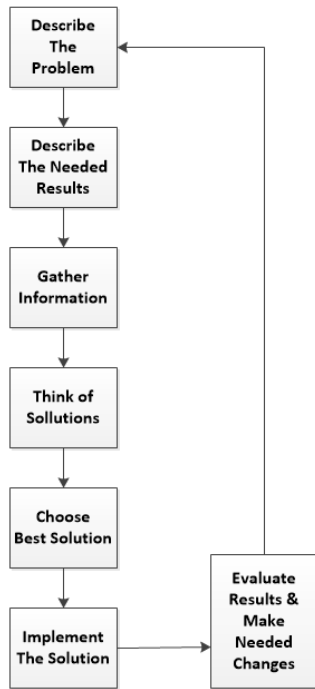
■ Define tasks and resources necessary for implementation.

■ Implement actual plan as appropriate for your particular project.

### 7. Test & Evaluate the solution

■ Compare the solution against the criteria and constraints.

■ Define how to modify the solution for different or better results.



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