Problem-Solving Models

To develop decision-making and problem-solving skills, students need to be challenged to identify problems and develop solutions. The problems students identify or are assigned in technology education involve improving existing products and systems, as well as designing and developing new ones. Models that describe problem-solving processes should be developed with students so they understand the recurring nature of solving real-world problems (as part of a problem is solved, new problems arise and some steps in the processes recur).

The following diagrams present a variety of approaches to describe problem solving in technology education. They are intended to provide teachers with ideas; they are not prescribed models.

1. Simple Linear Model
   Some models suggest that problem solving is a set of clearly defined and prescribed linear steps (Figure 1). This is rarely the case.

   ![Figure 1—Linear model of problem solving](image)

2. Generic Model
   Designing is a problem-solving method used to develop solutions leading to the creation of articles, systems, or environments.

   Some specialized problems are approached in unique ways, for example by using troubleshooting techniques or by assessing the repercussions that various decision-making frameworks may have on society.

Troubleshooting
Troubleshooting is a method of solving problems used to isolate and diagnose a malfunction. The stages involved in troubleshooting are as follows (Figure 2):

- Identify the purpose of a system (inputs and outputs)
- Identify the purpose of subsystems (inputs and outputs)
- Test subsystems
- Identify cause and implement solution
- Test solution
- Refine solution as required
Assessing Social Impact
This is a method of solving problems to appraise the social, environmental, and ethical implications of technological decisions. Assessing the social impact of a decision involves the following stages:

- Identify consequences and effects
- Develop a value system through critical thinking
- Judge benefits and disadvantages of technological applications
- Make ethical decisions

3. Action Model
Some models suggest a continuous flow of activity, from problem identification to the development of a refined product (Figure 3).
4. **Interactive Model**

Interactive models illustrate the complexity of a process, in which at any time you might move to any point in the process in order to figure something out (Figure 4).
5. Design Loop Model

![Diagram of Design Loop Model]

This resource has been adapted from the BC Ministry of Education’s Technology Education 11 and 12: Industrial Design Integrated Resource Package (1997). [http://tinyurl.com/jcmo3n4](http://tinyurl.com/jcmo3n4)