

# Chapter 3 Lesson Plan

## The Engineering Design Process

Chapter Resources		
Textbook Activity	Teacher CD	Online Learning Center
<b>Design a Computer Desk</b> Design a comfortable and efficient computer desk and make a full-size model of it.	Lesson Plan Flash® Presentation <i>ExamView®</i> Chapter Test	Chapter Activities Chapter Quizzes

### FOCUS

Chapter 3 concentrates on the importance of engineering design, human factors engineering, the engineering design process, and other problem-solving methods.

### Objectives

- List and discuss important concepts of engineering design.
- Define and explain the importance of human factors engineering.
- Identify the ten steps in the engineering design process.
- Compare and contrast the problem-solving process and the scientific method.

### Tying to Previous Knowledge

Create a poster or PowerPoint® slide of the engineering design process. Discuss with the class how they may have already used parts of the process, perhaps without even realizing it.

### TEACH

1. **Critical thinking.** Define and discuss critical thinking in the context of Chapter 3. Pose a problem and ask for responses emphasizing critical thinking.
2. **Analysis.** Define and discuss what analysis is in the context of Chapter 3. Pose a problem and ask for responses emphasizing analytical thinking.
3. **Synthesis.** Define and discuss synthesis in the context of Chapter 3. How does it differ from analysis? Pose a problem and ask for responses emphasizing synthesis as a suggested solution.
4. **Evaluation.** Define and discuss evaluation in the context of Chapter 3. Pose a theoretical solution to a problem and ask for suggestions evaluating the solution.
5. **Demonstration.** Acquire an adult-sized desk and a chair suitable for young children. Have a student demonstrate how awkward it is to use the two in combination. Emphasize that human factors engineering also takes into account the ages of the users in question.

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## Chapter 3 Lesson Plan

### The Engineering Design Process (continued)

#### ASSESS

Have students complete Chapter Test 3. Chapter tests are found in the *ExamView*® Assessment Suite on this Teacher Resource CD-ROM.

#### Reteach

1. Write an anecdotal description of a frustrating encounter with trying to efficiently utilize a student locker for storage. Have student volunteers define the problem.
2. Practice brainstorming for any particular problem's solution (such as the locker scenario above). Emphasize the freewheeling and non-judgmental nature of the process.

#### Enrich

1. Using a single premise or problem, have groups summarize or demonstrate how they might tackle the problem using the traditional problem-solving process and, alternately, the scientific method.
2. The writer Carl Sagan is quoted as having said, "Science is a way of thinking much more than it is a body of knowledge." How might his comment describe the scientific method of problem solving?

#### REFLECT

In the scientific method, much is made of the need for objective observation and testing (easier said than done). One of the techniques for insuring such objectivity is the "double-blind" test. In this procedure, neither the subjects nor the researchers know which individuals are actually receiving "the treatment." It helps remove any bias on the part of subject or tester. Discuss such techniques with the class.