Chapter and Challenge Overview

This chapter is about communications technology and the physics behind it. The students are challenged to use the physics they learn to build a system to communicate from one room to another. In effect, they are engineers. In engineering, the nature of the task is expressed in requirements that the final product must meet. Engineering in the science lab is known as technological design. The most important feature of a technological design activity is the feedback process in which students build a prototype, test it against the requirements, and then modify the prototype until it meets the requirements. In this challenge, students might begin by running a Slinky from one room to the other. They might find that the Slinky waves would reflect back where the spring was pressed against a door frame. Then they might try running wires from one room to another and try to deflect a compass with an electric current. To increase the deflection they might wind a coil around the compass and add extra batteries to the circuit. With every change, they must evaluate the result and then decide on the next modification.

You and the students must choose the **Chapter Challenges**. The first challenge is an application of the basic physics presented in the activities to the engineering problem of communicating between two rooms. The optional essay enables the students to explore the effect of the Internet on society. Encourage your students to include an essay in the challenge. Remember, though, that the equity access issue raised in essay topic 2 (a) applies in your classroom. If the students are to write an essay as part of the challenge, they all must have had the opportunity to become familiar with the Internet.