SECTION 1

The Nature of Waves

Imagine that your family has just returned home from a day at the beach. You had fun playing in the ocean under a hot sun. You put some cold pizza in the microwave for dinner, and you turn on the radio. Just then, the phone rings. It's your friend calling to ask about homework.

In the events described above, how many different waves were present? Believe it or not, there were at least five! Can you name them? Here's a hint: A **wave** is any disturbance that transmits energy through matter or empty space. Okay, here are the answers: water waves in the ocean; light waves from the sun; microwaves inside the microwave oven; radio waves transmitted to the radio; and sound waves from the radio, telephone, and voices. Don't worry if you didn't get very many. You will be able to name them all after you read this section.

Reading Check **What do all waves have in common?** (*See the Appendix for answers to Reading Checks.*)

READING WARM-UP

Objectives

- Describe how waves transfer energy without transferring matter.
- Distinguish between waves that require a medium and waves that do not.
- Explain the difference between transverse and longitudinal waves.

Terms to Learn

wave	transverse wave
medium	longitudinal wave

READING STRATEGY

Discussion Read this section silently. Write down questions that you have about this section. Discuss your questions in a small group.

Wave Energy

Energy can be carried away from its source by a wave. You can observe an example of a wave if you drop a rock in a pond. Waves from the rock's splash carry energy away from the splash. However, the material through which the wave travels does not move with the energy. Look at **Figure 1.** Can you move a leaf on a pond if you are standing on the shore? You can make the leaf bob up and down by making waves that carry enough energy through the water. But you would not make the leaf move in the same direction as the wave.

wave a periodic disturbance in a solid, liquid, or gas as energy is transmitted through a medium

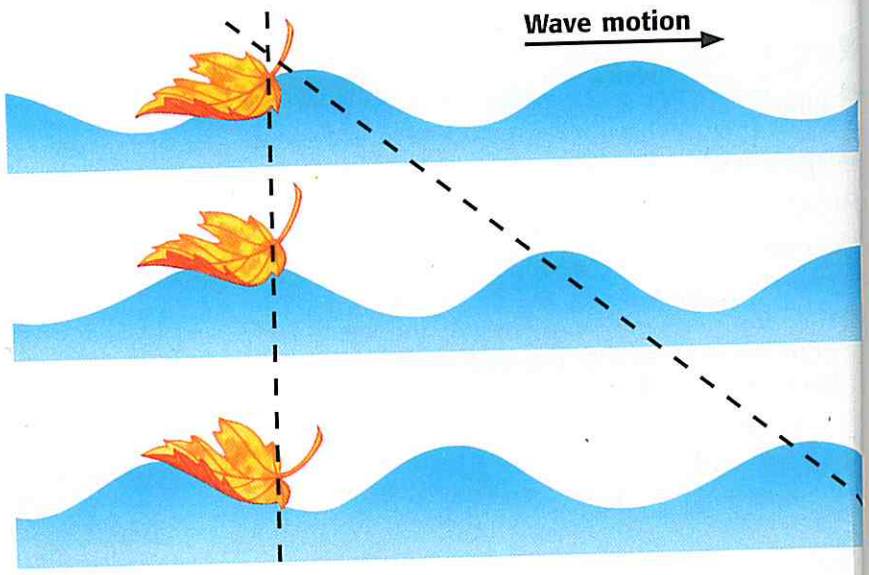

Figure 1 *Waves on a pond move toward the shore, but the water and the leaf floating on the surface only bob up and down.*