# Observing and Measuring Waves and Vibrations
# Teacher Background Information (SC060300)

In this unit students broaden their understanding of waves in sound, light, and nature. They compare longitudinal waves and transverse waves, looking at examples in water, land (earthquakes) sound, and light.

Waves are periodic oscillations that can all be described in terms of *amplitude*, how much energy is in the wave, and *wavelength*, how often the vibration occurs or the time (distance) between wavelengths.

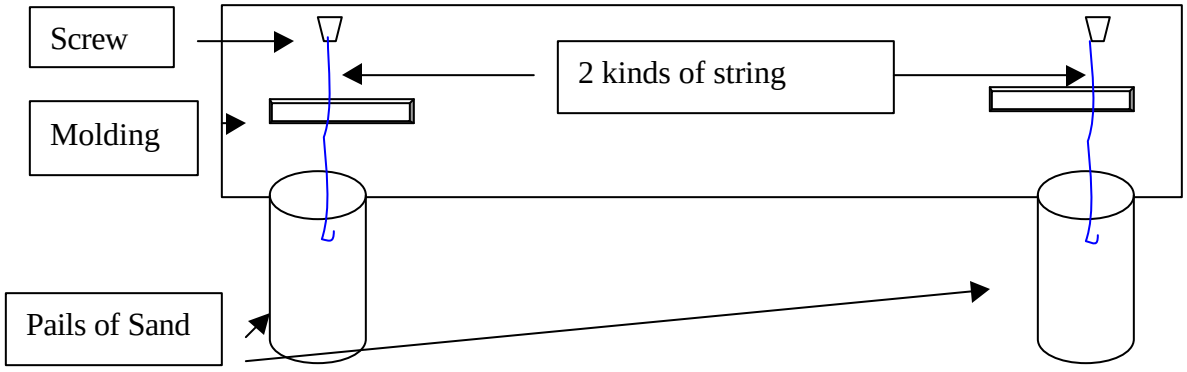
Water waves are transverse waves; the water particles move up and down as the wave moves toward the beach. Earthquake waves are both longitudinal and transverse; they both push and shake the portion of the Earth's crust in which they occur.

Sound is a longitudinal wave. Sound vibrations push and pull the air or matter ahead of the sound, compacting it and spreading it out like an accordion. Sound can only travel through matter.

Light is neither a wave nor a particle—it is light. But in many ways it acts like a wave, and thinking of it as having wavelength (frequency) can help students understand many light phenomena.

## Methods and Misconceptions

The activities in this unit expand and deepen the activities in from the Grade 5 Unit *Now Hear This*. It is never a mistake to repeat simple demonstrations and expand them for students. So, the activities in SC050500 that include making musical instruments are repeated here in brief. Below is an example of a student made guitar from the Unit *Now Hear This.*




But students can make their instruments in any way they wish. Be creative. One very popular Science Olympiad activity includes allowing students to make a variety of instruments and form a "band." This is a very good extension for this unit.

Despite repeating the activities in several grades, students may have serious misconceptions about waves and vibrations. The media persists in allowing rockets to “roar” through space, and to show light as being capable of “beaming” people from planet to planet. So leave plenty of time for conversation and hands-on exploration.

Make vibrations part of your conversation during other times of the day, as well. If the bell rings, the phone beeps or your pager goes off, mention those “good vibrations” to the class.

**Pictures and Transparencies**

(Photo by Bill Aldridge)