Name _____ Date _____ Class _____

The Nature of Sound

Key Concepts

- What is sound?
- How do sound waves interact?
- What factors affect the speed of sound?

Sound is a disturbance that travels through a medium as a longitudinal wave. Sound begins with a vibration. A vibrating object creates compressions and rarefactions that travel as longitudinal waves. Sound waves carry energy through a medium without the particles of the medium traveling along.

Each particle of the medium vibrates as the disturbance passes. When the disturbance reaches your ears, you hear the sound. A common medium for sound is air. But sound can travel through solids and liquids, too.

Sound waves interact with the surfaces they contact and with each other. **Sound waves reflect off objects, diffract through narrow openings and around barriers, and interfere with each other.** Sound waves may reflect when they hit a surface. A reflected sound wave is called an **echo**. Sound waves do not always travel in a straight line. They can diffract, or bend, around corners and through openings. Sound waves may meet and interact with each other. This interaction is called interference. Interference of sound waves can be constructive or destructive.

The speed of sound depends on the elasticity, density, and temperature of the medium. The ability of a material to bounce back after being disturbed is called **elasticity.** For example, a rubber band is made of an elastic material. Sound travels more quickly in mediums that have a high degree of elasticity, because when the particles are compressed, they quickly spread out again. The speed of sound also depends on the density of a medium. **Density** is how much matter, or mass, there is in a given amount of space, or volume. Sound travels more slowly in denser mediums. At a room temperature of about 20°C, sound travels through air at about 343 m/s. In a given medium, sound travels more slowly at lower temperatures than at higher temperatures.