

The Speed of Sound

We know that **sound** is a form of energy that is produced by **vibrating matter**. We also know that where there is no matter there is no sound. **Sound waves** must have a medium (matter) to travel through. When we talk, sound waves travel in air. Sound also travels in liquids and solids. How fast speed travels, or the **speed of sound**, depends on the kind of matter it is moving through.

Of the **three phases of matter** (gas, liquid, and solid), **sound waves** travel the slowest through gases, faster through liquids, and fastest through solids. Let's find out why.

Sound moves slowest through a **gas**. That's because the molecules in a gas are spaced very far apart. In order for sound to travel through air, the floating molecules of matter must vibrate and collide to form **compression waves**. Because the molecules of matter in a gas are spaced far apart, sound moves slowest through a gas.

Sound travels faster in **liquids** than in gases because molecules are packed more closely together. This means that when the water molecules begin to vibrate, they quickly begin to collide with each other forming a rapidly moving compression wave. Sound travels over four times faster than in air!

Sound travels fastest through **solids**. This is because molecules in a solid are packed against each other. When a vibration begins, the molecules of a solid immediately collide and the compression wave travels rapidly. How fast, you ask? **Sound waves** travel over 17 times faster through steel than through air. That's amazing!