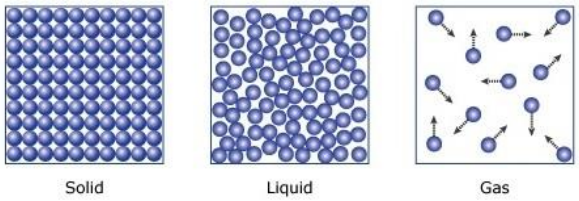
Exploring Sound 10: How Sound Waves Travel - part 2

We learned in the last lesson that **sound waves** are **longitudinal waves** that travel by the bumping of particles into other particles. That means that sound needs something to travel through.

These diagrams show how close together particles are in solid objects, liquids (like water at room temperature) and gasses (like the air).

Because sound needs to have particles to cause to vibrate, sound travels better when there are more particles.



So, sound travels better (faster) through solids than through liquids, and it travels better through liquids than through gases.

You may have experienced that when in a swimming pool. Sounds underwater seem louder than on the pool deck. (Hold your question on hearing underwater sounds that are happening outside the pool until the next lesson!) You may have also heard that it is possible to hear sounds coming from a distance away by putting your ear on the ground (this doesn't work very well in the city because there are so many sounds travelling through the ground).

Here's a video that talks about how sound travels through different mediums. Later in the video there is an experiment showing explosives going off in a pit mine and demonstrating the relative speeds of travel of light, sound through air, and sound through the ground:
https://www.youtube.com/watch?v=q9ezMbDpIHI

Here's a video explaining how sound travels through water:
https://www.sciencelearn.org.nz/videos/802-how-sound-travels-under-water

Here's an underwater listening experiment from Scientific American:
https://www.scientificamerican.com/article/what-do-you-hear-underwater/

When there are no particles to travel through (we call that a vacuum), sound cannot travel.
So, can we hear in space? Here's an article about that from How Stuff Works:
https://science.howstuffworks.com/humans-hear-in-space.htm

Here's a diagram showing how the aspects of the wiggly line waves we looked at first correspond to compression waves.