

## **Sound vs. Light in the Sea**

Light and other forms of electromagnetic energy do not travel well through materials as they are made of atoms and molecules. Atoms and molecules absorb, block or scatter this energy.

Water and gasses are clear, but they're still made of molecules that want nothing better to do than absorb this energy. Thus, water and even air hamper the conduction of light, no matter how clear. It's interesting that electromagnetic energy such as light can travel through the vacuum of space for trillions of miles, but can't penetrate even the clearest water for more than a few hundred feet. The vast majority of the sea is in total darkness.

On the other hand, sound requires matter in order to be transmitted. Sound cannot travel in outer space as there are no molecules to vibrate and pass along compression waves. In fact sound travels better in materials that are more dense, where molecules are more tightly packed. This is why the speed of sound in water is roughly five times faster in water than in air.

Life has proven that it evolves ways to sense its surroundings with the energy available. Many living things have features for sensing "visible light"; plants utilize it as an energy source for photosynthesis. Visible light is the form of electromagnetic energy that is most available to us from our star, the Sun. Perhaps if our sun bathed us in infra-red energy or ultra-violet, more life might have evolved ways to "see the world" using these forms of electromagnetic radiation.

Sound travels well in water and is a more versatile and useful form of energy in the deep than light. So it makes sense that many undersea animals have adaptations for using sound to communicate and sense their surroundings. This is especially true for whales and dolphins who can "see" in the darkness using echolocation, and have advanced vocalizations to communicate with other individuals to navigate, coordinate a hunt, or simply find each other.