SOL 5.5 -- SOUND ENERGY

Sound can be produced and transmitted. Key ideas include

a. sound is produced when an object or substance vibrates;

b. sound is the transfer of energy;

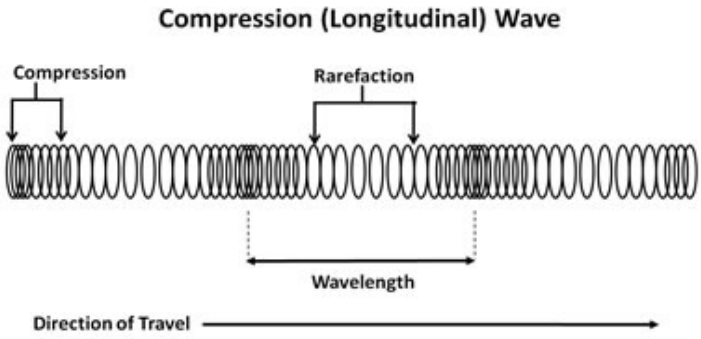
c. different media transmit sound differently;

d. sound waves have many uses and applications

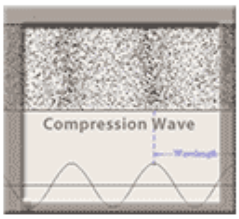
CENTRAL IDEA –Energy can be transmitted through different media (solids, liquids, gases) in waves. The transfer of energy in waves causes vibrations that can produce sound.

VIBRATING MATTER - COMPRESSION WAVES

Waves transmit energy from one place to another. Sound is produced as these waves cause **vibrations** as they travel through **matter**.

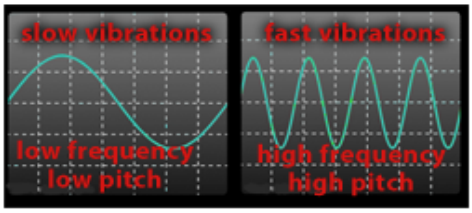


- Sound is a form of mechanical energy produced and transmitted by vibrating matter
  - Mechanical energy is the energy an object has due to its motion or position.
- In sound waves, energy is transferred through the vibration of particles of the medium through which the sound travels.
- Sound travels in compression waves and must have a medium through which to travel.
  - Sound also travels in liquids and solids

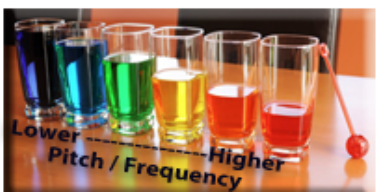


FREQUENCY, WAVELENGTH, PITCH & AMPLITUDE

- Objects vibrating rapidly have a higher pitch than objects vibrating more slowly
- Musical instruments vibrate to produce sound.
  - There are many different types of musical instruments and each instrument causes vibrations in different ways



- *Remember:* ***larger, longer or thicker*** *vibrating objects create* ***lower*** *frequency (lower pitch) sounds. Likewise,* ***smaller, shorter, or thinner*** *(or stretched) vibrating objects create* ***higher*** *frequency (higher pitch) sounds.*

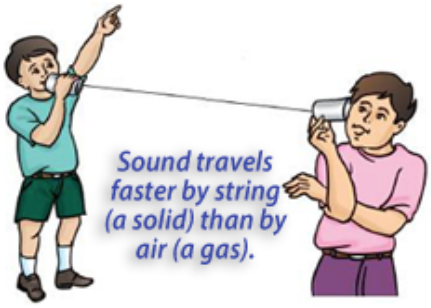


Sound travels fastest through solids where molecules are packed tightly together.

Sound can't travel through empty space where there are no molecules to vibrate.

THE MEDIUM

- Sound travels more quickly through solids than through liquids and gases because the molecules of a solid are closer together.
- Sound travels the slowest through gases because the molecules of a gas are farthest apart.



ANIMALS

- Some animals make and hear ranges of sound vibrations different from those that humans can make and hear.

Whales make low-frequency moans that distant whales can hear.

Dogs can hear high-frequency sounds that humans cannot hear.

Bats use high frequency sounds to locate objects