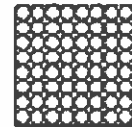


# Key Concepts

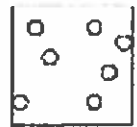
Force, Motion, Energy, and Matter  
(SOL 5.2)

## Sound

- **Sound** is a form of energy produced and transmitted by vibrating matter.
- Sound travels in waves and can be described by the wavelength and frequency of the waves. A **wave** is a disturbance moving through a *medium* (solid, liquid, or gas).
- The **frequency** of sound is the number of vibrations in a given unit of time.
- Sound is a **compression wave** moving outward from its source. The **wavelength** of sound is the distance between two compressions.
- **Pitch** is determined by the frequency of a vibrating object. Objects vibrating faster have a higher pitch than objects vibrating slower.
- **Amplitude** is the amount of energy in a compression (longitudinal) wave and is related to intensity and volume.
- Sound travels more quickly through solids than through liquids and gases because the molecules of a solid are closer together. Sound travels most slowly through gases because the molecules of a gas are farthest apart.

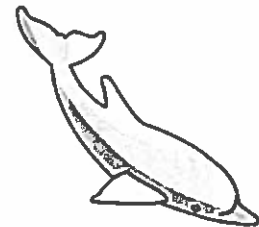


Solid

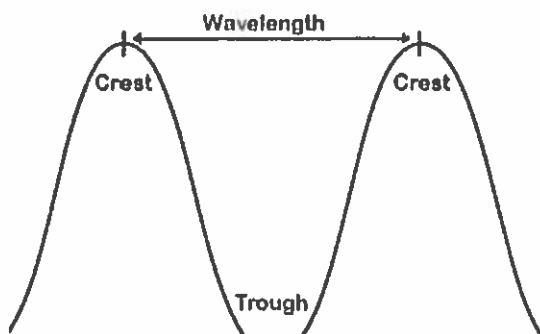


Gas

- Some animals make and hear ranges of sound vibrations different from those that humans can make and hear.
- Musical instruments **vibrate** to produce sound.



### Wavelength



### Pitch

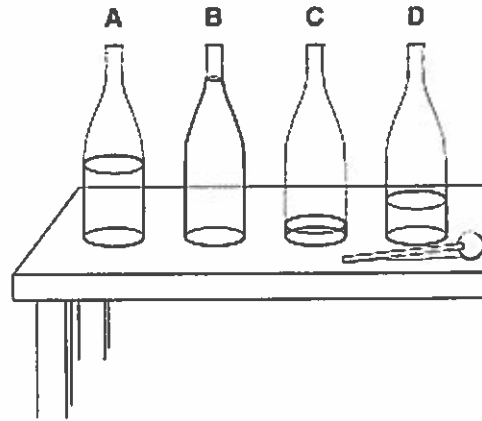
High



© 2013 HCPS

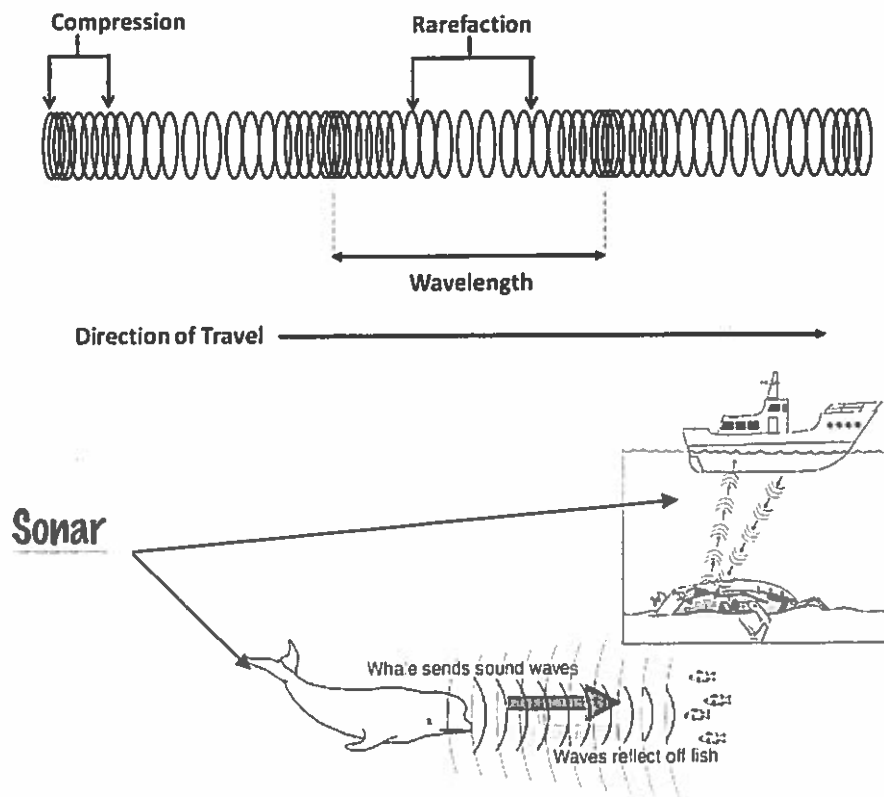
Low

Highest pitch would be container "C," and the lowest pitch would be container "B"



Sound is a **compression wave** moving outward from its source, the place where the sound begins. The **wavelength** of sound is the distance between two compressions. A sound wave differs from a light wave or an ocean wave because it is not a transverse or up-and-down wave.

### Compression (Longitudinal) Wave





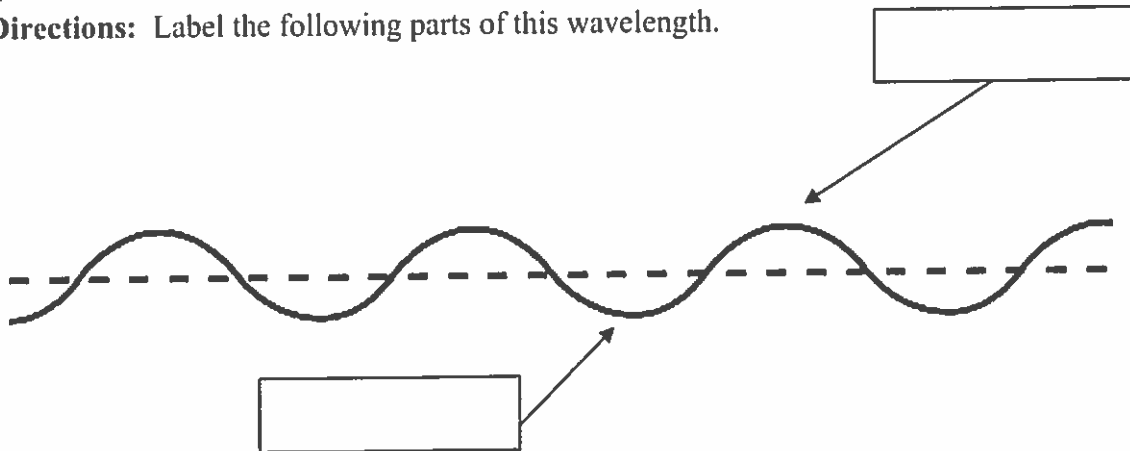
**Directions:** Fill in the blanks using the information provided in the chart.

MATERIAL	AVERAGE SPEED OF SOUND (M/SEC)
air	343
fresh water	1,490
salt water	1,532
wood	4,000
glass	4,540
steel	5,790

1. The material that sound travels slowest through is \_\_\_\_\_.
2. Sound travels \_\_\_\_\_ m/sec faster through salt water than through fresh water.
3. The material that sound travels fastest through is \_\_\_\_\_.
4. Through which state of matter does sound travel fastest? \_\_\_\_\_.



**Directions:** Label the following parts of this wavelength.





**Directions:** Fill in the blanks using the word bank below.

<i>sound</i>	<i>longer</i>	<i>compressional waves</i>
<i>pitch</i>	<i>compression</i>	<i>frequency</i>
<i>wavelength</i>	<i>sonar</i>	<i>vibrates</i>

1. A dog can hear sounds at a higher \_\_\_\_\_ than humans.
2. A submarine uses \_\_\_\_\_ to measure the depth of the ocean floor.
3. Low frequency sound waves have \_\_\_\_\_ wavelengths than high frequency sound waves.
4. \_\_\_\_\_ is a form of energy produced and transmitted by vibrating matter.
5. The region of a sound wave where the air particles are packed tightly is called a \_\_\_\_\_.
6. Sound travels in the form of \_\_\_\_\_.
7. The \_\_\_\_\_ of sound is the distance between two compressions.
8. When a musician strums a guitar, the string moves back and forth, or \_\_\_\_\_.
9. A lower frequency sound has a lower \_\_\_\_\_.



**Directions:** Answer the following questions.

1. Which wave has the longest wavelength?

\_\_\_\_\_

2. Which wave has the highest frequency?

\_\_\_\_\_

