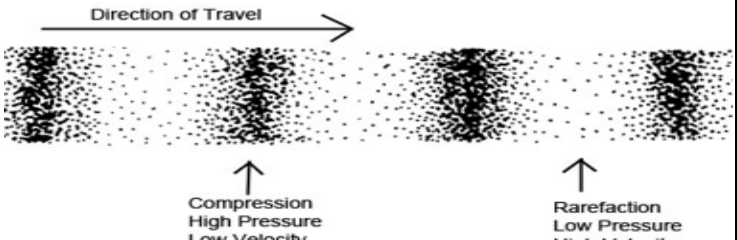


## 5.2 Force, Energy, & Motion- Sound

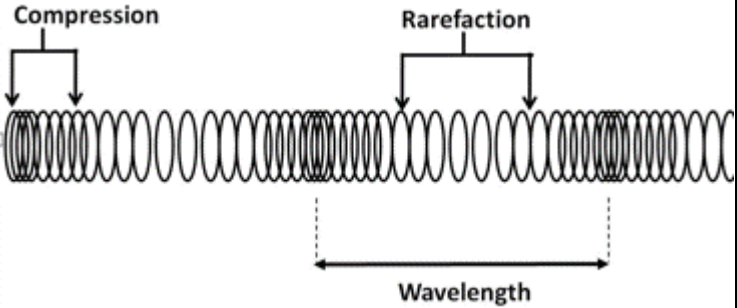
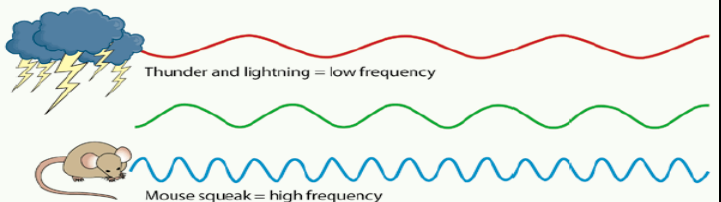
## Question/Answer Packet

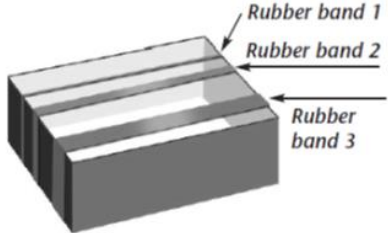
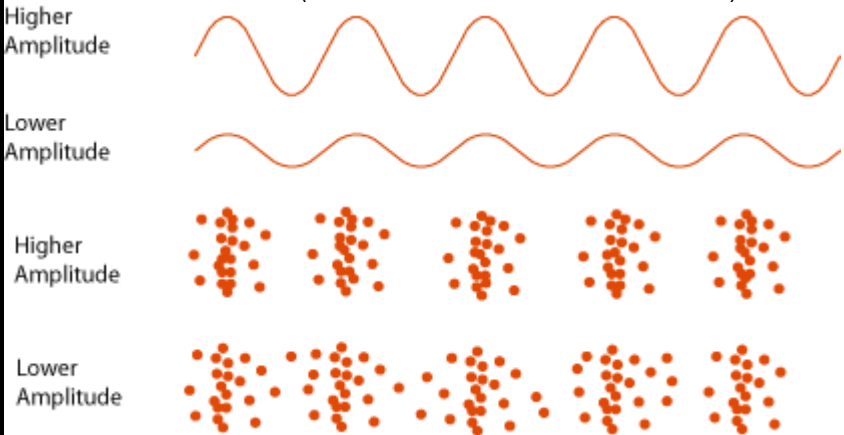


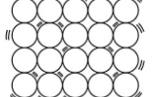
The student will investigate and understand how sound is created and transmitted, and how it is used. Key concepts include  
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### 5.2a) compression waves;

1. What is sound?	A form of energy made and transmitted by vibrating matter.
2. Vibration	A back and forth movement of an object.
3. Sound Waves	Alternating areas of high and low pressure, called compression waves or longitudinal waves.
4. Compression	The result of molecules being squeezed or pressed together.
5. Rarefaction	<p>The opposite of compression. Places where molecules of air are not squeezed and are spread out.</p> 
6. How does sound travel?	<ul style="list-style-type: none"> <li>• Sound travels in waves.</li> <li>• <b>Sound</b> waves need to <b>travel</b> through a medium such as a solid, liquid, or gas.</li> <li>• <b>Sound</b> waves move through each of these mediums by vibrating the molecules in the matter.</li> </ul>

### 5.2b) vibration, compression, wavelength, frequency, amplitude;

7. Wavelength	<p>The distance between two compressions or between two rarefactions.</p> 
8. Pitch	How high or how low a sound is. This is determined by the frequency. (What you hear.)
9. Frequency	<p>The number of wavelengths in a given amount of time. (How many?)</p> 

10. Tension	<p><b>A pulling force exerted by one object on another object.</b>  It is one of the factors in creating pitch, along with the length and thickness of the object that is vibrating and the amount of air it moves.</p> <ul style="list-style-type: none"> <li>• The tighter an object is pulled, the higher the pitch</li> <li>• The thicker an object, the lower the pitch</li> <li>• All 3 rubber bands have the same tension. Rubber band # 3 is the thickest &amp; will have the lowest pitch</li> </ul> 
11. <b>The higher the frequency-</b>	<p><b>The higher the pitch-</b> High Frequency = High Pitch  Objects that vibrate faster have a higher frequency – so they have a higher pitch.</p> <ul style="list-style-type: none"> <li>• Smaller objects vibrate faster and will have a higher pitch.</li> </ul>
12. <b>The lower the frequency-</b>	<p><b>The lower the pitch-</b> Low Frequency = Low Pitch  Objects that vibrate slower have a lower frequency- so they have a lower pitch. (Slower-Lower)</p> <ul style="list-style-type: none"> <li>• Larger objects vibrate slower and will have a lower pitch.</li> </ul>
13. Amplitude	<p>The amount of energy in a compression (longitudinal) wave, and it is related to intensity and <b>volume</b>  (The loudness or softness of a sound)</p> 
<b>5.2c) the ability of different media (solids, liquids, and gases) to transmit sound;</b>	
14. Solid, Liquid, or Gas? 	Gas- The gas model has the most space between its molecules.
15. Solid, Liquid, or Gas? 	Liquid
16. Solid, Liquid, or Gas? 	Solid- The molecules in the solid are packed closely together
17. Through which medium does sound travel the slowest?	Sound travels most slowly through gases because the molecules of a gas are farthest apart.
18. Through which medium does sound travel the fastest?	Sound travels the quickest through solids, because the molecules of a solid are packed closely together.

<b>19. Vacuum</b>	A space with absolutely no matter. Sound cannot travel in a vacuum like that on the moon or elsewhere in outer space.
<b>5.2d) uses and applications of sound waves.</b>	
<b>20. Hertz</b>	<p>The unit for measuring frequency of sound and radio waves. One hertz is equal to one vibration per second.</p> <p>Different animals are capable of hearing different frequencies.</p> <ul style="list-style-type: none"> <li>• Humans- 20-20,000 Hertz</li> <li>• Cats- 55-79,000 Hertz</li> <li>• Dogs- 40-60,000 Hertz</li> <li>• Bats 20-200,000 Hertz</li> <li>• Beluga whale- 1,000-123,000 Hertz</li> </ul>
<b>21. Echolocation</b>	<p>The location of objects using reflected sound.</p> <p>Animals such as toothed whales, dolphins, and bats use echolocation.</p>
<b>22. Infrasound</b>	Sound that has a frequency below the range of human hearing.
<b>23. Ultrasound</b>	Sound that has a frequency above the range of human hearing.
<b>24. Percussion</b>	<p>Includes a wide range of different looking instruments including the drums, triangle, xylophone, and cymbals.</p> <ul style="list-style-type: none"> <li>• Musicians make sounds with percussion instruments by striking or shaking the instrument.</li> <li>• <b>Percussion = Vibrating surfaces</b></li> </ul>
<b>25. Woodwinds</b>	<p>Includes a flute, saxophone, oboe, piccolo, and clarinet.</p> <ul style="list-style-type: none"> <li>• The musician blows on the instrument to vibrate the air.</li> <li>• <b>Woodwind = Vibrating air</b></li> </ul>
<b>26. Strings</b>	<p>Includes: guitars, pianos, and violins</p> <p>These instruments have a variety of strings, each having a different thickness. Thinner strings produce higher pitches than thicker strings.</p> <ul style="list-style-type: none"> <li>• <b>Strings = Vibrating strings</b></li> </ul>
<b>27. Brass</b>	<p>Includes: trumpets, trombones, French horns, and tubas.</p> <p>Brass instruments can produce different pitches by changing the length of tubing the air moves through.</p> <ul style="list-style-type: none"> <li>• <b>Brass = Vibrating lips</b></li> </ul>