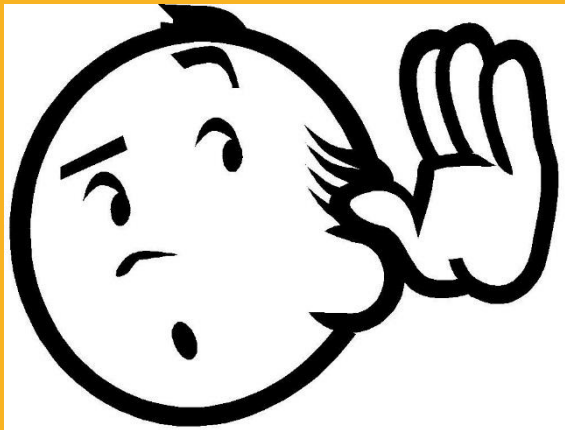


SCIENCE SOL 5.2

SOUND

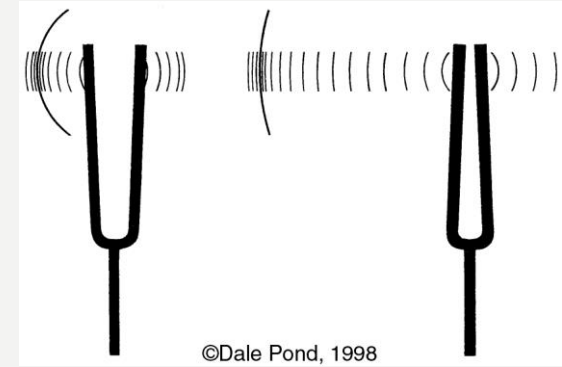


MRS. SCOTT

WHAT IS SOUND?

- Sound is a form of energy produced and transmitted by vibrating matter (a solid, liquid, or gas).
- The source of all sound is movement.
- The movement causes vibrations, which in turn can cause molecules surrounding the source of the movement to vibrate.
- Vibrating objects transfer energy to whatever they touch.
- The energy, not the matter, is transferred.
- The medium (solid, liquid, or gas) is not carried along with the sound wave.

VIBRATION

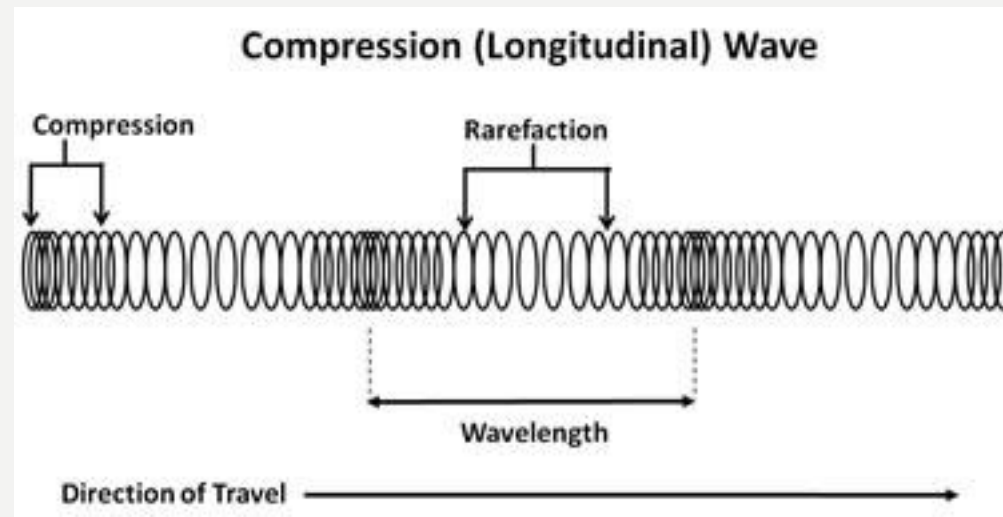


- Vibration is a back and forth motion.
- Larger vibrations produce louder sounds, and smaller vibrations produce softer sounds.
- Vocal cords in our bodies vibrate to produce sounds.



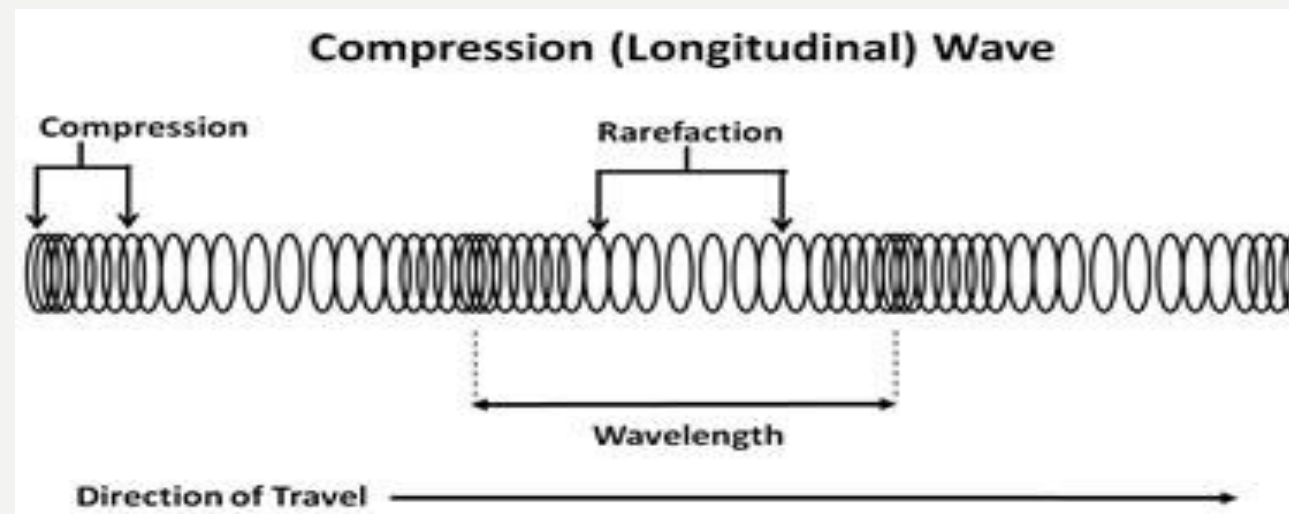
SOUND

- Sound is a compression wave moving outward from its source through a material medium (solid, liquid, or gas)
- Sound needs a form of matter or medium (solid, liquid, or gas) to travel through. Without matter, there would be no sound.
- In a vacuum, sound cannot travel because there is no matter for it to move through.
- Sound waves are compression (longitudinal) waves.

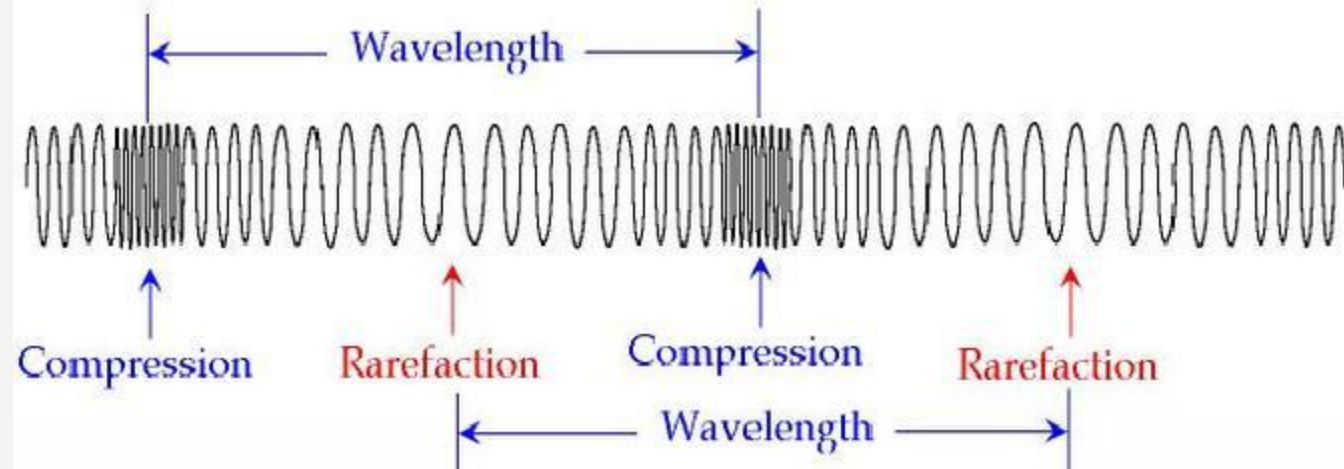


COMPRESSION WAVES

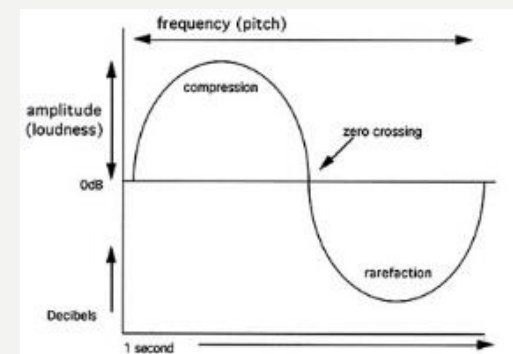
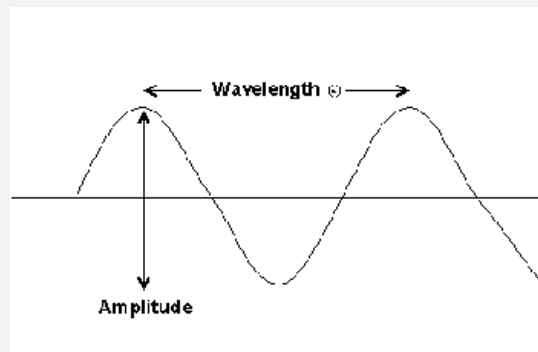
- When compression (longitudinal) waves move through matter (solid, liquid, or gas), the molecules of the matter move backward and forward in the direction in which the wave is traveling.
- As sound waves travel, molecules are pressed together in some parts (compression) and in some parts are spread out (rarefaction).



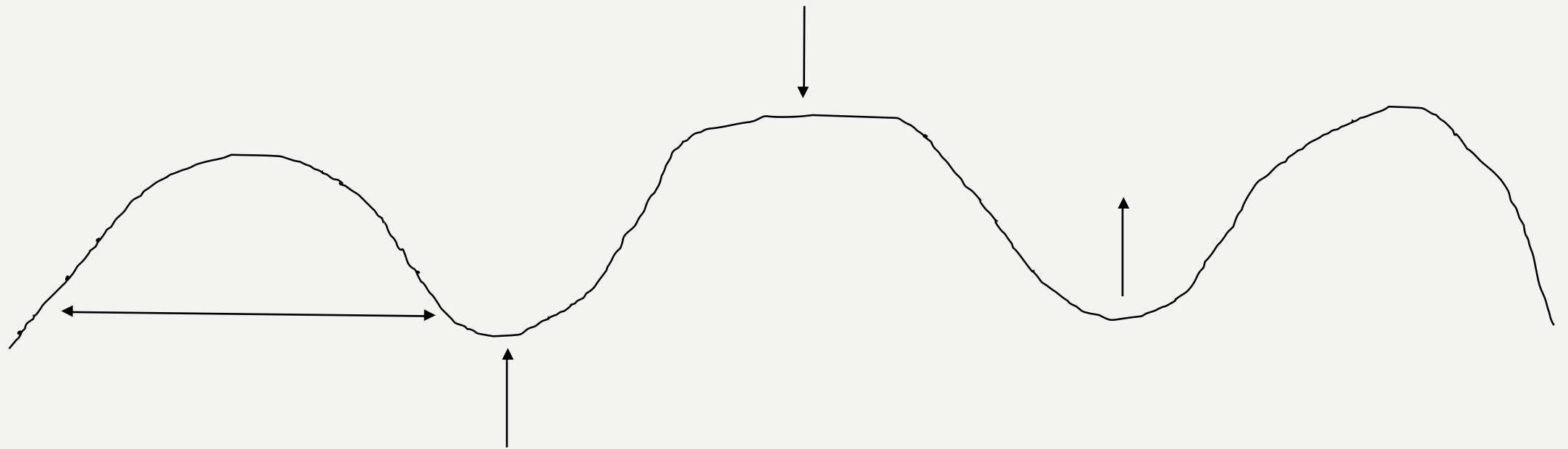
SOUND WAVES



- Sound travels in waves and can be described by the wavelength and frequency of the waves.
- A wave is the regular disturbances caused by molecules bumping into each other (they moved through a solid, liquid, or gas.)
- A wavelength is the distance between a point on one wave to the same point on the next wave (the distance between 2 compressions or between 2 rarefactions.)
- The frequency is the number of wavelengths in a given unit of time (the number of sound waves in a given amount of time.)

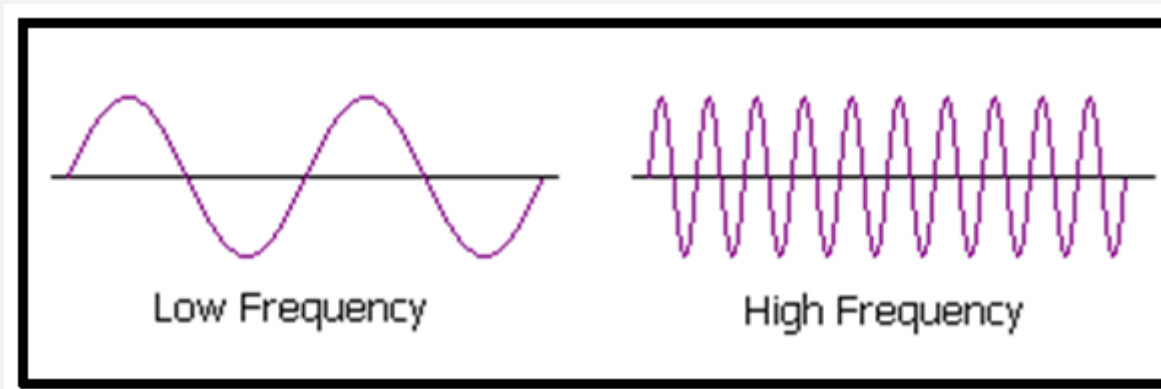


DRAW A SOUND WAVE



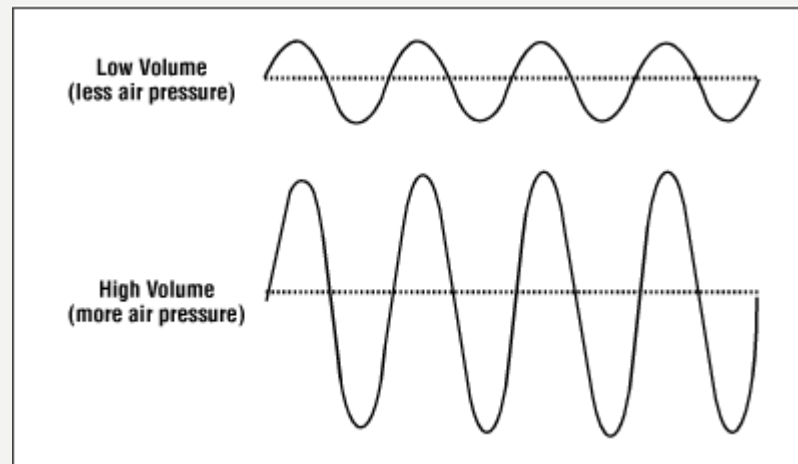
PITCH

- Pitch is determined by the frequency of a vibrating object.
- Objects vibrating faster have a higher pitch than objects vibrating slower.
- The higher the frequency, the higher the pitch.
- The lower the frequency, the lower the pitch.
- Long strings produce lower sounds.
- Short strings produce higher sounds.



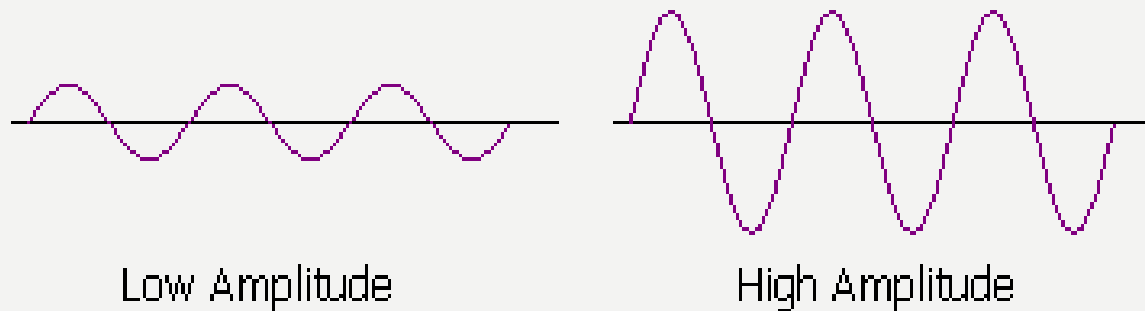
VOLUME

- Volume is how loud or soft a sound is.
- Volume is measured in decibels.
- The higher the decibel, the louder the sound.
- The lower the decibel, the softer the sound.



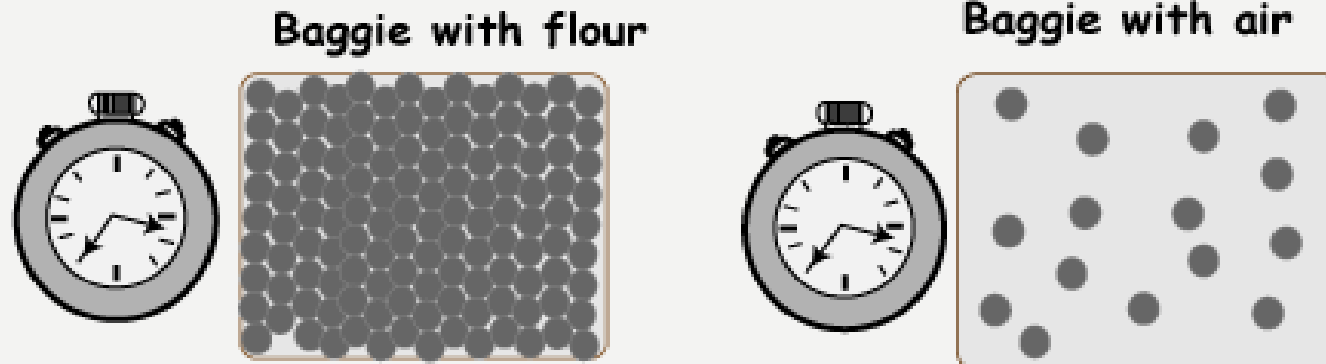
AMPLITUDE

- Amplitude is the amount of energy in a compression (longitudinal) wave and is related to the intensity and volume.
- For example, when a loud sound is heard, it is because many molecules have been vibrated with much force.
- A soft sound is made with fewer molecules being vibrated with less force.
- The greater the amplitude, the louder the sound.



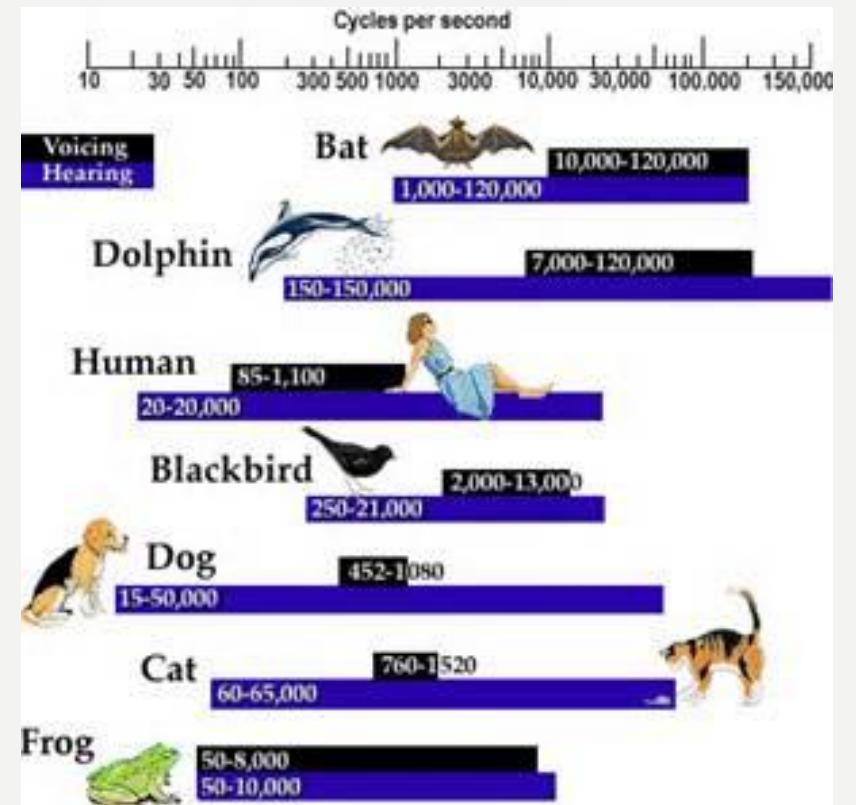
SOUND TRAVELING

- Sound travels more quickly through **solids** than through liquids and gases because molecules in a solid are closer together.
- Sound travels the **slowest** through **gases** because the molecules of gases are the farthest apart.
- Sound also travels **faster** in **warmer** temperatures.
- Smooth, hard, flat surfaces **bounce or reflect** sound.
- Soft, irregular surfaces **absorb** sound.



SOUNDS OF ANIMALS

- Some animals make and hear ranges (frequencies) of sound vibrations (itches) that humans cannot make nor hear.
- Whales, dolphins, and bats use sonar.
- The sound waves used in sonar are ultrasonic.










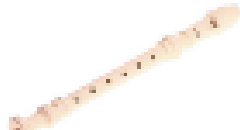







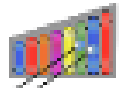


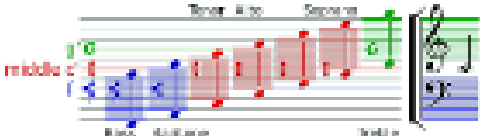


MUSICAL INSTRUMENTS

- Musical instruments vibrate to produce sound.
- There are many different types of musical instruments and each instrument causes the vibrations in different ways.
- The most widely accepted way to classify musical instruments is to classify them by the way in which the sound is produced by the instrument.

BASIC CLASSIFICATIONS OF INSTRUMENTS:

- **Percussion**: drums, cymbals
- **String**: violin, piano, guitar
- **Wind**: flute, clarinet, trumpet, trombone
- **Electronic**: electronic organ, electric guitar

Strings	    
	<p>Piano Violin Guitar Erhu Banjo</p>
Woodwinds	    
	<p>Clarinet Bassoon Oboe Flute Recorder</p>
Brass	    
	<p>French Horn Saxophone Trumpet Trombone Tuba</p>
Percussion	    
	<p>Snare Drum Chimes Xylophone Tambourine Marimba</p>
Vocal	
	<p> Bass : E2 - E4 Baritone : F2 - F4 Tenor : C3 - C5 Alto : G3 - F5 Soprano : C4 - C6 Treble : > C7 </p>

SPEED OF SOUND

- The speed of sound is 343 meters per second or 1,115 feet per second.
- Light travels faster than sound.
- You will see lightening first, then hear the thunder.
- This plane is traveling near the speed of sound.

