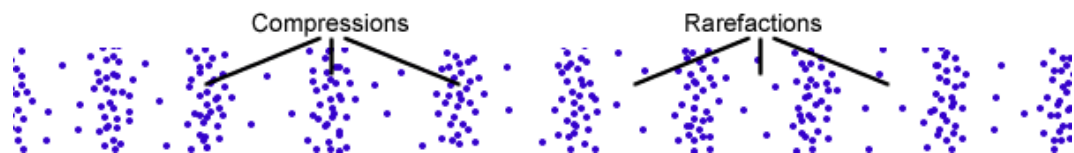


## Vocabulary: Doppler Shift

### Vocabulary

- Doppler shift – the apparent change in the wavelength and frequency of sound waves that is caused by the movement of the sound source, observer, or both.
- Frequency – the number of times something happens in a given period of time.
  - The frequency of a sound wave is equal to the number of waves that pass a point each second.
  - The unit of frequency is the *hertz* (Hz). One hertz is one event per second.
  - The shorter the *wavelength* of a wave is, the greater its frequency. Longer wavelengths correspond to lower frequencies.
- Pitch – the perceived frequency of a sound.
  - Shrill sounds like sirens or smoke alarms are high in pitch and high in frequency.
  - The deep sounds made by foghorns and tubas are low in pitch and frequency.
- Sonic boom – a loud noise produced by a source moving faster than the speed of sound (343 m/s at sea level with a temperature of 20 °C or 68 °F).
  - Just as a ship leaves a visible wake in the water behind it, a supersonic jet leaves behind an invisible “wake” of compressed sound waves.
  - An observer will hear the sonic boom *after* the jet flies by.
- Sound waves – vibrations transmitted through an elastic medium such as a gas, liquid, or solid.
  - Sound causes air molecules to vibrate back and forth in the same direction that the sound is moving. This creates the alternating high- and low-pressure areas (*compressions* and *rarefactions*) shown below.



- Sound waves cause our eardrums to vibrate. The vibrations are transmitted to the auditory nerves via a series of delicate structures in the inner ear.
- Wavelength – the distance between consecutive compressions of a wave.
  - Wavelength could also be the distance between consecutive rarefactions of a wave.
  - The wavelength of a transverse wave is the distance between consecutive crests or troughs.

