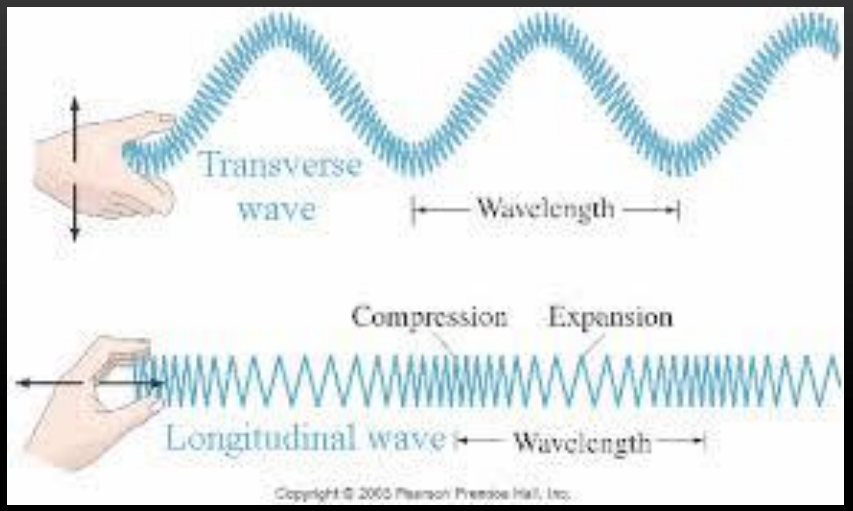
# WAVES




By Ms Toal

*Longitudinal Waves*

*Transverse Waves*

*Wavelength*

*Amplitude*

*Resonance*

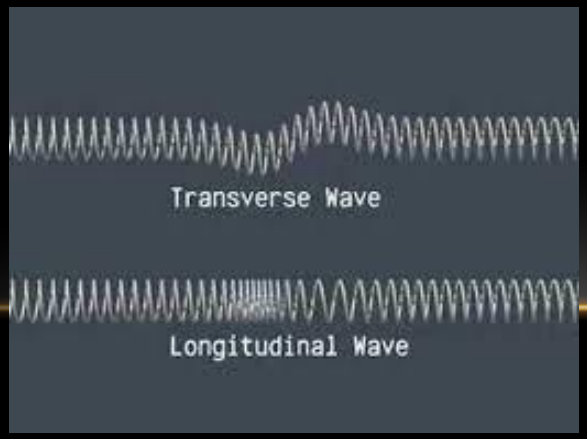
*Frequency*

*Period*

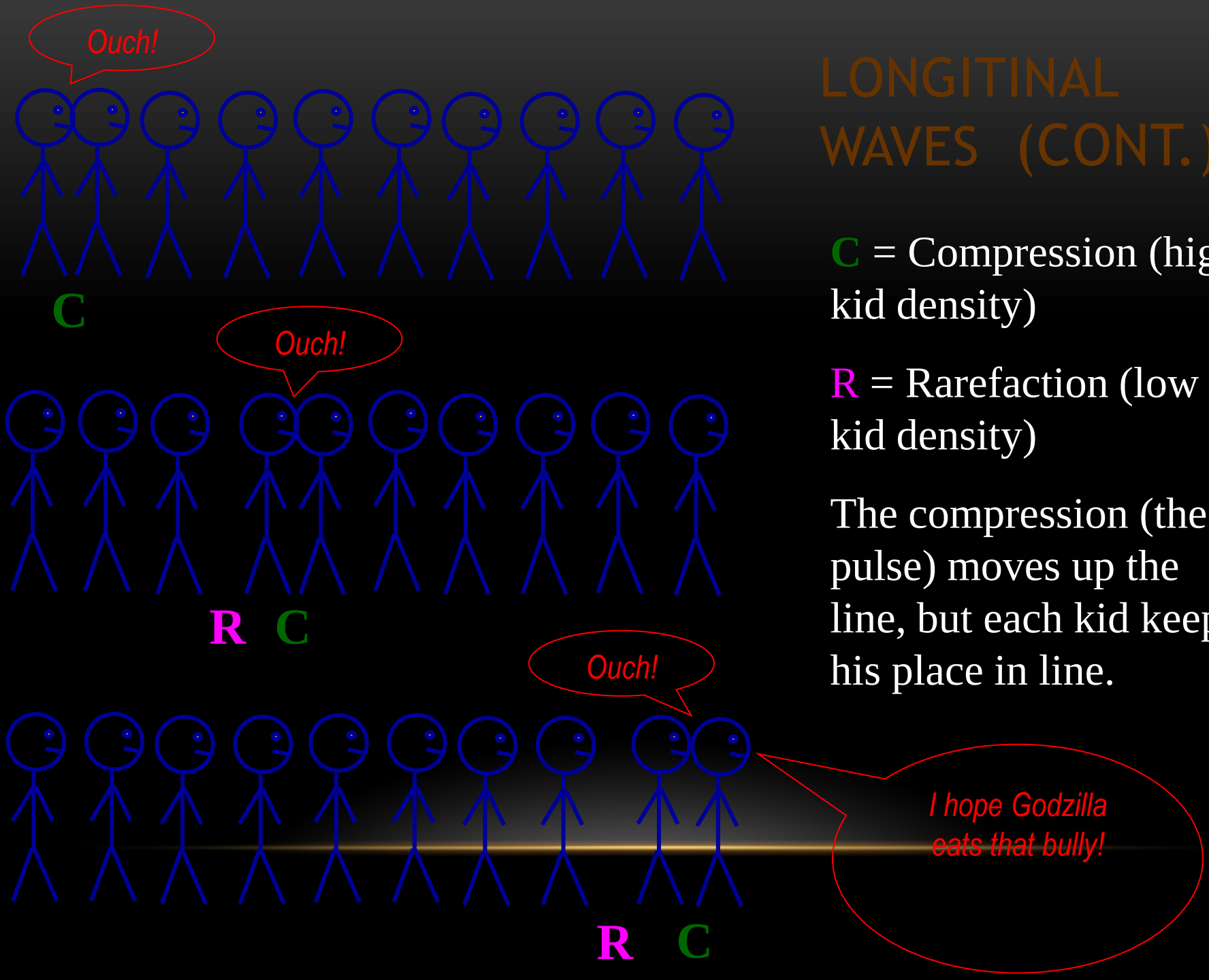
*Interference*

*Doppler Effect*

- *Longitudinal Wave*
  - wave particles vibrate back
  - and forth along the path that
  - the wave travels.
  - (Compressional Wave)
- Compressions
  - The close-together part of the wave
- Rarefactions
  - The spread-out parts of a wave



# LONGITINAL WAVES (CONT.)



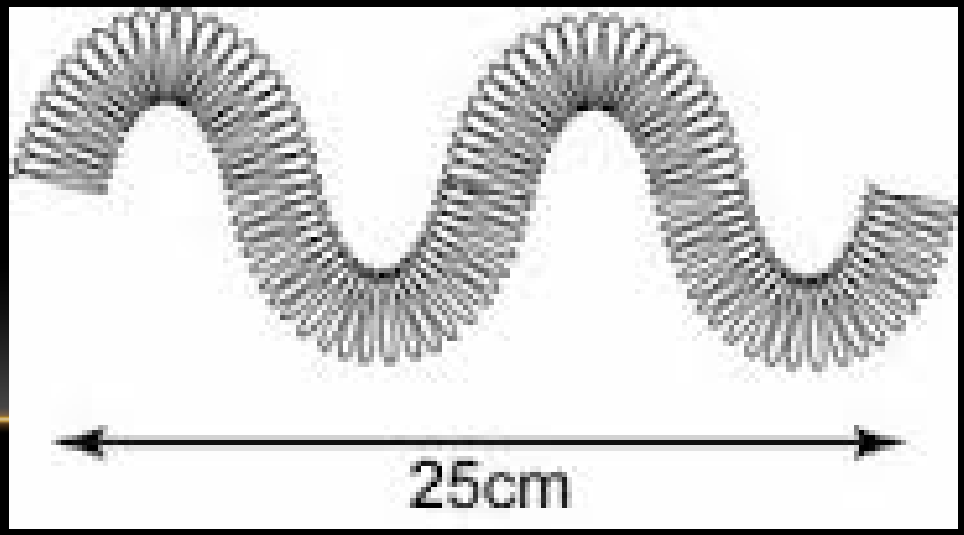

**C** = Compression (high kid density)

**R** = Rarefaction (low kid density)

The compression (the pulse) moves up the line, but each kid keeps his place in line.

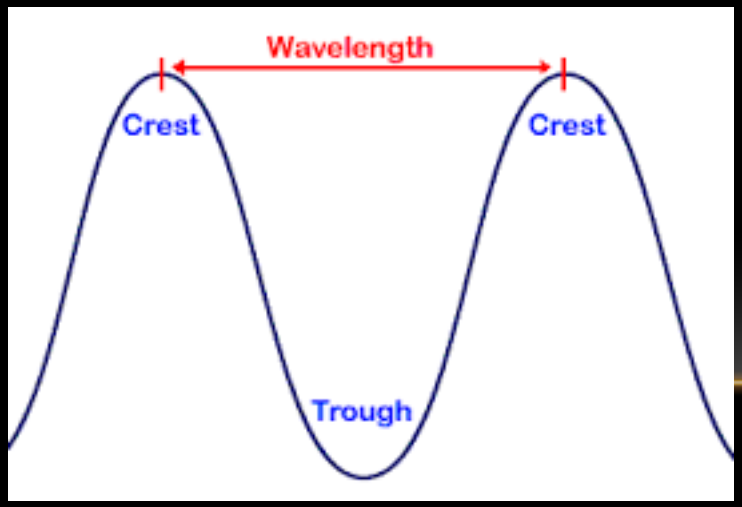
- Transverse waves

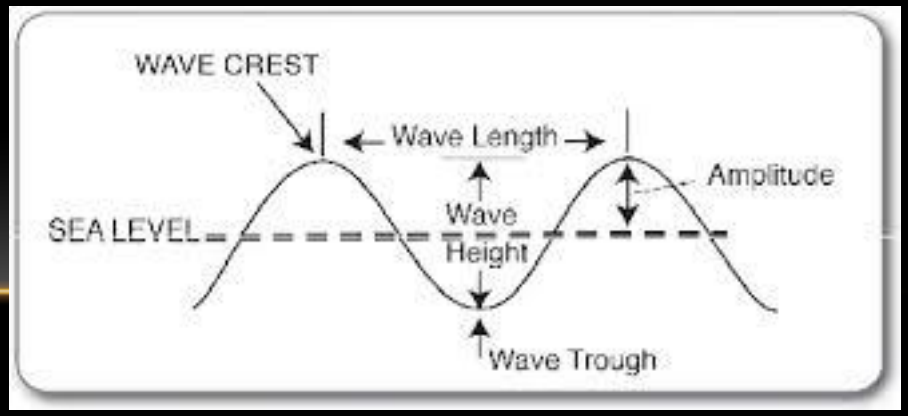
- wave particles vibrate
- in an up-and-down or side-to-side motion



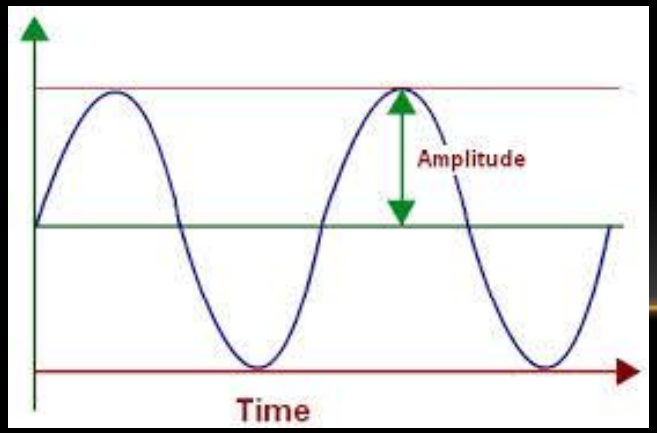
# TRANSVERSE WAVES

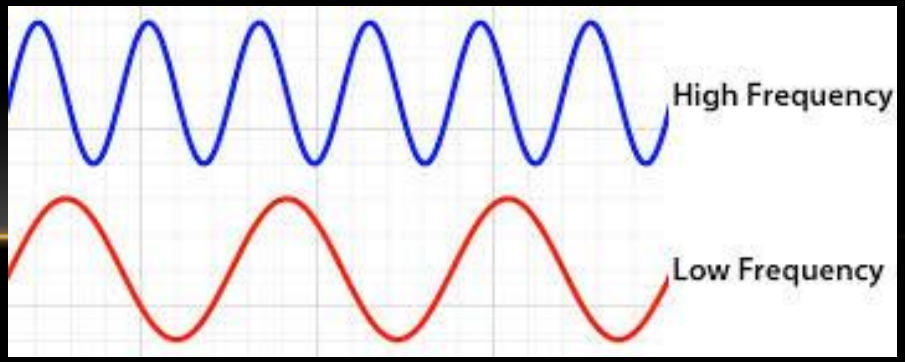
- Wavelength
  - the distance between two successive points in the wave.
- Crests
  - Highest part of a wave
- Troughs
  - The low points of the wave



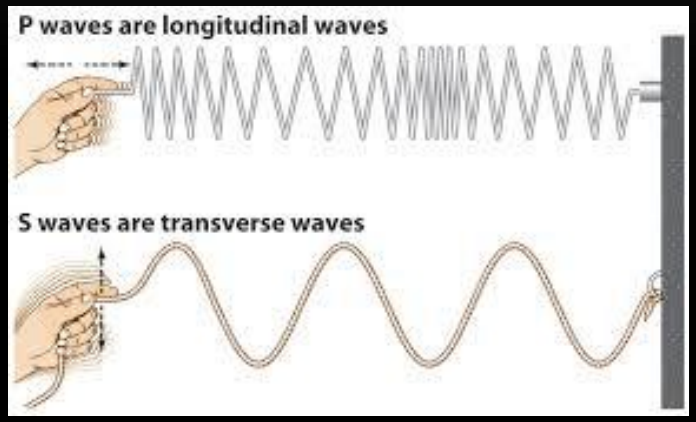



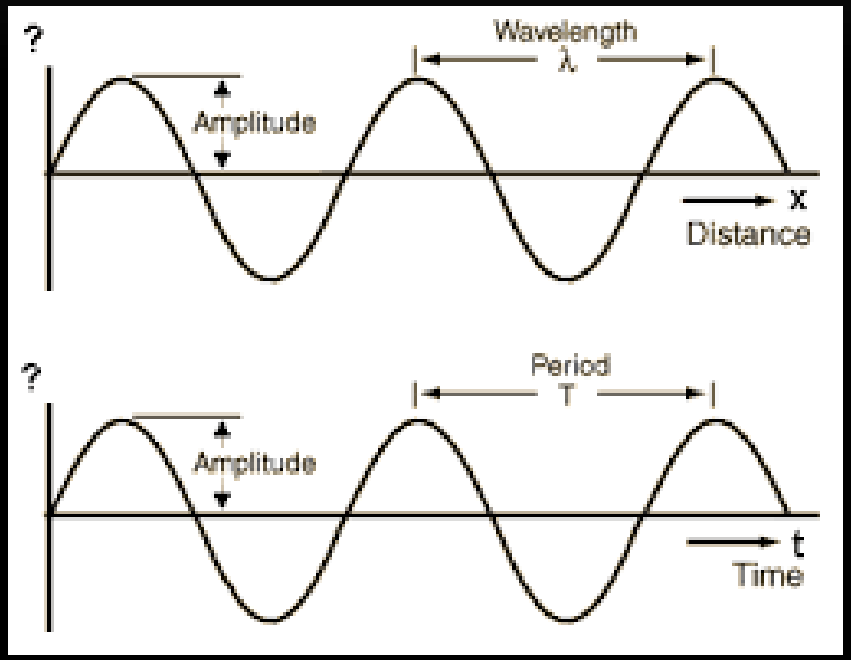
- Amplitude
  - is the maximum distance in a wave from its rest position.
- Frequency -
  - the number of waves produced in a given time

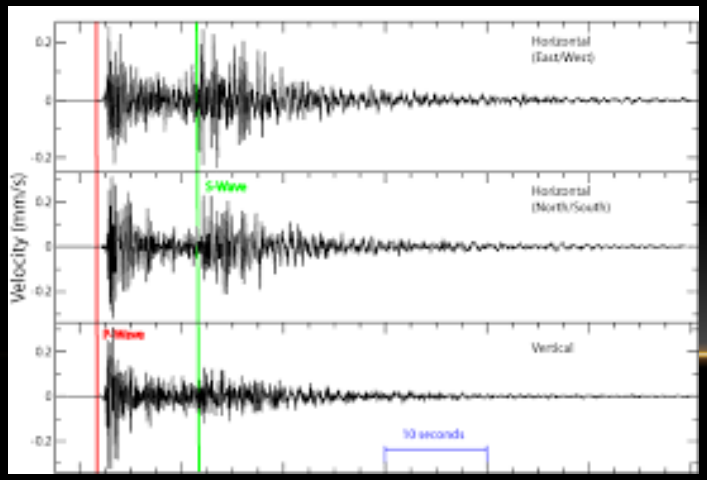


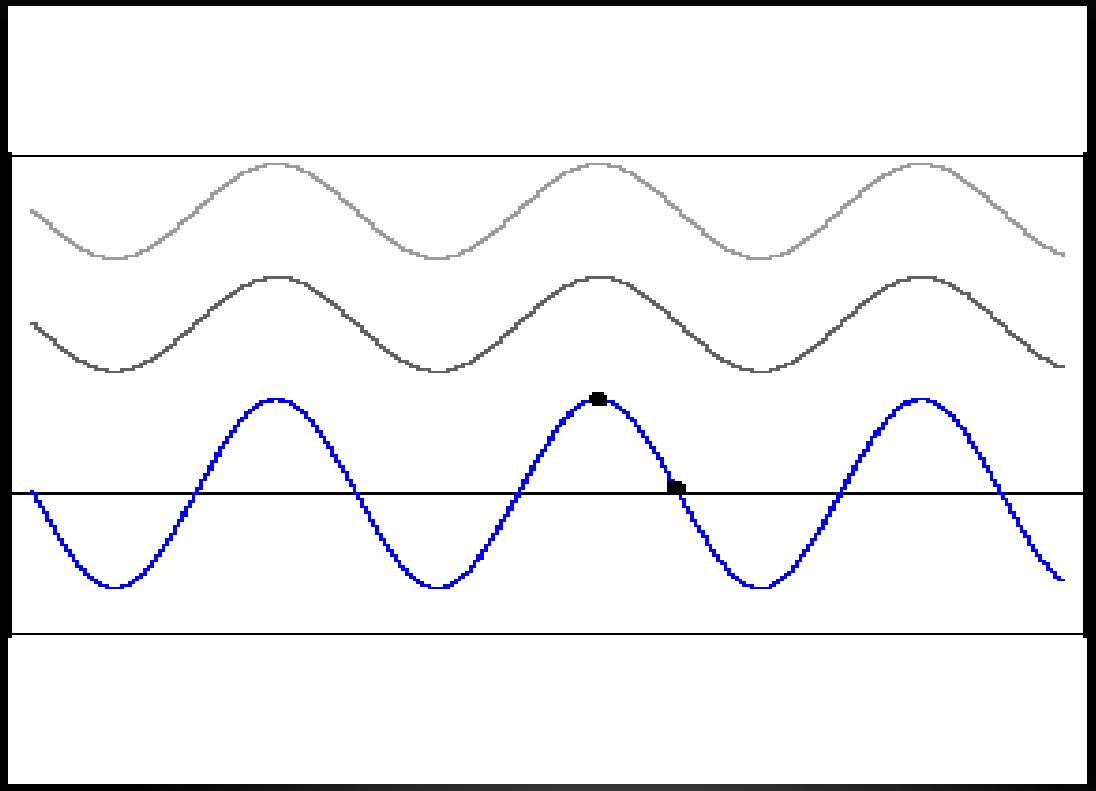
- Wave Speed
- Frequency × Wavelength



- Interference:
- the result of two or more sound waves overlapping



# SOUND WAVES

- Pitch

description of how high or low the sound seems to a person

- Loudness

how loud or soft a sound is perceived to be


http://www.si.com/nfl/2014/09/29/chiefs-break-seahawks-noise-record

SEATTLE -- The Seattle Seahawks' fans have set a noise record for the loudest outdoor sports stadium, taking back a mark they achieved earlier this season.

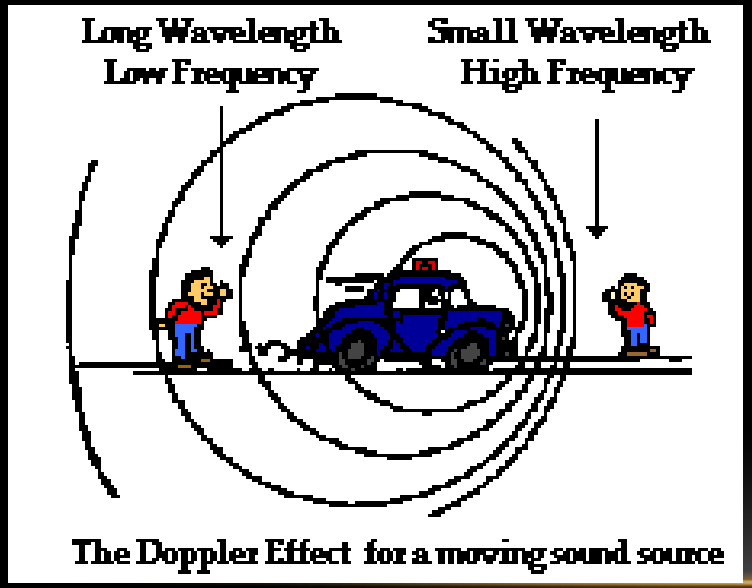
An official from Guinness World Records recorded the crowd noise at 137.6 decibels during the Seahawks' victory over the New Orleans Saints on Monday night. The record came during the second quarter of Seattle's 34-7 victory and was announced on the Seahawks' Twitter page.

Seahawks fans had set a record of 136.6 in a win over San Francisco in September. The mark was topped by Kansas City fans in October with 137.5 decibels.

To put that in perspective, a jet engine at 100 feet is about 140 decibels.

- Doppler Effect

is the apparent change in the frequency of a sound caused by the motion of either the listener or the source of the sound.



The Doppler Effect for a moving sound source

https://www.youtube.com/watch?v=a3RfULw7aAY

http://www.animations.physics.unsw.edu.au/jw/doppler.htm

# DOPPLER EFFECT IS THE APPARENT CHANGE IN THE FREQUENCY OF A SOUND CAUSED BY THE MOTION OF EITHER THE LISTENER OR THE SOURCE OF THE SOUND

- If the source is moving as fast or faster than the speed of sound, the sound waves pile up into a shock wave called a sonic boom.

A sonic boom sounds very much like the pressure wave from an explosion

- Resonance

the frequency of sound waves

exactly matches the natural frequency

of an object.

Tacoma narrow bridge

https://www.youtube.com/watch?v=3mclp9QmCGs

https://www.youtube.com/watch?v=nFzu6CNtqec

# ELECTROMAGNETIC SPECTRUM = LIGHT WAVES

- Photon
  - Massless “no rest” particle
  - Travels 186,282 miles per second
- Vacuum
  - Space entirely devoid of matter
- Radiation
  - The process in which energy is emitted as particles or waves

# EM SPECTRUM

- Radio Waves
- Infrared
- Visible Light
- Ultra Violet
- Xrays
- Gamma Rays

- Low end of spectrum, mile long wavelength, low frequency
- Heat rays, used to determine temperature of stars
- 3% of light, red → violet
- Causes chemical change (sunburn)
- Shorter wavelength/higher frequency than UV, depends on voltage
- Highest frequency/shortest wavelength

  Most dangerous, found in universe

# Food irradiattion GOOD?

- "The Food and Drug Administration has approved irradiation of meat and poultry and allows its use for a variety of other foods, including fresh fruits and vegetables, and spices. The agency determined that the process is safe and effective in decreasing or eliminating harmful bacteria. Irradiation also reduces spoilage bacteria, insects and parasites, and in certain fruits and vegetables it inhibits sprouting and delays ripening."
- **Irradiation damages the quality of food.**
- · Irradiation damages food by breaking up molecules and creating free radicals. The free radicals kill some bacteria, but they also bounce around in the food, damage vitamins and enzymes, and combine with existing chemicals (like pesticides) in the food to form new chemicals, called unique radiolytic products (URPs).

# Food Irradiation BAD

- · Irradiated fats tend to become rancid.
- · When high-energy electron beams are used, trace amounts of radioactivity may be created in the food.

- **Irradiation covers up problems that the meat and poultry industry should solve**
- · Irradiation covers up the increased fecal contamination that results from speeded up slaughter and decreased federal inspection, both of which allow meat and poultry to be produced more cheaply.
- https://www.youtube.com/watch?v=rEkc70ztOrc
- https://www.youtube.com/watch?v=mKwL5G5HbGA
- https://www.youtube.com/watch?v=dCqKI4Q3hW4