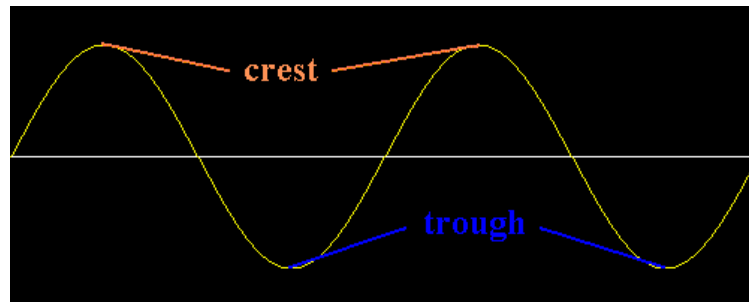


Chapter 25

Vibrations and waves

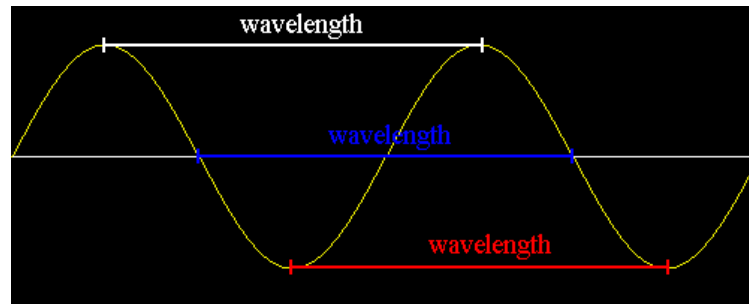
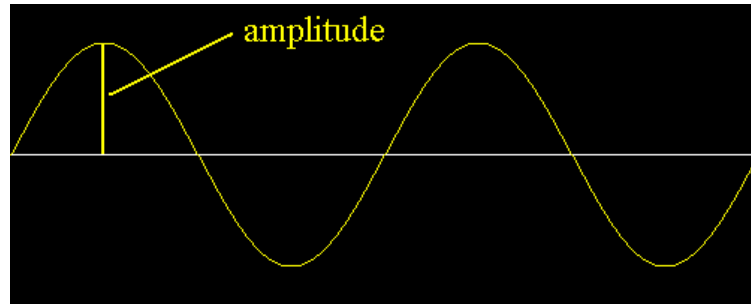


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Sound

<http://ionaphysics.org/ntnujava/sound/sound.html>

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Mar 26-5:23 PM

Wave Parameters:

- Wavelength λ
- Amplitude
- Frequency f
- Period T

Frequency is measured in Hertz (Hz)

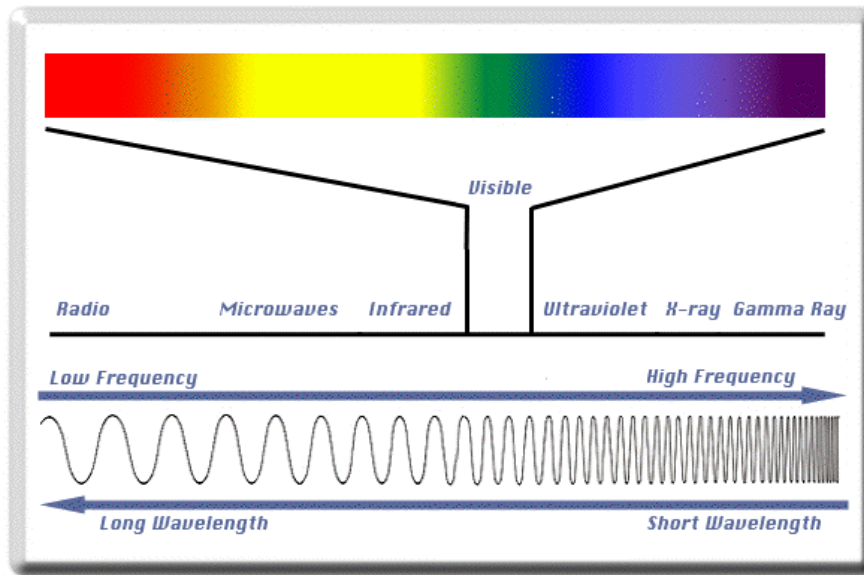
$1 \text{ Hz} = 1 \text{ cycle/second} = 1/\text{sec}$

Prefixes:

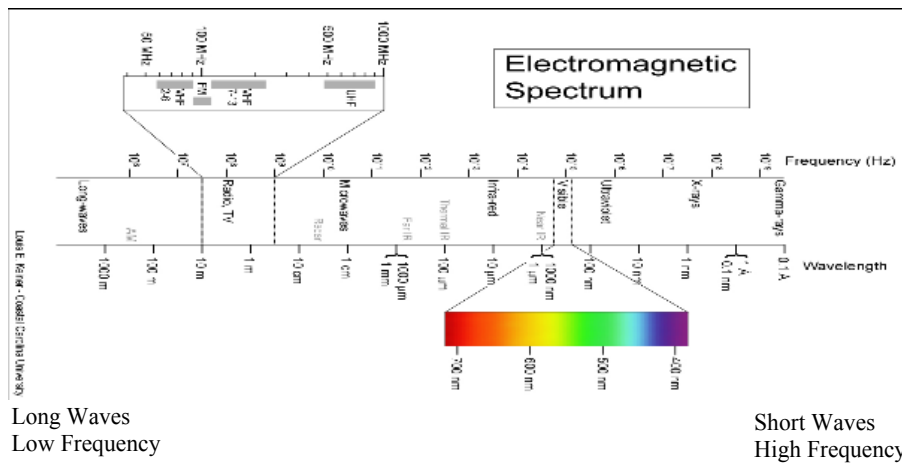
- kilo
- mega

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Electromagnetic waves



Mar 27-7:11 PM



Mar 27-7:16 PM

Period = 1/frequency

$$T = 1/f$$

Frequency = 1/period

$$f = 1/T$$

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Wave speed

(how fast it moves from the source to the
observer.) v

$$v = f\lambda$$

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Transverse Wave

medium moves at right angles to the direction the wave is moving

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Longitudinal Waves

the medium moves parallel to the direction the wave is moving.

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http://aspire.cosmic-ray.org/labs/waves/wave_basics/waves.htm

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Sound travels at about 340 m/s. $=3.4 \times 10^2$ m/s
Light travels at 3.00×10^8 m/s.

1. What is the wavelength of the wave transmitted by radio station 1010 WINS ? ($f=1010$ k Hz)
2. What is the wavelength of the musical note called concert A (frequency = 440 Hz)?

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3. What is the frequency of red light which has a wavelength of 6.00×10^{-9} meters?

Apr 20-6:04 PM

Sound travels at about 340 m/s.
Light travels at 3.00×10^8 m/s.

4. How long does it take lightning to travel 1 mile (1 mile = 1609 meters)?

5. How long does it take thunder to travel 1 mile?

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Interference


When two or more waves pass through the same region of space they add up (as vectors)

Constructive interference- waves meet in phase (in step) and reinforce each other

Destructive interference- waves meet out of phase (out of step) and tend to cancel each other.

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 <http://lectureonline.cl.msu.edu/%7Emmp/kap13/cd371.htm>

 <http://ionaphysics.org/lab/Fendt/phase/phase/interference.htm>

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Doppler Effect

The apparent shift in frequency when a source and observer move relative to each other.

Diagram  <http://www.ionaphysics.org/ntnujava/Doppler/Doppler.html>

Sound  <http://www.ionaphysics.org/lab/DopplerDemo.htm>

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Review:

Vocabulary:

Crest
Trough
Amplitude
Frequency
Wavelength
Period
Longitudinal
Transverse
Doppler Effect
Constructive/Destructive Interference
Electromagnetic Spectrum

Chapter Formulae

$$T = 1/f$$

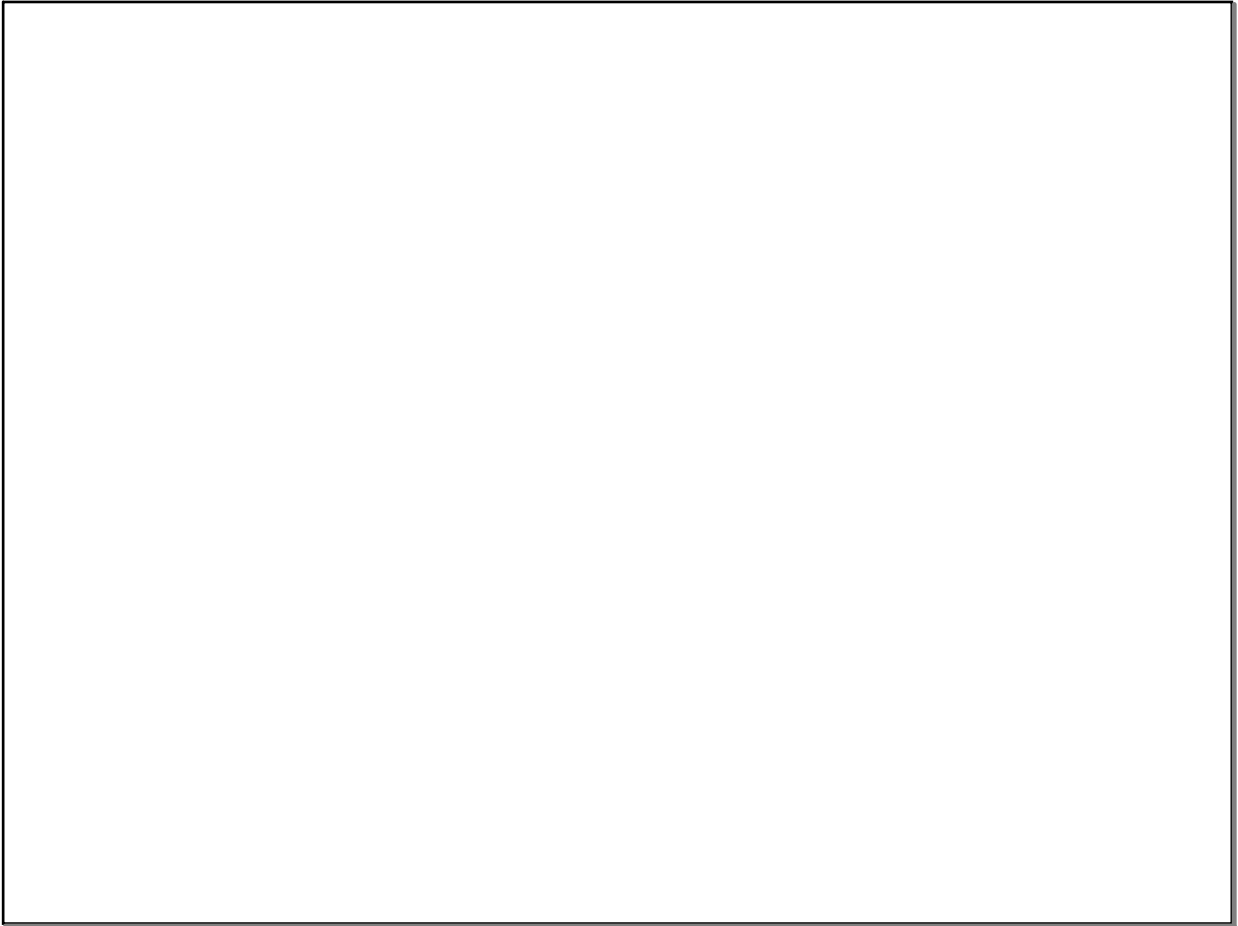
$$v = f\lambda$$

And in general

$$v = d/t$$

What travels at the speed of light/sound

Mar 14-10:18 AM



Mar 14-10:21 AM