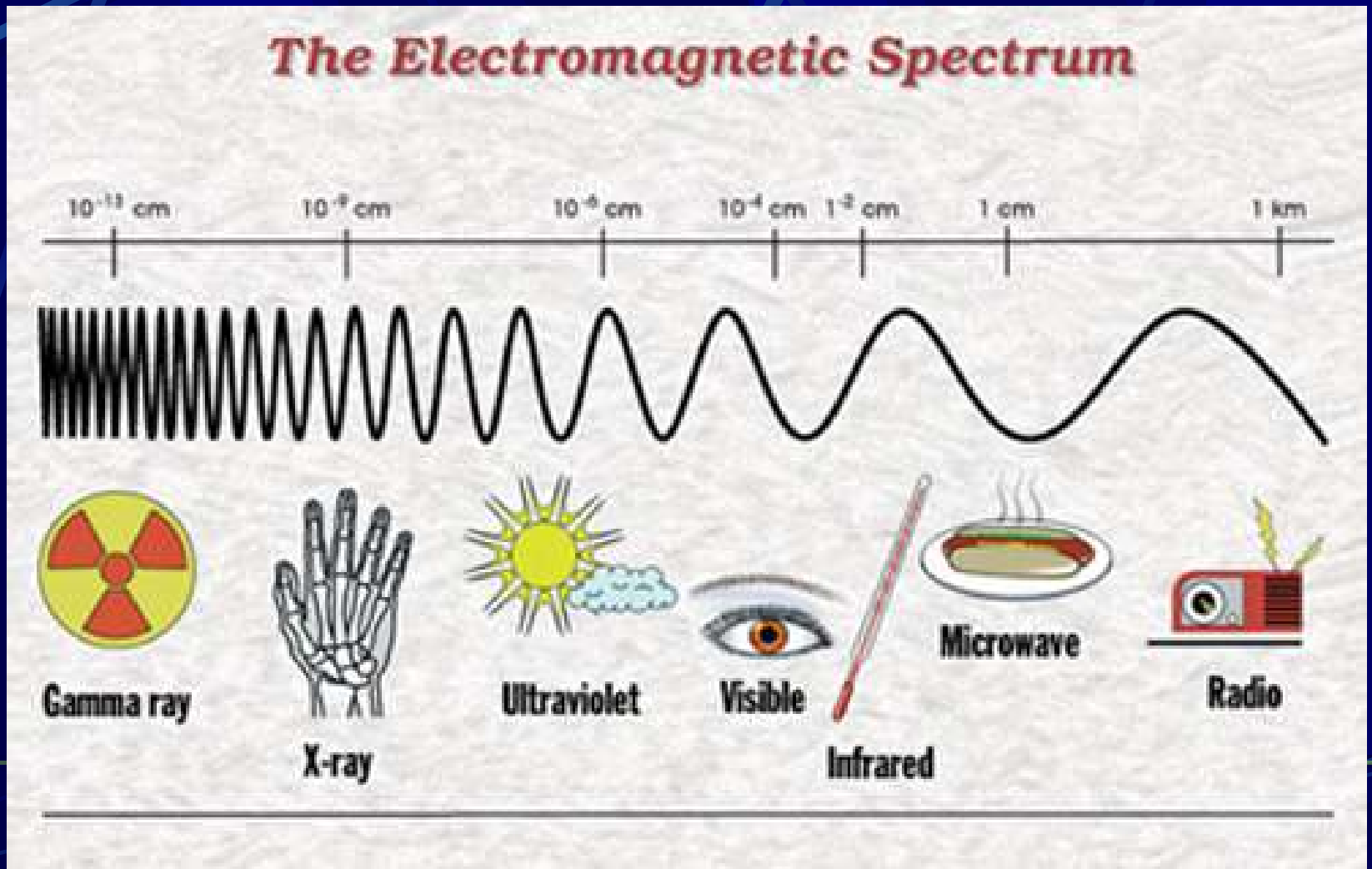
Chapter 13-1

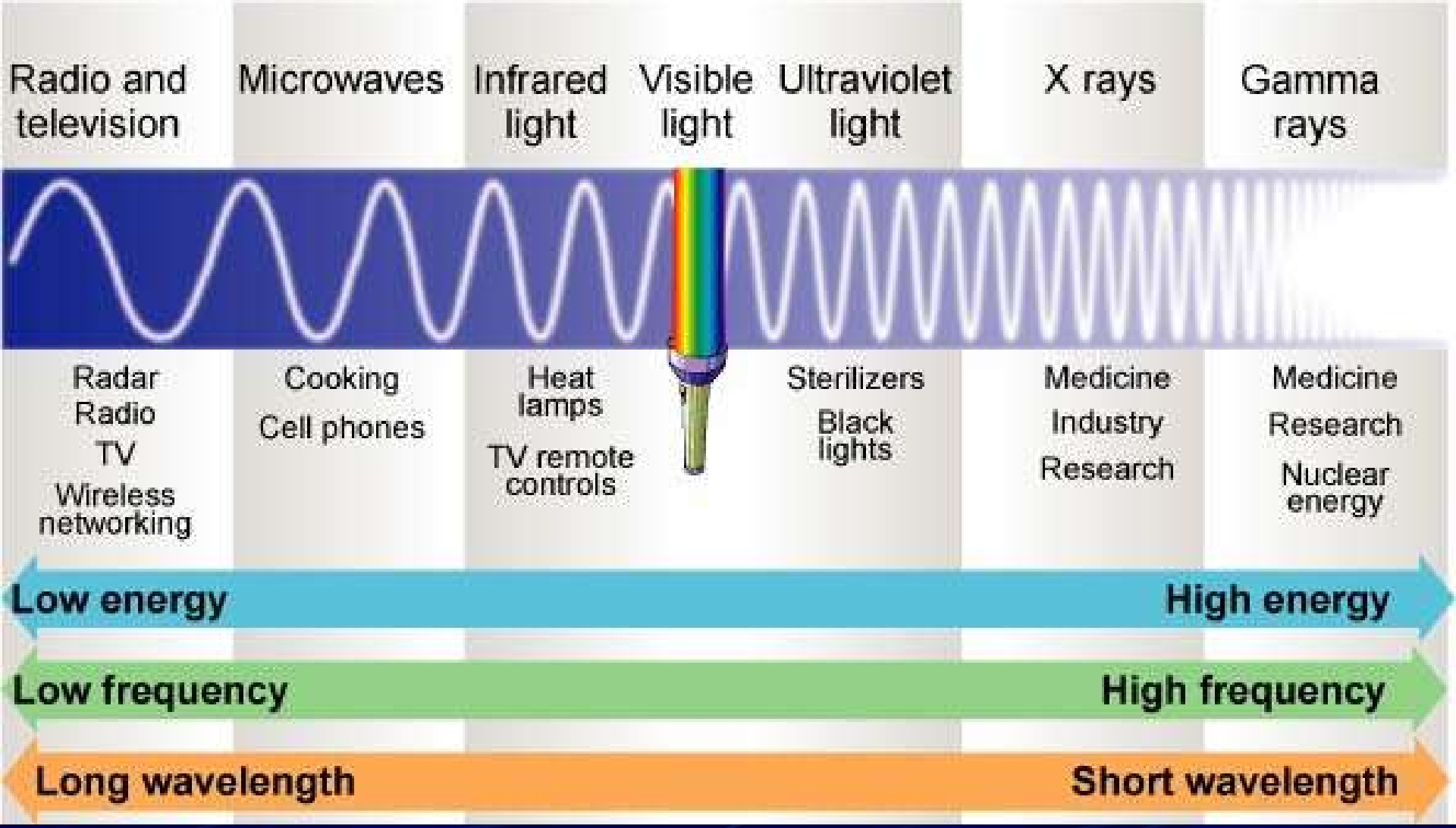
- Electromagnetic Waves

- Electromagnetic Wave – A transverse wave consisting of oscillating electric and magnetic fields at right angles to each other.
- The spectrum includes more than visible light – not all light is visible to the human eye.
- Light is a wave and also a particle.

Electromagnetic waves vary depending on frequency and wavelength.



Electromagnetic Spectrum



- In visible light, the differences in frequency and wavelength account for different colors.
- The differences in wavelength and frequency also distinguishes visible light from invisible electromagnetic radiation, such as X Rays.

- Radio Waves – Longest wave – AM FM, TV
- Microwaves – 2nd longest – radar, microwaves
- Infrared waves – 3rd – infrared photography, night vision
- Visible Light – 4th – microscope, astronomy
- Ultraviolet Light – 5th – sterilization
- X rays – 6th – medical exam of teeth & bones
- Gamma Rays – Shortest Wave – Cancer treatment, food irradiation

Electromagnetic Demos

- 1. Night Vision Goggles
- 2. UV Frisbee and Polish
- 3. Glowing Bowl

- All electromagnetic waves move at the speed of light.
- Speed = wavelength x frequency
- Only the wavelength and frequency change.
- This change decides which type of electromagnetic wave it is, radio, gamma, etc.

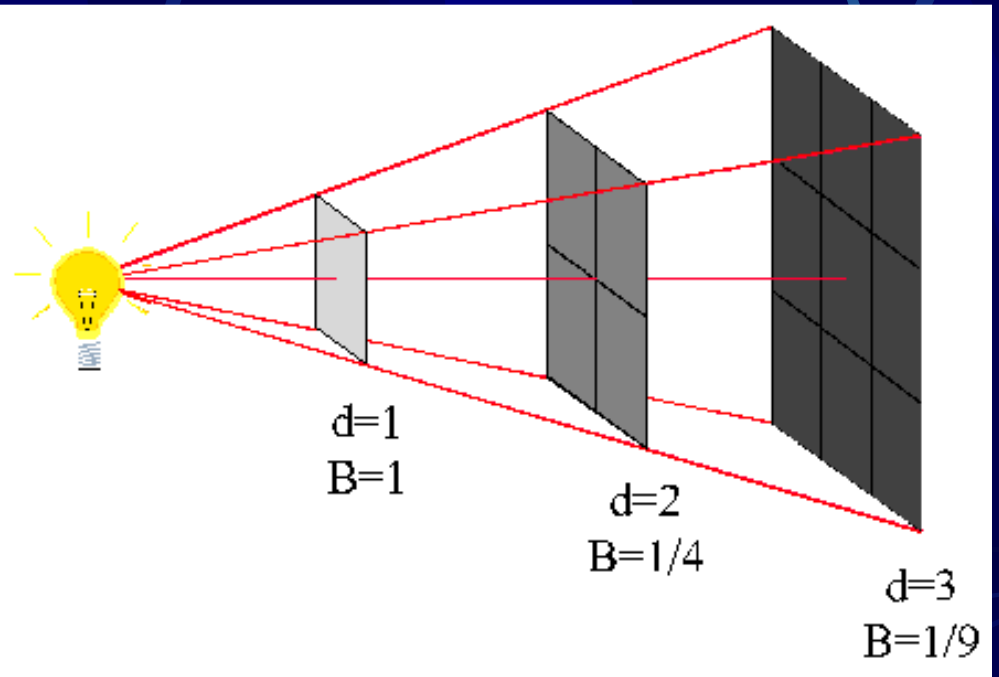
- The speed of light in a vacuum =

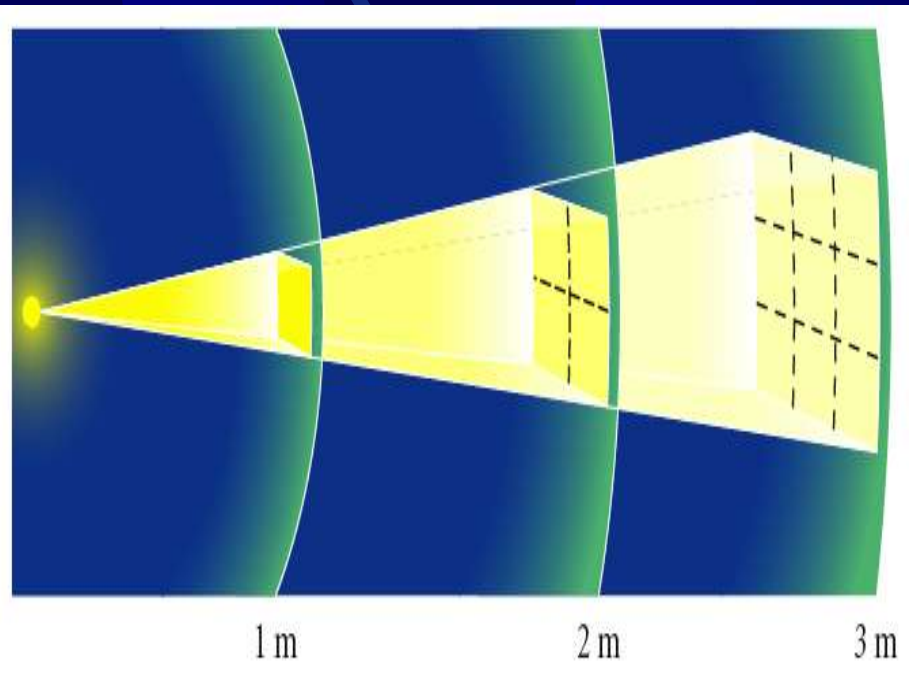
2.99792458×10^{8}

- The speed of light in air = 2.99709×10^{8}
- We use 3×10^{8}

- What is the wavelength range of the FM radio band (60 MHz to 100 MHz)?

- Waves can be approximated as rays.
- Next chapter we'll be drawing out light rays.
- Brightness of light decreases by the square of the distance from the source.





Class Work! Due Today~

- 13-1 Worksheet