

Name:

Date:

Wave Properties of Light

Electromagnetic Spectrum

1. $10^3 = 1000$
2. $10^6 = 1,000,000$

- 1. Energy of one photon with a frequency of 5×10^{14} Hz
- 2. Speed of light = 3×10^8 m/s
- 3. Wavelength of light = 4.0×10^{-7} m
- 4. Wavelength of radio
- 5. Frequency of the gamma rays (approx)

10. $10^9 = 1,000,000,000$
11. $10^{12} = 1,000,000,000,000$

Electromagnetic Spectrum (continued)

- 1. $10^3 = 1000$ meters
- 2. $10^6 = 1,000,000$ meters
- 3. $10^9 = 1,000,000,000$ meters
- 4. $10^{12} = 1,000,000,000,000$ meters
- 5. $10^3 = 1000$ Hz
- 6. $10^6 = 1,000,000$ Hz
- 7. $10^9 = 1,000,000,000$ Hz
- 8. $10^{12} = 1,000,000,000,000$ Hz

Wave Properties of Light

1. A photon has a frequency (ν) of 2.00×10^{14} Hz. Calculate its energy.
2. Calculate the energy (E) and wavelength (λ) of a photon of light with a frequency (ν) of 6.00×10^{14} Hz.
3. Calculate the frequency and the energy of blue light that has a wavelength of 450 nm .
4. Calculate the wavelength and energy of light that has a frequency of 3.3×10^{17} Hz.
5. A photon of light has a wavelength of 3.00×10^{-7} m. Calculate its energy.
6. Calculate the number of photons having a wavelength of 300 nm required to produce 1.0 J of energy.
7. Calculate the total energy in 1.0×10^{17} photons of gamma radiation having $\lambda = 3.0 \times 10^{-13}$ m.
8. Calculate the energy and frequency of red light having a wavelength of 6.50×10^{-7} m.
9. The wavelength of green light from a traffic signal is centered at 5.20×10^{-7} m. Calculate the frequency.
10. Calculate the frequency of light that has a wavelength of 4.20×10^{-7} m. Identify the type of electromagnetic radiation.