

NAME _____ Period _____ Date _____

Light and Energy Worksheet

Color	Wavelength	Frequency
Violet	shorter than 4.5×10^{-7} m	more than 6.7×10^{14} 1/sec
Blue	4.5 to 5.0×10^{-7}	6.7 to 6.0×10^{14}
Green	5.0 to 5.7×10^{-7}	6.0 to 5.2×10^{14}
Yellow	5.7 to 5.9×10^{-7}	5.2 to 5.1×10^{14}
Orange	5.9 to 6.1×10^{-7}	5.1 to 4.9×10^{14}
Red	longer than 6.1×10^{-7}	less than 4.9×10^{14}

Constants and Relations

$$E = h\nu$$

$$c = \lambda\nu$$

$$h = 6.63 \times 10^{-34} \text{ J/Hz}$$

$$c = 3.00 \times 10^8 \text{ m/s}$$

$$1 \text{ m} = 10^2 \text{ cm} = 10^9 \text{ nm}$$

$$1 \text{ nm} = 10^{-9} \text{ m}$$

$$1 \text{ Hz} = 1 \text{ wave/sec}$$

$$\Delta E = h\nu = -2.18 \times 10^{-18} \text{ J} \left[\frac{1}{n_f^2} - \frac{1}{n_i^2} \right]$$

PROBLEMS:

1. Calculate the frequency of light that has a wavelength of 4.7×10^{-7} meters. What is the color of that light?
2. Calculate the wavelength and energy of light that has a frequency of 5.0×10^{14} hertz. What is the color of that light?
3. Calculate the wavelength and the frequency for a photon that has an energy of 2.4×10^{-14} joules. Using your text book tell what type of electromagnetic radiation is involved?
4. What color of light has a wavelength of 5.89×10^{-5} centimeters?
5. Calculate the frequency and energy for a wavelength of ultraviolet light that is 2.3×10^{-8} m long .
6. Calculate the wavelength, speed and energy of a radio wave that has a frequency of 200 sec^{-1} .