

Level: 3

Version 1

Name:

Objective:

Quantitatively relate wavelength, frequency, and photon energy of a wave; problems presented step by step.

**You must show some work on each problem.**

**You will not receive credit if you simply write answers.**

Reference Information:

$$E = h\nu$$

$$\nu\lambda = c$$

1 Joule =  $6.24 \times 10^{18}$  electron volts.

Planck's Constant =  $6.626 \times 10^{-34}$  J s

Speed of Light =  $3.00 \times 10^8$  m/s

Metric Units

Text	Symbol	Multiplier
Tera	T	$10^{12}$
Giga	G	$10^9$
Mega	M	$10^6$
Kilo	K	$10^3$
Centi	c	$10^{-2}$
Milli	m	$10^{-3}$
Micro	$\mu$	$10^{-6}$
Nano	n	$10^{-9}$

**Problem 1:**

An infrared photon has a wavelength of 900 nanometers.

Determine:

a) The wavelength of the photon in meters:

b) The frequency of the photon in Hertz:

c) The energy of the photon in Joules

d) The energy of the photon in electron Volts

**Problem 2:**

A visible light photon has an energy of 6.40 electron-volts.

Determine:

a) The energy of the photon in Joules:

b) The frequency of the photon in hertz.

c) The wavelength of the photon in meters.

d) The wavelength of the photon in nanometers.

What TV theme song has these lines?

“In West Philadelphia, born and raised

On the playground is where I spent most of my days”