

### Next Step Pre-Med Equation Worksheet #47: Light

<b>Energy of a photon</b>	$E = hf = \frac{hc}{\lambda}$
Variables	E = Energy h = Planck's constant f = frequency c = speed of light in a vacuum $\lambda$ = wavelength
Units	Joules = (J • sec)(1 / s) = [(J•s)(meters/s)] / m
If the energy of a photon remains constant, then the frequency must:	Remain constant
If the wavelength of a photon is cut in half, then the energy:	Is doubled
Quadrupling the energy of a photon will cause the frequency to:	Quadruple
Quadrupling the energy of a photon will cause the wavelength to:	Be decreased to 1/4 of its original value
<b>Speed of a wave</b>	$v = f\lambda$
Variables	v = speed f = frequency $\lambda$ = wavelength
Units	meters / sec = (1 / s)(m)
At constant speed, if the velocity of a wave doubles, the $\lambda$ :	is cut by 1/2
At constant $\lambda$ , if the frequency of a wave is triples, then the v:	is also tripled
If both the frequency and the $\lambda$ of a wavelength are halved, then the v:	is cut by 1/4
If the f of a beam of light doesn't change but the $\lambda$ increases, then the v:	also increases