2. Wavenumbers

In chemistry, an additional variable is used when talking about light: The Wavenumber. While wavelengths (λ) have a unit of m or nm, wavenumbers ($\tilde{\nu}$) have a unit of cm^{-1}.

1) Using the units given for wavenumbers above, see if you can determine the wavenumber for a wave with a wavelength of 0.1 m (10 cm).

2) Given this information, what is the relationship between wavenumber and wavelength?

3) Complete the following table by first converting wavenumbers to wavelengths, and then calculating frequency using the equation for the speed of a light wave.

$$c = \lambda \nu \quad (1)$$

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

$\tilde{\nu}$ [cm^{-1}]	λ [m]	ν [Hz]
100		
200		
500		
1000		
2000		
5000		

4) Given this information, what is the relationship between wavenumber and frequency?

5) If a graph is plotting increasing wavenumber from left to right, how is the wavelength changing from left to right? What about the frequency?