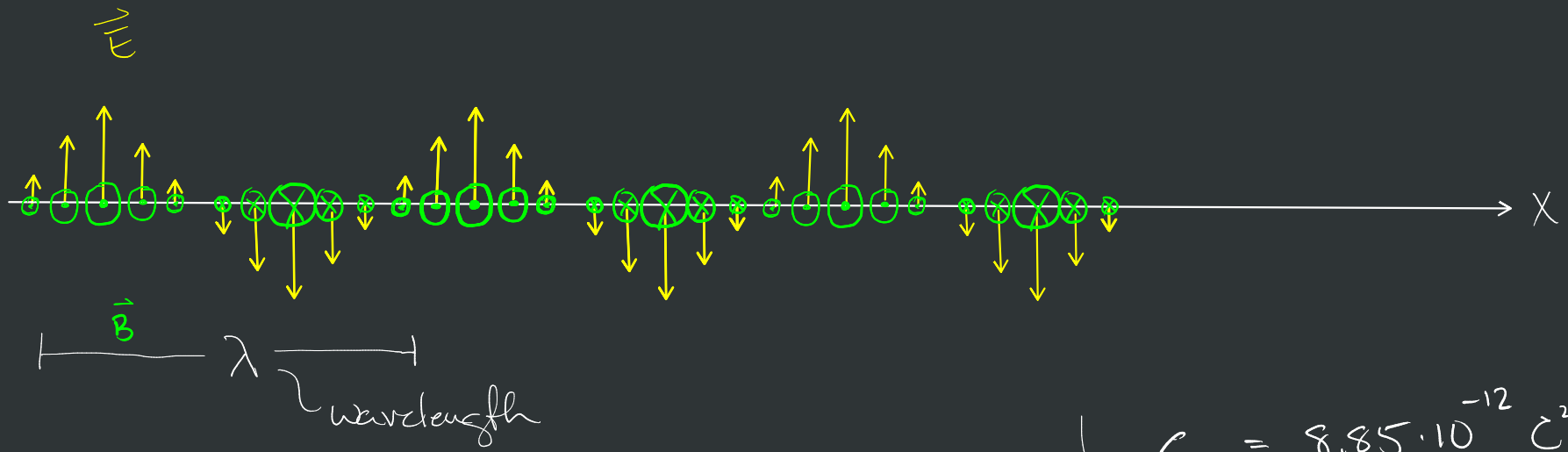
After this you can

- discuss the properties of electromagnetic waves
- discuss the electromagnetic spectrum
- apply the index of refraction



$$v = \frac{\lambda}{T} \qquad f = \frac{1}{T}$$

T ← period

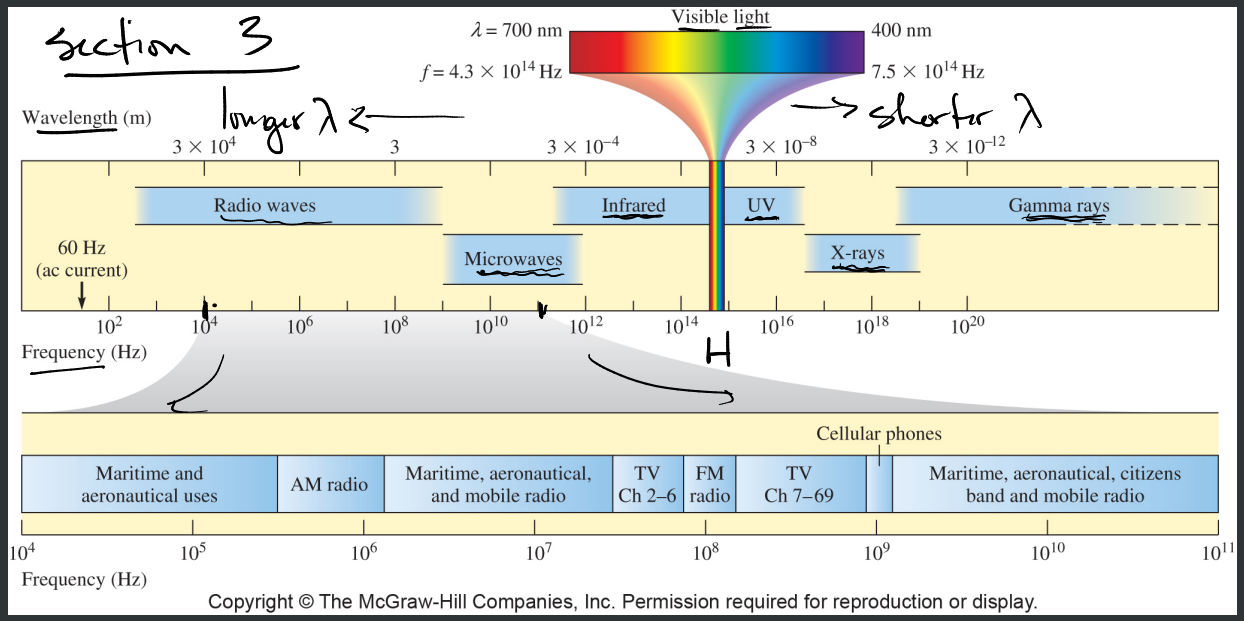
$$v = \lambda \cdot f$$

↳ in vacuum → $c = 3 \times 10^8$ m/s

- $\epsilon_0 = 8.85 \cdot 10^{-12} \frac{C^2}{Nm^2}$
- $\mu_0 = 4\pi \cdot 10^{-7} \frac{T \cdot m}{A}$

$$c = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$$

Section 3



$v = \frac{c}{n}$ ← in vacuum

v = in material

n ← index of refraction

$\frac{c}{n} = v = \lambda \cdot f$

→ changes when v changes

$\lambda = \frac{\lambda_0}{n}$ ← in vacuum

in a material

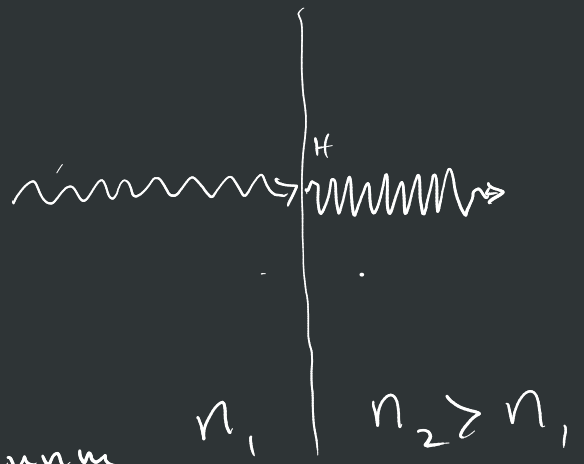
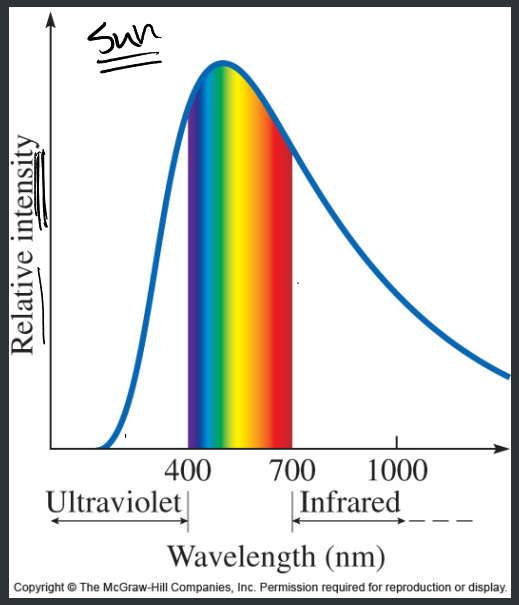


Table 23.1 Indices of Refraction for $\lambda = 589.3$ nm in Vacuum (at 20°C Unless Otherwise Noted)

Material	Index
Solids	
Ice (at 0°C)	1.309
Fluorite	1.434
Fused quartz	1.458
Polystyrene	1.49
Lucite	1.5
Plexiglas	1.51
Crown glass	1.517
Plate glass	1.523
Sodium chloride	1.544
Light flint glass	1.58
Dense flint glass	1.655
Sapphire	1.77
Zircon	1.923
Diamond	2.419
Titanium dioxide	2.9
Gallium phosphide	3.5
Liquids	
Water	1.333
Acetone	1.36
Ethyl alcohol	1.361
Carbon tetrachloride	1.461
Glycerin	1.473
Sugar solution (80%)	1.49
Benzene	1.501
Carbon disulfide	1.628
Methylene iodide	1.74



- prism
- diffraction grating