Name _____ Hour _____

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Redemption code: **LWSD-JVW9-W6PO**

Light and Color Book Assignment: Ch. 16 and 26

What is light anyway? Light is energy emitted by "vibrating" electric charges. In an atom, when an electron drops down in orbital shells (remember those from chem…s, p, d, f) it moves to a place of lower energy, the energy lost is given off as light. In some ways light acts like a wave, in other ways it acts like particles. This is known as the "dual nature of light."

1. What 2 principles make up the ray model of light? (p. 439)

2. Everything you see either _____ and emits its own light (a _____ source) or else it _____ light. (an _____ source

What is our equation for the speed of waves involving frequency and wavelength from our Waves and Sound unit? _____

3. What is the speed of light in m/s and in mph? *(convert) (p. 446)*

4. **What letter do we use for the speed of light?** _____ ***(p. 446)***
5. A light year is the distance light would travel in a year. Calculate a light year in **miles**. *(Hint: Light travels at a constant speed so* $v = \Delta x/\Delta t$*)* (5.88 x 10^{12} **miles**)

6. What happens to white light when it goes through a prism? (p. 448, Figure 14)

7. Light is also believed to be a wave because it has _____ and _____

8. As white light crosses from air to glass and back to air, its wave nature causes each different color to be bent at a different angle. The shorter the _____, the more the light is _____.

9. Using answer to #8, what accounts for the different colors of light?

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10. **Use your c = λ*f* equation** to fill in the chart below: Examples found on **p. 713**

Type of wave	λ (m)	Frequency (Hz)	Examples
Radio waves	3.0		
Microwaves	0.001		
Infrared waves	6.0×10^{-6}		
Ultraviolet light	5.5×10^{-7}		
X-rays	1.0×10^{-11}		
Gamma rays	1.0×10^{-15}		

11. What is an electromagnetic wave? (p. 710. **Put it into your own words if possible**) **Draw an example**. (Use figure 6 on p. 711 for example)

12. An electromagnetic (EM) wave is a _____ wave that can travel through a medium or through a _____.

13. What happens to the frequency of an EM wave as the wavelength gets smaller?

14. What is the wavelength of green light that has a frequency of 5.70×10^{14} Hz?

15. A wave has a frequency of 6.80×10^{14} Hz? What color is it? (p. 713 for colors)

16. Blue light has a λ=470 nm, orange light λ=600 nm. Which one has more waves per second? (1 nm = 10^{-9} m)

17. What is the frequency of a microwave wave with a wavelength of 0.15 m?

18. If your microwave has a frequency of 2450 **MHz** and a wavelength of 0.12 m. Calculate the experimental speed of light.

19. Calculate the % error for the speed of light in #18. $\frac{\text{(accepted – expt)}}{\text{accepted}} \times 100\%$