<u>Wave Nature of Light – Research Questions</u> (interference, diffraction, polarization, dispersion, diffraction)

1. How do geologists use wave nature of light to find mineral deposits? (ASTER)
2. How do surface plasma polaritons (SPPs) make use of wave nature of light? …..what are some of the applications of SPPs?
3. How does global positioning system use wave nature of light? What are some of its shortcomings **?**
4. How has holographic technology made it more difficult to counterfeit currency? Use Canadian examples if possible.
5. How does laser surgery improve surgical techniques and recovery time? Is there a downside to laser surgery? How do they hope to improve it?
6. In what ways can posting magazines and newspaper on the Internet benefit the environment? Are there shortcomings to this practice? Wireless communication
7. How do cell phones use the wave nature of light? Socially, what are the advantages and disadvantages of this form of communication? Can cell phone waves cause cancer?
8. How does the invention of night vision help us find lost people . What are the limitations of this technology?
9. How does spectroscopy help us better understand stars and galaxies?
10. What are blue & red shifts and how do they tell us about the expanding universe and help us to find orbiting planets far away.
11. Initial studies with microwaves suggest we could build an 'invisibility cloak'. Use the wave theory of light to explain how this would work.
12. Some detergents now contain phosphors. Why would they do this? Since washing machine water goes down the drain, what impacts could phosphors have on our environment. Should we have phosphors in our detergents?
13. How does radio astonomy work? What is VLA and what is the value of radio astronomy?
14. What is photoelasticity? How does it work? How do we use it to our advantage? (have a specific example)
15. What are the limitations of a light microscope? How does an electron scanning microscope work better? When is it best to use each type of microscope**?**
16. Phototonic computers??
17. How do wi-fi hot spots work? The government proposes setting up 70+ hot spots in national parks by 2017. Should they?
18. How do wi-fi hot spots work? Why is the reception in our school spotty? What could we dto improve it?