**Introduction to Light and Color - WebQuest**

1) Use "Save As" to save this document as LastName FirstInitial Light and Color (example: “Lurie D Light and Color”) to your own folder at school or your own computer at home.

There are some websites provided for you. (Hold Control Key while clicking on link to open in another window.) PLEASE feel free to explore the internet to find other websites which explain the material. If you paste the URL's for those websites into your document, or [hyperlink](http://www.word-2010.com/insert-a-hyperlink-in-microsoft-word-2010/) to them and email the document to dlurie@clarenceville.k12.mi.us, you will get a higher grade.

Assignment:

1) Research how visible light and other electromagnetic waves are produced. After viewing websites and animations, explain

a) What moves up and down in an antenna or transmitter to produce a radio wave?

b) Do electromagnetic waves need a medium? What do they travel through?

c) Why are they called "electromagnetic" waves? What is waving?

[Vibrating Charge Producing Electromagnetic Wave](http://www.colorado.edu/physics/2000/waves_particles/wavpart4.html) (Read the directions!!)

[Interactive Tutorial - Electromagnetic Wave Propagation](http://micro.magnet.fsu.edu/primer/java/polarizedlight/emwave/index.html)

[Phet - Radio Waves and E-M Fields](http://phet.colorado.edu/en/simulation/radio-waves)

[Animation of Perpendicular Electric Field and Magnetic Field](http://www.phy.ntnu.edu.tw/ntnujava/index.php?topic=35)

2) What is the difference between "light" and "electromagnetic waves"? Often, people just use "light" to describe visible light, but there are lots of colors (energies) of light that we can’t see with our eyes. Research the entire electromagnetic spectrum.

a) What are the major categories of electromagnetic waves?

b) What are the measurable differences between types of E-M waves?

c) Describe the scientific, industrial, or medical use of at least two kinds of light.

[Article: "Your Next Phone may be Able to See Through Walls"](http://www.pcworld.com/article/254174/your_next_phone_may_be_able_to_see_through_walls.html)

[NASA website: The Electromagnetic Spectrum](http://imagine.gsfc.nasa.gov/docs/science/know_l1/emspectrum.html)

3) How do we perceive color? Do our eyes and brains see color the same way a camera does? Do we see what is really coming into our eyes?

1. What cells in our eyes sense light? Do they all sense the same colors of light?
2. What are the three colors that our eyes are most sensitive to?
3. How do our brains sense colors other than the primary colors?
4. What cells in our eyes respond to yellow light? How can we trick our brains into seeing yellow?
5. What is the difference between "additive" colors and "subtractive" colors? Which type is used in a theater during a play, and which is usually used in art class?

[Theory of Color](http://www.atmos.ucla.edu/~fovell/AS3/theory_of_color.html) [Color and Vision – The Physics Classroom](http://www.physicsclassroom.com/Class/light/u12l2b.cfm)

[Phet Color Vision Applet](http://phet.colorado.edu/en/simulation/color-vision) [RGB Additive Color Mixing Applet](http://www.lon-capa.org/~mmp/applist/RGBColor/c.htm) [CYM Subtractive Color Mixing Applet](http://lectureonline.cl.msu.edu/~mmp/applist/CYMColor/c.htm)

4) Use the sliders on the left side of the [Numerical Color Mixer](http://www.cbu.edu/~jvarrian/applets/color1/colors_g.htm) to make different colors. See what each pair of colors makes. Adjust the sliders to make the following colors, and record your values for each component.

1. orange: Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_
2. lemon: Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_
3. grape: Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_
4. coffee: Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_
5. vanilla: Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_
6. mountain dew Red \_\_\_\_\_\_\_\_\_ Green \_\_\_\_\_\_\_\_\_\_ Blue \_\_\_\_\_\_\_\_\_