**Electromagnetic Waves & Color Online Tutorial**

***Instructions****: Follow the links below and read the text on the page. Follow the instructions given and answer the questions as directed below in your journal or digitally.* ***Formulate thoughtful responses****.*

1. Use this link🡪[Light Waves and Color](http://www.physicsclassroom.com/class/light) 🡪 Lesson 2: Color and Vision
2. [**Lesson 2a**](http://www.physicsclassroom.com/class/light/Lesson-2/The-Electromagnetic-and-Visible-Spectra)**: Electromagnetic and Visible Spectra**
	1. In a new tab, open this [link](http://www.bbc.co.uk/schools/gcsebitesize/science/edexcel/electromagnetic_spectrum/electromagneticspectrumrev4.shtml). *You may also use your own source for this if you prefer.*
		1. Draw a wave diagram for the EM Spectrum from high to low frequency
		2. Write down one example/use of each part of the spectrum
	2. Read through the tutorial and include the answers to the following:
		1. How do electromagnetic waves differ from mechanical waves?
		2. What is the electromagnetic spectrum?
		3. What is the visible light spectrum? How is it different from the EM spectrum?
		4. What is dispersion?
	3. Use the **Investigate!** Widget to try different wavelengths of light.
	4. Answer the 2 of the 3 **Check Your Understanding** questions.
3. [**Lesson 2b**](http://www.physicsclassroom.com/class/light/Lesson-2/Visible-Light-and-the-Eye-s-Response)**: Visible Light and the Eye’s Response**
	1. Summarize the process your eye uses to “see” light in your journal; include new definitions.
	2. Use the **Investigate!** Widget at the bottom of the screen to write down the ratio of red, green and blue present in the following list of colors out of 255 for each color.
		1. Red, magenta, cyan, yellow, fuzzy wuzzy, banana mania, plus 1 more of your choosing!
4. [**Lesson 2c**](http://www.physicsclassroom.com/class/light/Lesson-2/Light-Absorption%2C-Reflection%2C-and-Transmission)**: Light Absorption, Reflection, and Transmission**
	1. Take notes in your journal on this page.
		1. Explain how light is transmitted and reflected.
	2. Complete the 2 Quick Quiz Sections at the bottom of the page to check if your explanation is correct.
	3. Answer the 2 of the 4 **Check Your Understanding** questions.
5. [**Lesson 2d**](http://www.physicsclassroom.com/class/light/Lesson-2/Color-Addition)**: Color Addition**
	1. Copy down the color addition models in your journal using colors
	2. What are the primary colors of light? What are the secondary colors of light?
	3. What are the complementary/secondary colors of light?
	4. Answer the 1 of the 2 **Check Your Understanding** questions and check your work
6. [**Lesson 2e**](http://www.physicsclassroom.com/class/light/Lesson-2/Color-Subtraction)**: Color Subtraction**
	1. What are the primary pigment colors?
	2. Click on the Interact! “[Painting with CMY](http://www.physicsclassroom.com/Physics-Interactives/Light-and-Color/Painting-with-CMY/Painting-with-CMY-Interactive)” activity (2nd down).
		1. Explain how you can achieve the following:
			1. ****Paint the football player’s helmet blue
			2. Paint the football player’s shirt green
			3. Paint the football player’s pants black
			4. Paint the football player’s shoes red
	3. ****Click on the Interact! “[Colored Shadows](http://www.physicsclassroom.com/Physics-Interactives/Light-and-Color/Colored-Shadows/Colored-Shadows-Interactive)” activity (3rd down) that uses RGB lights to form shadows.
		1. Turning on only 1 light at a time, try to predict the color of that man’s shirt.
		2. Explain what color the man’s shirt, skin and hair color would be in sunlight.
	4. Answer the 3 of the 8 **Check Your Understanding** questions and check your work.
7. [**Lesson 2f**](http://www.physicsclassroom.com/class/light/Lesson-2/Blue-Skies-and-Red-Sunsets)**: Blue Skies and Red Sunsets**
	1. How would you explain to an elementary school student why the sky is blue?
	2. Draw a sketch and explain why sunsets are red.