

Synopsis

The seminar I took focused on the Art and Chemistry of Light. This will also be the focus of this CU. I will have the students personify the visible light spectrum ROYGBIV (red, orange, yellow, green, blue, indigo, and violet) by turning the EM Spectrum between 450 nm and 750 nm into a person: Dr. Roy G. Biv. Students will study and do experiments pertaining to the physical, chemical and life-giving properties of light. Students will also explore the role of light and color in the art field. Finally, the students will create a person, Dr. Roy G. BIV (acronym on the visible light spectrum) who is not only a scientist but an innovating artist as well, citing his accomplishments and experiments, relating them back to what they studied in the unit.



The electromagnet spectrum. Visible light is between 400 and 700 nm. Image courtesy of http://www.cyberph ysics.co.uk/topics/lig ht/emspect.htm.

Unit Goals

My goal for this unit is to have students understand the concepts of color and light on a scientific level. I want them to understand the electromagnetic spectrum, specifically the visible light portion. Students will understand the science behind why we can only see radiation in that narrow 400 nm to 700 nm range. I want them to understand the principles of reflection and absorption, which is how color is visualized. I want them to understand that it is light (from the sun) that supports all life on earth, drives the hydrologic cycle, and controls the weather.

In terms of art, I want students to understand what role color plays in the significance of art, and how by using color and patterns, art can have a profound impact upon the human psyche. Students will understand the purpose and function of art, and why it is important. Lastly, I want students to understand how science and art intersect with color and light.



Light as Beauty



Light gives life to this plant

Erika L. Williams

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Research Main Points

- "Light is the visible part of the electromagnetic spectrum between 750 nm (red) and 450 nm (violet)
- Light is made up of particles called photons
- Sir Isaac Newton penned a letter about his experiments with light to the journal *Philosophical Transactions* in 1871
- Colors are used frequently in education to denote behavior or student achievement
 - Red usually denotes something negative, such as a conduction violation or failure to master an objective
 - Yellow usually denotes a borderline...students either had a few behavior infractions or the student came close to achieving mastery on the topic
 - "Green is Good" this means either the student behaved well that day or that the student mastered the concept.
 - "Light gives life" Light drives the process of photosynthesis and the hydrologic cycle, therefore controlling the living ecosystem
 - Light is essential to humans We need light to make vitamin D, a nutrient that is essential for health bones, teeth, and skin.
 - Light is the central component of art and photography



Behavior 'stop light" tricolor system. Image courtesy of https://www.creativelearning4kidz.com/B ehavior-Traffic-Light-Chart-Card-Set-Digital-Download p 182.html

ps Trackers Assessments Pins Community 🕐 🛄 Erika 🗸 em2: Human Bod 👻 🧮 📰 🛞

> MasteryConnect, a student data tracking system uses colors to demonstrate mastery

G: 93% AVG: 87% 15 1 0

AVG: 83% 7 3 5 AVG: 70%

The curriculum will be broken up into two main units, and each unit will have two sections. The main units are The Science of Light and the Art of light. The subunits in the Science unit will include the Chemistry/Physics of Light and the Biology of Light. The subunits of the Art unit will include Painting/Color blending and Photography. Each unit will have several quizzes in the subunits (3-5) and one unit test. Labs and quizzes will account for 20% of the final grade, the unit tests will account for 40% and the final project will account for 40%. Day One The course will incorporate literacy, since improving literacy is an important common goal throughout CMS. On the first day of the class, I will write the terms *light*,

words or phrases that come to mind; they will have two ROYGBIV (red, orange, yellow, green blue, indigo, violet) and what makes this part of the spectrum between Isaac Newton's Letter on Light. For homework, students will write a response to Newton's letter as if they were a fellow scientist in that era.

color on the board, and have students write down any minutes to do so. The micro-lecture will focus on the visible light part of the EM spectrum and the acronym 450nm and 750 nm different from any other part of the spectrum. The class will conclude with the reading of

Personifying Light: The Life and Times of Roy G. Biv



Instructional Implementation



Isaac Newton's "Letter of Light" (Unit 1)



Students will grow crystals to study the properties of light. (Unit 1)



Students will use prisms to study the bending and separating of light. (Unit 1)

Unit 1



For a final project, students will bring the visible spectrum ROYGBIV to life in the form of a person: Roy G. Biv. The person could be a man or a woman. The student will create a biography of that person, detailing some of their experiments with light and their artistic work. The experiments that the students choose to write up can be ones that they made up or ones that have been previously conducted, which they repeat to verify the results. They will share these experiments in a letter to a journal, similar to the letter Isaac Newton penned to Philosophical Transactions in 1649. The students' letters will represent the time that they choose for their artist to exist. If the student's artist/scientist is contemporary, then the submissions can be typed. For the artistic side of the project, the student must submit original artwork pieces. They can either submit three paintings done with any pigment other than watercolor or 30 photos. The photos must be a combination of digital and film. There must also be different finishes such as sepia, black and white, glossy, matte, etc. One picture must be a cyanotype. The student will present their Roy. G. Biv to the class with a slideshow, Prezi, video, or poster. After everyone has presented, there will be a show, set up in a gallery where the public can view their projects and the students have a chance to present to the public.

- To Access my full curriculum unit, go to
- http://bit.ly/ew2018cti





Instructional Implementation

• Read scientific papers on light (Newton, Einstein) Experiment with light (photosynthesis, crystals, prisms) Studying Visual Perception of the Eye

• 5 Micro-lectures

- Quiz after each lecture or lab
- Unit Test

Unit 2: Art of Light

Interpreting paintings for an emotional response Photography

- Daguerreotypes
- Cyanotypes
- Traditional Development of Pictures



"Starry Night by Vincent van Goh and "Mountain Top Sunrise" By Sharon Daguay will be used to interpret art's impact on emotions.

Final Project

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