

Physics

Light and Color

This unit will allow each student to:

- a. gain a better understanding of the behavior and characteristics of light as an electromagnetic wave and particle
- b. continue making proper scientific measurements and calculations
- c. define and properly use all vocabulary
- d. properly apply all terms and concepts in describing/explaining real world examples
- e. continue making and interpreting scientific graphs
- f. teach someone else the concepts discussed
- g. practice proper laboratory safety

This will be accomplished by each student that is able to:

1. describe the creation of light and relate to the spectra produced by specific atoms
2. state the speed of light in a vacuum
3. identify and properly arrange the different regions of the electromagnetic spectrum
4. list/describe applications of different electromagnetic waves
5. explain the behavior of light interactions with transparent and opaque materials
6. discuss the polarization of light by various materials such as water and filters
7. distinguish between primary colors of light and pigment
8. identify complementary colors of light and pigment
9. predict colors produced by the mixing of primary/complementary colors of light and pigment
10. observe and explain afterimages as they relate to human vision
11. explain why the sky is blue, sunsets are red, and water is greenish-blue
12. identify the speeding up or slowing down (and associated bending) of light as it passes from one medium to another
13. relate the speed of light to medium properties and the color of the light
14. describe how a prism separates white light into the visible spectrum
15. describe total internal reflection
16. explain how a rainbow is formed by water droplets in the atmosphere

Textbook Reference – Physics (HMH)

Chapters/Sections	13.1	13.4	14.1	15.2	20.4
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Key Terms – *write the definitions of the boldface terms on your own paper, definitions are available at theteterszone.net*

electromagnetic radiation, electromagnetic spectrum, photon, opaque, translucent, transparent, light, pigment, retina, cone, rod, polarization (light), reflection, refraction, index of refraction, total internal reflection

Light review sheet – Answer on a separate sheet of paper; due prior to the 20Q on Day 5

- A. How is a light wave produced?
- B. Sketch the electromagnetic spectrum include all 7 regions in order from low frequency to high frequency.
- C. Give an application of each region of the electromagnetic spectrum.
- D. What is the speed of light in a vacuum?
- E. Why does light travel slower through glass than it does through a vacuum?
- F. Does light speed up or slow down when it leaves water into the air?
- G. Draw a light ray as it passes from air into a piece of glass and back into the air again.
- H. What causes the total internal reflection of light as it travels from water to the air?
- I. Why is glass transparent for visible light, but opaque for infrared and ultraviolet light?
- J. Which color of light travels slowest through transparent materials? which travels fastest?
- K. How is white light separated into the various colors of the rainbow by a prism?
- L. What are the primary colors of light? What are the primary colors of pigment?
- M. What is a complementary color?
- N. What color results from the combination of magenta and green light? blue and green light? red, blue and green light?
- O. What color results from the combination of yellow and cyan paint? cyan and magenta paint? yellow, magenta, and cyan paint?
- P. What color results when a yellow light shines on cyan paper? red light on a green leaf? blue light on magenta handkerchief?
- Q. Why is it that you can see a faint blue spot after staring at the sun?
- R. What part of the human eye absorbs light and sends signals to the brain?
- S. What is the purpose of cones and rods on your retina?
- T. Why the sky is blue? Why are sunsets red?
- U. Why does water look greenish-blue?
- V. What do polarized lenses in sunglasses primarily reduce?