The Nature of Color

BACKGROUND FOR EDUCATORS

Overview of Student Worksheets

Using worksheets, students explore the exhibition to understand the properties of color and light through models, objects, rocks, and organisms. Students learn that light is the visible part of the electromagnetic spectrum of energy—colors are different wavelengths of light—and we perceive objects as having color when light reflects off them and reaches our eyes. Different wavelengths are perceived as different colors. The color of an object depends on the wavelengths of light shining on it, as well as which wavelengths the object reflects. For example, a leaf looks green only when green wavelengths reflect off it and enter our eyes. The leaf looks green in sunlight because it is reflecting the green wavelengths of the sunlight into your eyes and absorbing all the other wavelengths as thermal energy (heat).

These observations help students experience a **natural phenomenon**: Different objects reflect different colors. This phenomenon can serve as an anchoring point in discovery and discussion as the students explore the **investigation question:** How do the wavelengths determine the colors we see?

Extension Ideas

Back in the classroom, students can complete their worksheet model by adding the properties and behavior of the light reflected from the object *once it reaches the eye*. Have students draw diagrams illustrating where in the eye the light travels, and how it is eventually perceived as a colorful object in the brain.

For Grades 9–12: Have students expand their model to answer the question: What happens to the wavelengths of light that are not reflected off the object?

Suggested resources:

- What's This? Colorful Creatures (ology.amnh.org/zoology/whats-this-colorful-creatures)
- Color in Nature (ology.amnh.org/marine-biology/color-in-nature)
- Play with Color and Light (ology.amnh.org/physics/play-with-color-and-light)
- Seeing Color (ology.amnh.org/brain/seeing-color)
- See the Light (ology.amnh.org/physics/see-the-light2)

Correlation to Standards

This activity supports the following Next Generation Science Standards:

Disciplinary Core Ideas	**PS4.B: Electromagnetic Radiation** An object can be seen when light reflected from its surface enters the eyes. When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat).

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Crosscutting Concepts	**Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.
Science and Engineering Practices	**Developing and Using Models** Develop and use a model to describe phenomena.

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