ANIMAL, VEGETABLE, MINERAL: THE COLOR OF THINGS

The world around us is full of many wonderfully colored living creatures in almost endless variety. The marvelous colors of fall, especially in the northeastern United States, are the result of organic compounds in the leaves of trees and other plants that are revealed once the normally dominant color of chlorophyll disappears.

Sometimes the colors of birds and insects are also the result of absorption of light by organic molecules, for example, xanthopterin is a yellow-orange pigment found in the wings of butterflies and other insects as well as animals; however, many birds and insects use a trick of physics to produce color. They arrange layers of reflective material (usually inorganic salts) at a precisely defined spacing that selectively reflects light of a specific wavelength. A physicist would call such a "device" a quarter wavelength interferometer, a device that selectively reflects light of wavelength $\lambda$ from multiple layers with a thickness of $\lambda/4$. Many of you are taking physics at the same time as organic chemistry. Ask you instructor to explain how such a device works.
operates. With such knowledge in hand, you may view the beauty of nature with even greater awe.