Beaver Lake Nature Center

December 2011

Winter *Blues*

Beaver Lake's Teachers Newsletter

Dear Teacher,

Explore the color blue with your students this December through many familiar natural phenomena.

ICE

Which colored pencil would your students grab if asked to sketch a glacier, or ice cubes in a glass of water? (You might even try this: give them 1 minute to draw some form of ice.) Snow and ice often appear white because they reflect all of the wavelengths of light, which of course, combine to produce white light. Light is reflected at the boundary where ice meets air. Snow and some ice, such as ice cubes in your freezer, contain a considerable amount of air, so they quickly reflect the full spectrum of visible light. The extremely compact ice of glaciers, unlike our ice cubes, actually absorb most wavelengths except for (but of course!) blue wavelengths. As these are the only wavelengths of light reflected, it's blue light our eyes see reflecting back.

Experiment:

Have your students bring in feathers of different colors, including at least one (naturally) blue feather. You might have your students work in small groups with 3 different colors of feathers, with one blue feather in each group. Have them describe the colors of the feathers in different lighting situations: bright artificial light, sunlight, backlit, etc. Can they come up with scenarios in which a bird would want to be brightly colored, and when it would not?

FEATHERS

Almost all the blue feathers in birds are not colored blue with any pigment. Instead, in most blue-colored birds like our Blue Jays and bluebirds, the barbs of the blue feathers contain pockets of air that cause the light that hits them to scatter. What about the iridescence of hummingbirds? The male Broad-billed Hummingbird, a species found in Mexico, has a blue-violet throat. Its blue comes from the structure of the feathers rather than from pigment too, but with a different effect: shiny iridescence. At the microscopic level, the structure of a hummingbird's gorget, that specially colored throat patch, is designed to refract light in a particular way. Incident light is split as if through a prism. Just like when a Blue Jay's feathers are backlit, they don't look blue, a hummingbird's shine will turn black at certain angles like a hologram.

TRY IT: ***Your students know that mixing red, orange, yellow, green, blue, and violet paints will yield a black or brown muck. Do they know what happens when you mix these colors of light? Get some prisms for them to play with, so they can see what colors are there when you dissect white light.***

BUTTERFLIES

Morpho Butterflies live in Mexico and South America and are known for their large, shiny blue wings, but actually, these butterflies contain no blue pigmentation. Just like the iridescence of a hummingbird's throat, at an angle, their brilliant blue wings are a dull brown, and like a hummingbird's feathers, the scales that comprise Morpho's wings create that blue shimmer structurally.

VEINS

People with less melanin in their skin can see blue veins running through their arms. That's the blue, deoxygenated blood you see, just like in the textbook, right? No, human blood is always red; the textbooks just use the color blue for deoxygenated blood to differentiate between venous and arterial blood for the sake of clarity. True, venous blood has a *slightly* bluish hue to it, more so than arterial blood, but both arteries and veins contain red blood.

Blood typically absorbs most wavelengths of light, but absorbs red wavelengths less, reflecting these back to our eyes so that we perceive the color red. Any but a very superficial vein also has skin's properties to contend with. Skin with less melanin reflects most blue wavelengths of light, rather than absorbing these, before it can reach and be absorbed by the blood in veins.

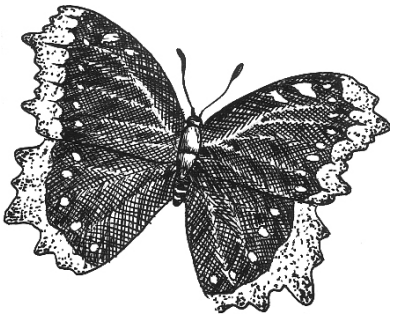
BLUEBERRIES

Think back just a month to when the brilliant reds, oranges, and yellows of our deciduous trees bejeweled our woods. Remember those deep purples and reds? As you may recall, the pigmentations responsible for purples, blues, and reds-- in autumn leaves as well as in fruits--are phytochemicals called anthocyanins.

New York's native blueberries ripen in summer and early fall, as many people who visit you-pick farms are aware. But of course, blueberry farms aren't the only place you will find blueberries growing. Despite the sweetness of their fruits, these plants love acidic soil. A walk on the boardwalk through Beaver Lake's fen (The Bog Trail) will take you through blueberry paradise. But even in blueberry season, you might be hard pressed to actually see any berries: they are rather popular among game birds, songbirds, and many mammals. Studies suggest that eating blueberries reduces a person's chance of getting diabetes, cancer, and heart disease, and they also are an unusually good source of iron for a fruit native to a temperate region.

IN SCHOOL PROGRAMS

Looking for that perfect teacher's gift? Or a special gift for a child or grandchild? Why not sponsor an indoor program at your child or grandchild's classroom? Subjects include ***The World of Reptiles and Amphibians***
Amazing Animal Adaptations
Animals with Bad Raps, or
Insects Are Cool
with a visit from Dr. Arthur Pod. Each of these programs are one hour in length, and the fee is $75. We will give you a program brochure and a gift certificate that the child can give to the teacher. At their convenience teachers can call the Nature Center to reserve a time: 315-638-2519.



Beaver Lake Nature Center | 8477 East Mud Lake Road | Baldwinsville | NY | 13027