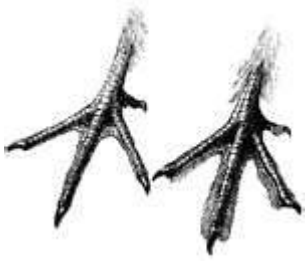
Winter 2012

Notes From Nanjemoy Creek

Nanjemoy Creek Environmental Education Center

Charles County Public Schools



Science Outside

by Meagan Keefe

"Come forth into the light of things,
Let Nature be your Teacher.
She has a world of ready wealth,
Our minds and hearts to bless."

These words from William Wordsworth's poem, "The Tables Turned," remind us that there is much to be discovered through observing nature. Humans have long looked to the natural world to help solve problems and improve quality of life. For example, people living in cold snowy climates observed the feet of the animals they used for food, such as hare and grouse, and created snowshoes to make winter travel easier, cutting edge technology at the time. Today, we call this process biomimicry or biomimetics.

The field of biomimetics is producing new technology on a wide ranging scale. From the large scale of bullet trains based on bird bills to the micro scale of Lotus leaf inspired paint that can shed dirt and water, studying nature has a huge impact on improving our lives. It can also be an engaging gateway to STEM education. STEM, as defined by the Maryland State Department of Education (MSDE), is an educational approach to teaching and learning which integrates the fields of Science, Technology, Engineering and Mathematics. Behaviors and practices of a STEM student include engagement in inquiry, logical reasoning, team collaboration and investigation. These practices are also found in environmental and outdoor education.

Most people, children especially, like to know how "stuff" works or how it was invented. What better way to start using the STEM model than to take students outside to investigate the world around them and try to figure out what things they use every day might have been inspired by nature? Schools are increasingly creating outdoor classrooms and/or schoolyard habitats. Even if schools don't have something quite so formal, almost every school has a field or forest edge nearby for students to explore.

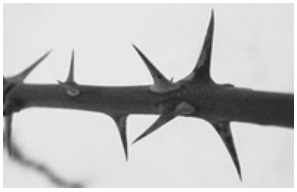
Studies have shown that spending time outdoors leads to increased creativity and productivity among workers. Many companies, including internet giants Facebook and Twitter, are finding ways to allow employees an opportunity to do work and hold meetings in outdoors spaces. We often think that the next big thing in technology is going to come from space, a corporate headquarters or a lab. But maybe it will come from an "AH HA" moment someone has when outside on a field trip, surveying for a science class, walking the dog or just playing around with friends outside. Nature has had many millennia to find things that work. Taking time to observe this can lead to a wealth of discovery. Perhaps we should spend more time heeding Wordsworth's closing lines:

"Come forth, and bring with you a heart
That watches and receives."

What on Earth is Biomimetics?

by Laura Taylor

Throughout history, inventors have borrowed ideas from the natural world to create new, efficient ways to solve problems. Both Leonardo da Vinci and the Wright brothers studied the way birds fly to assist them in creating their flying machines. In 1868, Michael Kelly needed a way to keep his cattle in check. Noticing that they avoided plants with thorns, he came up with a design that involved metal "thorns" wrapped on a single wire resulting in barb wire. In 1948, a Swiss engineer named George de Mestral noticed how cockleburs stuck to his clothing after a hike and created a manmade version of the cocklebur called Velcro. Clever inventors learned long ago to study and imitate nature's best ideas, designs and processes to help them solve human problems. The principals these inventors used are now referred to as biomimetics or biomimicry, terms that come from the Greek words *bios*, meaning life, and *mimesis*, meaning to imitate. Simply put, biomimetics is biologically inspired engineering.



Let's explore some other inventions created using biomimetics. Athletes have often looked to the world of animals to help improve their performance because many animals are faster and stronger than humans. Studies have shown that sharks can move through water using close to ten percent less energy than other fish. Therefore, the Speedo company developed a swimsuit based on the design of shark skin which allows competitive swimmers to increase their speed.

In the past, doctors focused solely on humans when designing prosthetics (artificial arms and legs) for those who have lost or were born without limbs. By examining the leg design of the cheetah, a new type of prosthetic was developed called a "flex foot." These specialized prosthetics allow athletes who are missing limbs like Oscar Pistorius (2012 Olympics) to race competitively.

People have long been fascinated by how bats use sonar or echolocation to find their way around caves and to track food. That same idea has been applied to a cane called the "Ultracane." Using sound waves, the cane detects objects in the path of the user and vibrates a warning. In 2008, the University of Michigan's College of Engineering created a robotic spy plane that mimics the shape of a bat in flight. Bats are naturally aerodynamic, and therefore, require less energy for flight, making their shape the perfect design for a small plane. The spy plane is called the COM-BAT and operates by using solar power.

Another example of biomimicry in action includes the efficient shape of wind turbine blades inspired by the leading edge of a whale's fin. The changing colors created by the scales on butterfly wings inspired the design of LED displays on mp3 players and other electronics. The adhesive that mussels use to attach to rocks inspired the design for glue that holds laminate flooring and particle board together. The aerodynamic shape of a V that geese create when flying inspired the shape of the modern airplane. The list could go on and on.

The moral of this story is that nature can be a great teacher if we take the time to look and listen. The next time you find yourself trying to solve to a problem, spend some time observing nature. The solution just might be found there.

"Great things are done when men and mountains meet. This is not done by jostling in the street." ~ William Blake

In Memory of Haliaeetus leucocephalus, aka Hali the Bald Eagle

by Mike Callahan

I never expected to get so attached to a wild animal as I did to Hali. I suppose we became close over the years because she was the first Bald Eagle I trained to perch on my glove. In order to write this article and maintain composure, I chose to write it very much like an obituary.

On September 20, 2012, Hali, our female Bald Eagle took her last breath in the office of Dr. Adam Terry of All Kinds Animal Hospital in Calloway, MD. Dr. Terry treated her for over a year for a suspected inoperable brain tumor. She could no longer stand on her perches and held her head in an unusual position. Her balance was compromised and occasionally she fell and had difficulty getting up. Dr. Terry recommended we monitor her behavior and eating habits. By August 2012, she was unable to right herself after a fall without assistance. The difficult but necessary decision was made that her quality of life had deteriorated to the point that she needed to be euthanized. At approximately 10:15 a.m., she took her last breath as I held her in my arms with Meagan Keefe and NCEEC raptor care volunteers Matt Taylor and Mandy Heatwole nearby. Results of her necropsy discovered that she had arterial sclerosis or hardening of the arteries. Plaque from her arteries dislodged and traveled to the brain resulting in several small strokes which lead to her symptoms.

Much of Hali's life was spent educating humans. In early 2000, NCEEC received a call from veterinarian Dr. Mark Hocking of St. Charles Animal Hospital in Waldorf about an adult bald eagle that he had been treating for injuries she received in the wild. She was found in a field near the Governor Harry Nice Bridge with her face torn and a wing dislocated. These injuries led Dr. Hocking to believe she had been in an altercation with another eagle. Her face healed, but the wing damage was too severe for her to be released into the wild.

In the winter of 2000, she moved to NCEEC where she would live the rest of her life in the company of our other bald eagle, Tayac. Originally, she was given the name *Haliaeetus leucocephalus* which was later shortened to "Hali", though she was also called Mrs. Tayac by the family of Chief Billy Tayac. For Earth Day 2002, she was invited to the U.S. State Department Headquarters in Washington, DC and got to meet Secretary of State Colin Powell. Each year she received an invitation to the Eagle Festival at Black Water National Wildlife Refuge in Cambridge, MD where she represented her species until 2011 when health complications prevented her from attending.

Hali became an ambassador and educator for NCEEC, Charles County Public Schools and local wildlife. She met over 25,000 CCPS students and thousands of people in the community throughout her tenure at NCEEC . Everywhere she went, people were excited about her presence. She never seemed to let her celebrity go to her head even when the paparazzi were at her talons. A special thanks goes to Dr. Adam Terry for treating Hali and for all of his time, expertise and the cost of lab tests he donated toward her care. Kudos, as well, to the special care provided to Hali and the other raptors by our volunteers and staff members.

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The mission of Charles County Public Schools is to provide an opportunity for all school-aged children to receive an academically challenging, quality education that builds character, equips for leadership, and prepares for life in an environment that is safe and conducive to learning.

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Update: Passing Hali's Torch

We found a Bald Eagle who may be able to carry on Hali's mission. This immature bird hatched in the winter of 2012 in Wisconsin and has all the brown plumage of a first year Bald Eagle. She is a flighted bird, but cannot make a normal landing due to an eye injury. If we are approved to receive this eagle, she will travel from the Four Lakes Wildlife Center in Madison, WI. One of the conditions from Four Lakes staff is that she has access to a flight cage, and arrangements are being made to have it constructed by volunteers. In the near future, we will request that the Federal permit be transferred from Four Lakes to NCEEC. The eagle would then be transported by Pilots N Paws, a volunteer pilot organization who transports rescue animals across the country. Stay tuned….

Nanjemoy Creek Fan Club

Would you like to help support the programs and projects that take place throughout the year at Nanjemoy Creek Environmental Education Center? Become a member of Nanjemoy Creek's Fan Club by completing the attached form and including a small, tax deductible donation to our center. Your donation helps us keep our program up to date with the latest advances in environmental education and supports care for our raptors and bees. In return for your support, you will receive our newsletter to keep you informed about what's happening at the center.

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