



# CRCST

Cleveland Regional Council  
of Science Teachers

**FOCUS: CONSERVATION IN CLEVELAND**

CRCST  
Quarterly  
Newsletter

Spring 2018

IN THIS ISSUE

## President's Message

by Manuel Mendoza, CMSD, CRCST President

"Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts. There is something infinitely healing in the repeated refrains of nature -- the assurance that dawn comes after night, and spring after winter."

— Rachel Carson, *Silent Spring*

As the winter ends and we face the upcoming summer the Cleveland Regional Council of Science Teachers, CRCST, finds itself looking at ways to adapt to this new century. Teaching science has a unique set of challenges. It has never been more important to teach students how to think logically and use evidence to evaluate a problem. In a world dominated by snapshots, micro blogs and misinformation, science teachers find themselves attempting to help students make their way through multifaceted problems that require them to not only know some baseline facts but also understand the relationships between forces that define our world. The science teacher of today has to balance the experiments and experiential aspect of science with the assessment structure that defines many of our teaching practices. How can an organization as time tested as CRCST meaningfully help a science teacher make an impact at what they do?

The CRCST board is taking a hard look at how to use its relationships with the regional science education organizations to make a difference in the science classroom across the region. The real question is: how can CRCST help the science teacher make more of what they do; more enjoyable, meaningful, special, and, indeed, impactful for both the student and the teacher? What can the organization provide that will help make this profession better?

We are looking to answer this question. Like anything worthwhile it begins with honesty and reflection. Once the needs are identified new ideas and fresh perspectives are required. Along with experience and support, the new ideas can eventually blossom into useful products that will help teachers work in a time with fresh challenges, many of which have never been seen before. CRCST is seeking to become an organization that provides tools and opportunities for the science teacher in as convenient a way as possible. CRCST has served science teachers in the region throughout the last century and is working hard toward staying relevant throughout this century. Join us and be a part of an organization that makes a difference in our life's work... teaching the people that will ensure a spring that is full of sounds long into the future.

Sincerely,  
Manuel G. Mendoza  
CRCST President



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# Green Parking Lots

by Manuel G. Mendoza, CRCST President



At the Sustainable Cleveland Conference two years ago, my students and I learned about methods of creating a green parking lot, an idea that I was not familiar with. I knew that you could make anything more “green” but I had never thought much about parking lots. Lack of water infiltration leading to increased runoff, pollutants entering the waterways, opportunity costs from the space being used to park cars, and distributional issues are just a few of the negative way parking lots impact a community and the environment.

These negative impacts can be mitigated first in the planning stage. During this stage, reducing the minimum parking requirement, regulating parking maximums and creating more “compact car” spaces, so that the area being used by the parking lots is reduced, are important and relatively easy ways of conserving land and water. There are “in-lieu of” parking fees laws that allow developers to have access to a centralized parking space that allows for easy access. Some cities have applied this concept to the entire municipality. They then provide shuttle services or free bikes for visitors and customers to get to their destinations. Berkeley, California, Lake Forest, Illinois and Orlando, Florida have these “in-lieu of” parking fees.

Linking planning to smart growth is another way to reduce the impact of parking on a community and the environment. Planning for long-term living and sustainability, walkability, preserving open space are all part of planning your city’s growth rather than ending up with the cost associated with losing the opportunity to develop the land in a way that would be sustainable in the long run. This is then linked to developments like

on site shower areas. These areas are provided so people can bike to work, improving the health of the work force. Not taking advantage of these opportunities has a cost that an accountant can quantify.

The consequences of parking lot runoff are something that I am aware of. I grew up in Cleveland, a city with an aging infrastructure in a region with combined sewers. I have seen the result of increased runoff and backed up sewers. Increased storm runoff impacts erosion, as expected, minimized groundwater recharge, higher water temperatures, which lead to a negative impact on aquatic organisms and plants, and more frequent severe flooding.

I never thought that there was much of a solution to run off that did not include running sewer lines and expensive construction. It turns out the solution, or at least a mitigation strategy, is beautifully simple. Planning and design. Swales are open channels or depressions that are filled with dense moisture loving vegetation that are tolerant of urban pollutants. Vegetated filter strips/Riparian Buffers are shallow angled strips of land that slow the flow of water and help detoxify the runoff.

Bio-retention Areas involve buffer strips with shallow ponds, and dry retention areas that again reduce runoff and help detoxify the water.

Another great option is changing the pavement material. Porous pavement options such as pavers or gavel is an excellent alternative to asphalt or concrete. The EPA publication in the footnote reviews all of these points in detail and looks at some case studies that could easily be used in the classroom. I use case studies in the classroom and they are a great way to integrate writing across the curriculum. The kids love to work on them as well. I think it’s because they don’t have to listen to me, but still, they love them.

## REFERENCES:

- <sup>1</sup> EPA website publication concerning green parking lots, [click here](#)  
 “The pictures are copyright free from [pixabay](#)”



*The ‘in lieu of parking’ fees can be used to provide centralized public parking. In some cases, the community may wish to establish the fund in such a way that it can also be used for transit, bicycle, and pedestrian improvements that can reduce parking demand.*



# Cleveland Metroparks Zoo: Wildlife Conservation Efforts

by Kelly VanBooven, Education Specialist, Cleveland Metroparks Zoo

## GET INVOLVED AT THE ZOO...

We support, develop and implement unique and collaborative conservation projects that promote wildlife survival, benefit local people and directly address the most vital and emerging threats to wildlife today. And you and your classroom can be a part of it by participating in one of the many opportunities at the Zoo.

### Educator Open House

Join us for 2018's Educator Open House on April 21st-- a FREE event for area educators and their families at the Zoo (up to 3 guests per registered educator) where we share educational resources and ideas and say THANK YOU for all you do for our students and communities!

### Party for the Planet

The Zoo will also be hosting the annual Party for the Planet on April 21st. Guests attending Educator Open House can also enjoy the Party for the Planet festivities as a part of this day. Music, DJs, live demonstrations, hands-on activities and booths throughout the Zoo promote conservation and celebration.

### Make Your School Trip More Affordable...

With a group reservation, Cleveland Metroparks Zoo offers free admission to students within Cuyahoga County. To further help with costs, the Zoo offers travel vouchers up to \$250.00 regardless of school location if at least 30 percent of the student body participates in the federal free and reduced-lunch program.

#### FOR MORE INFORMATION

For more information and registration:

Call 216-635-3391

or visit

<https://www.clevelandmetroparks.com/zoo>

Cleveland Metroparks Zoo has been working to protect wildlife around the world for the past two decades and has dedicated more than 6 million dollars to wildlife conservation efforts around the world.

The Zoo began with a focus on conservation issues linked to human impacts on the planet - those involving wildlife, habitats, people, and the ecological and cultural activities that tie them together.

Today, that human-wildlife cornerstone remains. We continue to address human-wildlife conservation issues that threaten species survival in the wild - through programs that protect species today and benefit wildlife, local people, and habitats into the future.

Cleveland Metroparks Zoo is securing a future for wildlife around the world by tackling today's most complex and pressing human-wildlife conservation issues- habitat loss, illegal wildlife trade, human- carnivore conflict, and poaching.

We develop and implement unique and collaborative projects that directly address wildlife survival and benefit local people in some of the most critical ecosystems on the planet. Conservation issues are human issues, so we must look at our work holistically and find solutions that empower human communities while also protecting wildlife to make lasting progress.

The Zoo confronts wildlife conservation issues by addressing the complex issues that are keys to the long-term survival of wildlife and habitats.



*Click the photographs for more information on Zoo conservation for these animals.*





# The Greater Cleveland Aquarium Conservation in Action: Reintroducing the Spotted Turtle in to Ohio's Wetland

by Ray Patacca, Director of Education, The Greater Cleveland Aquarium



*Click to save the date to save a turtle!*

Living in the wetlands of Northeast Ohio are small turtles with yellow spots called, as you guessed, spotted turtles. They are native to eastern North America in small streams, marshes, bogs, and ponds. This six inch turtle is an omnivore and feeds on algae, insects, crustaceans and carrion. They can be seen basking on the edge of water. During the winter months and hot summer days they can become dormant.

Although spotted turtles produce eight to ten egg clutches, their population has become threatened in Northeastern Ohio. Their numbers have fallen victim to habitat destruction, pesticides, and pet trade. Predators of the spotted turtle and their eggs included raccoons, muskrats and humans.

"As a result, these animals are listed by The Ohio Division of Wildlife as an Ohio threatened species, which means that the survival of this species in Ohio is not in immediate jeopardy"<sup>1</sup>, but a threat does exist.<sup>1</sup> Studies show that if nothing is done to help this species, they may be extinct in 25 years.

To combat loss of the spotted turtle, in 2012 local institutions instituted the **Spotted Turtle (Clemmys guttata) Headstarting, Augmentation, and Repatriation Program for Northeast Ohio**. Partners include the Cleveland Museum of Natural History, the Greater Cleveland Aquarium and its Splash Fund, the Wild4Ever Foundation Cleveland Metroparks, Cleveland Metroparks Zoo, Cuyahoga Valley National Park, Geauga Park District, Lake Metroparks, Medina County Park District, Ohio Division of Natural Resources Division of State Parks, Summit Metro Parks, The Ohio State University, and the U.S. Department of Agriculture Animal and Plant Health Inspection Service.

The goal is to enhance and augment the turtle population by headstarting young turtles and returning them to their native habitat in Northern Ohio's wetlands. The role of the Greater Cleveland Aquarium is to head start the spotted turtle in preparation for release.

The project begins with collection of gravid females. The eggs are incubated and cared for by husbandry staff. The hatchlings are raised for approximately four years until they are ready for release! Aquarium guests can watch their progress on monitors in a gallery with an adult spotted turtle and other native Ohio turtle and fish species.

The juvenile turtles are returned to their original habitat. At the wetland site they are not immediately released. Instead they are placed in secure enclosures to acclimate and avoid predation. After four weeks with close monitoring in their enclosures these young turtles are finally released into the wild to forage on their own. In the summer of 2017, we released six young turtles which are fitted with tags and radio monitors for tracking with radio telemetry throughout the year.



## REFERENCES:

<sup>1</sup> Paul J. Pira, Geauga Park District & Gayle Albers, Cleveland Metroparks Zoo, Spotted Turtle (Clemmys guttata) Headstarting, Augmentation, and Repatriation Program for Northeast Ohio, 2012

[m.greaterclevelandaquarium.com](http://m.greaterclevelandaquarium.com)

The Maryland Zoo in Baltimore, Fact Sheet: Spotted Turtle (Clemmys guttata), 2015

# The 2018 NEOSEF Awards

by Susan Clay, CRCST Treasurer and NEOSEF Board Member



**Biology (Sandy Eisler):** Shereen Ahmad from Hathaway Brown "The Effect of Magnetic Field Exposure on the Regeneration of Plantaria"

**Chemistry (Irene Heller):** Katie Lavelle from St. Raphael Elem. "Bromelain Breaking it Down"

**Physics (Sam Brooks):** Jamie Park from Beachwood Middle "Mushrooms as Solar Steam Generators"

**Behavioral Health Science:** Eliana Wolf from Gross Schechter Day Elem. "Can a Growth Mindset Improve Your Memory"

**Earth/Space Science:** Kandance Kellon from Hathaway Brown "Sound Frequencies Effect on Solar Cell Efficiency"

**Engineering Science:** Shree Ghosh from Solon Middle "Which Components of A Steam Based Engine Results in the Greatest Velocity"

**Environmental Science:** Ryan Tyler from St. Paschal Baylon Elem. "The Power of Dirt"

**Health/Medicine Science:** Pedro Villa-Forte from St. Dominic Elem. "Children's Blood Pressure in Response to Exercise"

**Math/ Computer Science:** Kaz Kojima, Home Schooled "Pupillography Image Analysis for Measuring Pupillary Light Reflex"

***Kaz Kojima also was chosen as the 7th/8th Grade Grand Prize Winner in Physical Science.***



# Lesson Plan Central

## *Ecosystems in a Bottle*

by Cassidy Berkheimer, Washington Park School, Newburg Hts., Oh.

**Science: Biology, Grades 2, 4\*, 5, 7**

### **Materials:**

Paper towels, scissors, a sunny area, string, a hammer and nail (or another way to create holes in the caps of the bottles), spray bottles

### **For each group-**

Stage 1: 1 2 liter soda bottle, potting soil, aquarium gravel, quick germinating seeds (white radishes\*\*, marigolds, arugula, basil)

OPTIONAL: crickets or armadillidae (roly poly bugs, potato bugs)

Stage 2: 2 liter soda bottle, purified or dechlorinated water, 2 feeder guppies, 2 pond snails, 3 pieces of elodea (anacharis), pinch of lemniodeae (duckweed), small fish net

OPTIONAL: water conditioner, algae discs for pond snails.

### **Set-Up:**

#### **Stage 1: Terrarium\*\*\***

1. Cut the top of the bottle with about 4 or 5 inches to use for the terrarium.
2. Put holes in the caps of the bottles with strings hanging down through them.
3. Screw cap on and fill with about an inch of aquarium gravel or rocks.
4. Fill with potting soil, leaving about one to two inches at the top of the terrarium.
5. Place seeds in at desired depth and spacing according to the package.
6. Put inside the bottom of the bottle and allow to sit in a sunny area until sprouting. Spray twice a day with water.

#### **Stage 2: Aquarium\*\*\*\***

1. Cut the top of the bottle to about 3 inches. Use the remaining part of the bottle for the aquarium.
2. Fill with water and allow to sit for a minimum of 48 hours. (Water conditioner can be used to skip this step.)
3. Fill with about 1-2 inches of aquarium gravel or rocks.
4. Place three pieces of elodea inside the aquarium and add a small pinch of duckweed (it will multiply quickly!)
5. Using the small net place two feeder guppies and two pond snails inside the aquarium.  
OPTIONAL: Place one or two algae discs in the aquarium to give the pond snails something to eat while the ecosystem is up and running.
6. Place the terrarium on top of the aquarium so that the cap sits inside the water line. At this point the plants only need watered if it seems that they are getting dry.

### **Lesson objective(s): (4<sup>th</sup> grade)**

I can define biotic and abiotic factors.

I can identify that ecosystems are based on interrelationships among and between biotic and abiotic factors.

I can explain the connection between the cause of the environment changing and the effect of some plants and animals survive and reproduce and others die.

I can identify that an animal's patterns of behavior are related to the environment. This includes the kinds and numbers of other organisms present, the availability of food and resources, and the physical attributes of the environment.

**ENGAGEMENT**

- Allow students to research on the internet one of the biotic factors in the experiment (elodea, duckweed, guppies, pond snails, armadillidae, crickets, white radishes or other seeds being used)
- Throughout this process, encourage students to discuss how the animal interacts with the abiotic and biotic factors in its ecosystem.

**EXPLORATION**

- Students will observe the ecosystem created in their pop bottle ecosystem daily over a minimum of 2 weeks after aquatic ecosystem is established.
- Students will measure the plant growth over time and graph their results.
- Students will sketch their bottles over time.
- How do abiotic and biotic factors interact in an ecosystem? How do these factors affect an animal's behavior?

**EXPLANATION**

- What are the parts of our ecosystem?
- How can you tell if something is living or nonliving?
- How do the organisms in the ecosystem change one another?
- What might happen if no plant matter was introduced to the ecosystem? Why do you think so?

**ELABORATION**

- By observing and discussing how animals behave in an ecosystem, students will have adequate practice to discuss how adaptations may be helpful to organisms or why migration may occur. An animal's survival will be determined on the environment that is created and the organisms that are found in the ecosystem.
- Abiotic and Biotic factors should be explained and extended to other environments, such as woods, oceans, student's backyards, etc.

**EVALUATION**

- Students will sketch their established ecosystem and label the factors. These factors will then be labeled as either abiotic or biotic factors.
- Students will be able to discuss changes to the ecosystems in the classroom and predict the outcome of changes to water quality, increased population size, dying organisms, or other natural changes orally or in writing.
- Students will be able to explain orally or in writing how human changes could affect their ecosystem (knocking over a bottle, tap water used, etc.).
- They can explain how factors interacted with each other in the ecosystem.

**NOTES:**

\*This unit plan was designed for fourth grade students, but could be adapted to fit other grades with ecosystem standards.

\*\*White radishes grew the fastest in our classroom and would be the seeds I recommend.

\*\*\* I allowed students to complete steps 3-6 with their partner to complete the terrarium and prepared steps 1 and 2 before students assembled the terrarium.

\*\*\*\*I assembled the aquariums for students, but with access to a sink and extra adult help, students could easily complete steps 2-6.

Most pet stores carry anacharis and duckweed, although RMS Aquaculture had competitive pricing on both aquatic plants and live animals (6629 Engle Rd # 108, Cleveland, OH 44130)

William Tricker, Inc. also has a lot of plants that can help you with this project. (7125 Tanglewood Dr, Cleveland, OH 44131).



## RESOURCES:

## Elaborate

**Mrs. Six**, on Teachers Pay Teachers, has a great research organizer that was used during the engagement stage to organize information that students learned about their assigned organism. Find it here:

<https://www.teacherspayteachers.com/Product/Animal-and-Plant-Adaptations-Research-Graphic-Organiser-1261211!>

**Below:** Sample 4<sup>th</sup> grade student research paragraph about pond snails after using the research organizer by Mrs. Six on Teachers Pay Teachers.



## Pond Snail

A adult pond snail are 45-60 mm in height. The shell measures 20-30 in with. They have yellowish brown shells. Pond snails prefer to swim in slow moving waters such as rivers,pools,streams, and muddy sand. The snails usually are in waters that 75-80 fahrenheit. Pond snails usually feed off of small fish, sand and newts. There shell helps them burro into the ocean. Snails protect them self from predators by hiding under there shells.

Plant Observation Worksheet DAY 1

DATE:  HEIGHT OF PLANT

OBSERVATIONS (WHAT HAS CHANGED SINCE YOU LAST LOOKED AT YOUR PLANT?)

PREDICT (WHAT DO YOU PREDICT YOUR PLANT WILL LOOK LIKE TOMORROW?)

DRAW A PICTURE OF YOUR PLANT

## RESOURCES:

## Exploration

**Snapshots in Teaching** has this plant observation booklet on Teachers Pay Teachers. Download it here: <https://www.teacherspayteachers.com/Product/Plant-Lab-Worksheet-2411562!>



# Upcoming Events & Professional Development Opportunities



## BODY BASICS 101

Early Childhood Educators – Grades PreK-2 | [Register](#)

Wednesday, April 25, 2018: 4:30pm-7:30pm

\$5 ERC members and non-members

- Explore 2 newly developed early childhood health kits
- Rotate through thematic centers about the body's systems and healthy eating
- Participate in the Museum's "What's Inside Stuffee" early childhood program
- Participants receive a FREE 1-year ERC individual membership
- Step Up to Quality approved – 3 hours
- Dinner provided

Sponsored by



CITY NATURE CHALLENGE IS ORGANIZED BY



## CITY NATURE CHALLENGE:

Join the Museum on **April 27th-30th** for the [City Nature Challenge](#) - a global competition celebrating biodiversity. The entire Cleveland-Akron-Canton area is able to participate including the following counties: Cuyahoga, Lake, Geauga, Medina, Lorain, Portage, Summit, Stark, Carroll, Ashtabula, Tuscarawas, Erie and Huron.

To join in the fun:

1. Create a free [iNaturalist](#) account for your classroom to photograph and share your observations. For help using the app, check out iNaturalist's [Getting Started guide](#).
2. Join the [City Nature Challenge 2018: Cleveland Project](#) to stay up to date on our progress throughout the event. (Share this project page with your friends!)
3. Check out the **FREE educator resources** on the City Nature Challenge Website including excerpts from CMNH's Nature in the City (coming soon!).
4. Head outside in your schoolyard, neighborhood, or local parks to observe nature. Photograph what you find and identify it to the best of your ability.

Results will be announced on May 4th. Cities are competing on the number of total observations, number of species, and number of people who participated.



## Teacher Professional Development

Teachers are invited to experience the Holden Arboretum firsthand. If you have never visited and would like to see what an amazing educational facility we have to teach about plants and the natural environment, we invite you to be our guests. Contact [Sharon Graper](#) for a Member for a Day pass and come see what you have been missing!

## Forest Immersion XP - 2018

**Hosted by the Holden Arboretum and Red Oak Camp in Kirtland, Ohio.**

This fun overnight program allows high school students who love trees, forests and being physically active outdoors an opportunity to explore and learn more about careers in arboriculture, community forestry and natural resources.

## Haiku at Holden

In May 2018, the Haiku Society of America and Holden Forests & Gardens will be partnering to bring approximately 20 poems written by poets from around the world to the Holden Arboretum. The haiku will be placed along the Woodland Trail, giving visitors a new way to interact with the forest that surrounds them. Each poem will relate back to the mission and vision of the Holden Arboretum while reflecting an appreciation of nature.

## Lecture with Richard Louv

Richard Louv, bestselling author of *Last Child in the Woods: The Nature-Deficit Disorder* and *Vitamin N: A Practical Guide for Creating a Nature-Rich Life*, will be giving an insightful lecture about the importance of nature in the lives of young and old. A special pre-lecture VIP reception includes beer, wine, heavy hors d'oeuvres, and admission to the lecture.



Growing Students in Science was established in 2003 as a community partnership designed to build interest and ability in the sciences for local students and teachers. It is the only education program in the area that integrates multiple programs with teacher led classroom activities over multiple years, grades 2-5.

The primary goal is to provide programming in both the classroom and at the Holden Arboretum in an effort to impact student interest and proficiency with place based, hands on science concepts covered in the state science standards. It is STEM driven and supports many of the common core standards and concepts. In addition, the program is designed to improve teacher content knowledge, interest, and comfort level in teaching science through professional development opportunities.

Each year we add a select number of new districts. If you are interested in learning more about The Growing Students in Science program, including specific targeted indicators, visit <http://www.holdenarb.org/education/growing-students-science.asp>



GROWING STUDENTS IN  
**SCIENCE**  
HOLDEN FORESTS & GARDENS

# CRCST Quarterly Newsletter



## TEACHERS

Are you in search of information regarding the CRCST Spring Symposium? We are sorry to announce that no Spring Symposium will be held this year. Please save the date for our fall conference 2018!

### SAVE THE DATE!

CRCST Fall 2018 Conference  
Saturday NOVEMBER 3, 2018  
@ Cleveland Botanical Garden

More info coming soon!

## Letter from the Editor

by Hannah Morris, Academic Programs Coordinator, Cleveland Botanical Garden,  
CRCST Newsletter Editor

Greetings, everyone,

I am honored to be appointed as the editor of the CRCST newsletter. This is my first issue in the position. As a board, we decided to move the newsletter in a more concise direction by assigning a theme to each edition. This month's theme is Conservation in Cleveland. We hope to provide you with interesting, relevant, and useful information surrounding this theme via articles, upcoming event announcements, and even lesson plans that you can use in your classroom. That said, if you have ideas for next month's theme, a fabulous lesson that you'd like to share, or information on how this newsletter could better serve you, please do not hesitate to email me at [hmorrisCRCST@gmail.com](mailto:hmorrisCRCST@gmail.com).

I look forward to further developing the CRCST Quarterly Newsletter.

Sincerely,

Hannah Morris

CRCST Newsletter Editor