

LINKS

LESSONS, INNOVATION & NEW KNOWLEDGE IN SCIENCE



WINTER 2022




THE OFFICIAL MEMBER NEWSLETTER OF THE MICHIGAN SCIENCE TEACHERS ASSOCIATION



TABLE OF CONTENTS

Creativity Helps Zoo Project Survive COVID Restrictions	3
Incorporating Creativity into Math and Science	4
March Mammal Madness	6
MSTA Annual Conference Returns to Downtown Lansing	7
Old McDonald Has a 21st Century Farm	8
2021: What a Year for MAEOE! Michigan Alliance for Environmental and Outdoor Education Highlights	9
The K-5 Corner: Engineering Light in a Bottle in Elementary STEM	12





Creativity Helps Zoo Project Survive COVID Restrictions

Diana Matthews | Detroit Country Day School

Everything seems topsy turvy in our world today. Teaching in person... ZOOM... hybrid... pivot... words that we are all too familiar with. After a nine-week unit, our third graders had planned to go to the zoo and present their animal findings and research much like a zoo docent or guide. But alas, that experience was sidelined by the COVID-19 restrictions set in place. Disappointment abounded, but all was not lost.

Students completed a series of labs in our living things unit: they honed their skills as they discovered animal classification, vertebrates/invertebrates and animal kingdoms. They chose an animal to study and became a resident expert focusing on the animal's habitat, its traits and interesting facts.

The unit culminated with a 4-d experience in which we brought the animals to life in our science room. Giant sharks were swimming across the ceiling, tigers growled and licked their chops ready to pounce, and tiny penguins scampered across our desks. The children were delighted and eager to share these wonderful critters.

As a home assignment, students designed a shoebox diorama complete with areas for an animal to eat, drink and hide. Each animal's habitat was considered and incorporated in the project, as was scale and size. Great creativity was exhibited as some students added fairy lights, rocks, trees and even seashells. Students were so proud to share their work at our Virtual Zoo here at school. Children dropped augmented reality animals into their habitats and captured video of them in the new setting.

Google 3-D has a huge selection of animals,

planets, famous places and body systems that all come to life in your own space. However, iPad users are required to use the Google app. Our IT department felt this was not in the best interest of our elementary students as it has an NC-17 rating because of the full internet access required. The complete list is updated frequently and can be found here:

<https://9to5google.com/2021/12/24/google-3d-animals-list/>

It really is quite fascinating to see the progress that has been made in the AR world.

I digress, how did we make it work minus the Google app? Well, there is an Animal Safari app we found and it was quite remarkable. The app is free and has several animals to choose from that are also free. I purchased all the "locked" animals and let my students use my phone when recording animals in their habitats.

The students were thrilled to have ownership of the assignment and were so proud to see the completed project. We compiled each class's videos into a full movie (5 minutes in length) and shared it with the parents who were in disbelief, applauding the young zookeepers on their tremendous effort in producing such a quality product.

Truly, the AR animals gave meaning and purpose to what could have been yet another moment stolen by the pandemic.



Incorporating Creativity into Math and Science

Jamie MacPherson | Van Andel Institute for Education

When you think about math and science, what descriptors come to mind? Typically, we think about logic and reasoning, and it is rare for us to associate these subject areas with creativity. But, why not? Both math and science hold great potential for creative work. Why are these subjects portrayed as straightforward and analytical when they can provide so many creative opportunities?

One of the many reasons I went into teaching was to learn how to teach math and science differently. I wanted to get students to love science. I wanted them to engage with math in ways that extended beyond the worksheets and books. I wanted students to see the beauty and power in subjects that have a reputation for being stale. To hold an undeniable conviction they are necessary for our lives. Both math and science are relevant and meaningful – if you create the experiences to play out in this way.

Coloring Outside the Lines

Imagine if we taught art the way we teach math and science. We give our students a color-by-number. They don't get to choose their colors, they must stay within the lines, and they are very limited to how they can color the picture. In many ways, this is how a traditional math and science curriculum has been taught. We teach students how to figure out the equation or how to lead an investigation step-by-step, give them a bunch of practice problems on a worksheet, and check to see if they followed within the lines as instructed.

While we know it is important to give students time and practice through worksheets, we also recognize this shouldn't be the core of their learning. A key aspect of creativity is breaking free from routine patterns. Encouraging flexible thinking allows students to let go of their preconceptions and examine a problem from

different angles. This helps them to arrive at alternate, and often better, solutions. In today's ever-changing world, the job skills that our students will need have creativity at the core.

Fostering a Flexible Mindset

We can unleash student creativity in math and science in any number of ways, but here are four practical approaches for making this happen in your classroom:

- 1. Prioritize and Promote Play:** Whether its by creating room for unstructured play, or simply giving students the opportunity to mess about with new tools, teachers should make a habit of encouraging freedom within their lessons. By giving our students opportunities to grapple with the materials and/or the content before the intended learning happens, we provide opportunities to make connections before they learn the planned content.
- 2. Incorporate Opportunities for Creative Problem-Solving:** One of the best and easiest ways to get students to think differently and creatively is to pose a question that is open-ended. For example, in science, when students are following a step-by-step investigation, ask questions throughout the process which show students there is more than one way to solve any problem. (Ex. What patterns do you notice? How do you make sense of this?)
- 3. Cultivate Collaboration:** Not only is learning how to work together important, but it is also equally important to learn how to communicate ideas effectively. Not all students are gifted with the ability to regurgitate learned information in a way that makes sense. So, give students the opportunity to sketch their ideas out and use

this as a prompt when they are conveying their ideas to others.

4. Foster Weirdness: Students have a wonderful knack for taking what they hear us say and internalizing the meaning to construct their own ideas around a topic. While it's important for students to understand the correct definition of certain words, it also creates an opportunity. If we praise our students for their creativity, we show them that weird is, in fact, cool. We can get our students to take pride in thinking and being different. The message we send is being weird means being able to think differently, and this is exactly what our complex and ever-changing world needs.

It all comes down to this: if we want our students to develop a deep love of science and math, we must find ways to make their learning authentic, meaningful, and fun. While there is a place for

traditional lecture and rote practice, it's also important to seed opportunities for our students to express their thinking creatively and differently. This will open doors to engagement and wonder.

Jamie MacPherson is an Education Specialist for Van Andel Institute for Education. VAI is a Michigan-based education nonprofit which strives to empower teachers and build classrooms where curiosity, creativity, and critical thinking thrive. To learn more about Van Andel Institute for Education, visit vai.org.



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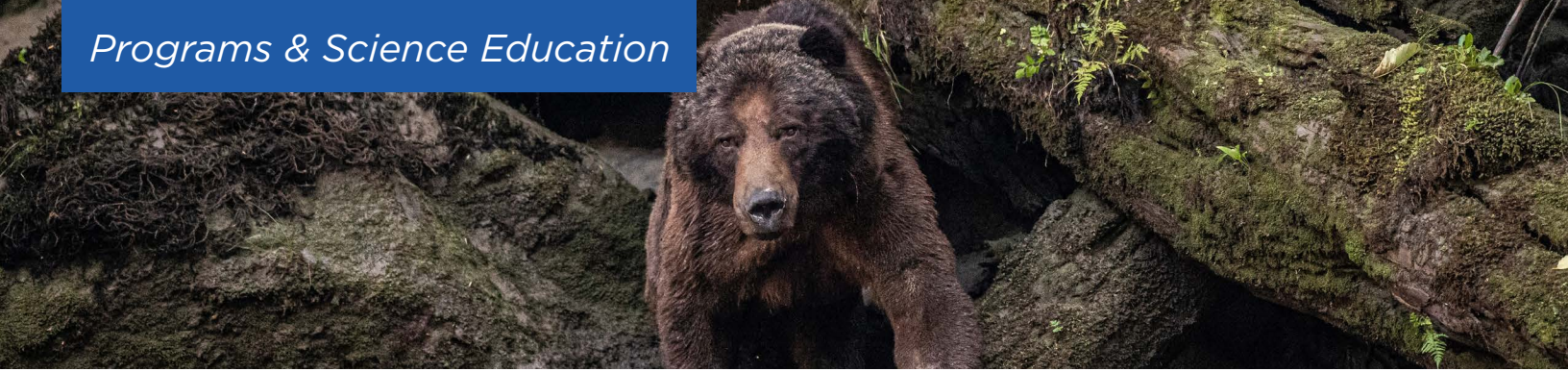
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March Mammal Madness

Diana Matthews | Detroit Country Day School

Let's Get Ready to Rumble!!!

March Mammal Madness is just around the corner!!! What is this mysterious contest you ask? Well, just like the collegiate basketball brackets, Dr. Katie Hinde and her crew of scientists place 64 animals into brackets to "battle it out" in this contest of wit, athleticism and wisdom. No animals are injured in this fictitious bout to see who really gets to be called the king or queen of the jungle.

There are 4 regions with 16 combatants in each division. Animals are ranked and pitted against each other in this playful competition. Twitter goes crazy as older students and professors talk it up to cheer their animal on to victory. Younger students adore the play by play given by the Rodent Roundtable commentary on YouTube.



The stories are written and read full of mystery and intrigue during the month of March. Animals advance to the next round and new contestants

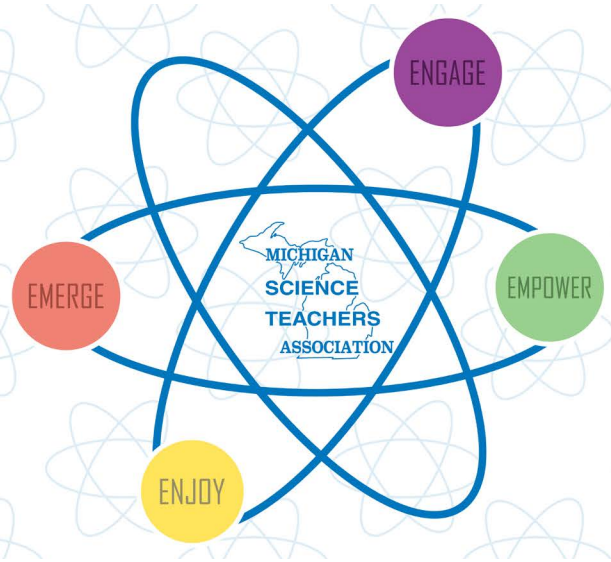
face off each week until there is one final animal who takes the crown. Are there upsets? You bet! Unbelievable, jaw dropping outcomes, of course! Animals can be moved to different habitats when facing a higher ranked opponent. Poison, size, talons and sheer ferociousness must all be considered when choosing who advances and who feels the agony of defeat.

We launched this at the elementary and middle school levels at our school. Die-hards researched and thought diligently about who would be the ultimate victor. While others played a game of chance and cast their votes to the wind for the "cute factor" hoping for an underdog win. Families rooted for their chosen animal. Other families were a house divided, but it certainly brought some light and levity to the month of March (and even a little heartache) but all in all, my students enjoyed the competition. They just asked this week if we were doing it again...and how did that Red Kangaroo really win last year?

Find out more about March Mammal Madness here:

<https://libguides.asu.edu/marchmammalmadness>

Get on board. Hope to hear you cheering on your favorite animal in March!



2022 MSTA Annual Conference

March 4-5, 2022

MSTA Annual Conference Returns to Downtown Lansing

Don't miss your opportunity to attend the 2022 MSTA Annual Conference to be held in-person March 4-5 at the Lansing Center and Radisson Hotel at the Capitol in Downtown Lansing!

The MSTA Conference Planning Committee understands the challenges and pressures currently placed on state educators. In that spirit, we have focused each day of the conference on different levels of action in science education. We pledge, while the conference is shorter, the quality educational content, networking and camaraderie you have come to expect will remain the same and will continue to thrive.

In addition to first-rate programming MSTA's top priority is the health and safety of our event participants. With the recent news about expanded and break through cases of COVID-19, we wanted to provide our attendees with an update about our current thinking related to the information we currently have.

While health and safety are always important, MSTA also recognizes the importance of meeting in-person, so we intend to go forward with the course as planned, while taking additional critical steps to protect your health and manage our potential exposure.

Here are some examples of the robust safety protocols we will put into place:

- **NEW** - Masks **MUST** be worn at all times, vaccinated or unvaccinated, unless you are actively eating or drinking.
- MSTA is partnering with the Radisson and Lansing Center who follow MDHHS and local health department protocols to provide a safe meeting environment.
- Meeting rooms will be set up to allow for social distancing.
- Social distance if standing in line.
- Food safety protocols will be in place.

Each participant must comply with all COVID-related procedures that may be implemented by MSTA. If you are ill the day of the event, please notify us but, stay home.

As we have more information, we will update our attendees accordingly. Thank you for your understanding as we navigate these challenging times.

Speaking of challenging times, finances for many school districts and educators are under duress. Do you know an education colleague that would benefit from attending the MSTA Annual Conference but lacks the funding? Tell them about the MSTA Annual Conference Scholarship! This scholarship is for teachers and pre-service teachers and can cover one or two days of conference registration, along with a one-year MSTA membership. The sponsorship comes from a generous donation made by various donors to help worthy science educators attend the MSTA Annual Conference.

Applications will be accepted until January 31, 2022. All scholarship winners will be notified by February 4, 2022. To apply for the scholarship visit www.msta-mich.org.



Old McDonald Has a 21st Century Farm

Amelia Miller | Michigan Agriculture in the Classroom

“Old McDonald had a Farm, ei, ei, oh and on his farm there was a computer, ei, ei, oh....”

With more than 59,000 annual job openings expected through 2050, the food, agriculture and natural resources sector of the U.S. has employment opportunities for our students (Fernandez, et. Al, 2020). Michigan agriculture offers crop and livestock diversity second only to California; meaning that everywhere we turn, there is fresh produce, grains, locally raised meat and dairy products as well as ornamental plants for every season. Agricultural connections can bring science to life for students in grades kindergarten through twelfth grade, while offering in-direct career exploration and community connections.

Ninety-six percent of Michigan farms are family owned and operated but these farms are not Old McDonald’s farm. Farmers today use computers to monitor weather, operate equipment, and track animal health. GPS is used to map farm fields or orchards, noting soil types, drainage, nutrients or



pests. Marketing managers run farmers markets, design advertising or write for trade magazines helping farmers learn new techniques. Help your

students see the modern-day Old McDonald through science connections.

Use Literature to Connect Science



Story books open your classroom doors taking students on imaginary or non-fiction trips in a matter of minutes. Books such as, *Full of Beans* connect history and science teaching how our very own Henry Ford experimented with soybeans as a plant-based alternative for car parts. Meet other inventors such as John Deere, Thomas Jefferson, and Temple Grandin through text. In *a Garden, First Peas to the Table, Honeybee, The Apple Orchard Riddle*, and more connect plant life cycles, photosynthesis and growing needs. Connect to animal habitats and food products through *Tales of the Dairy Godmother* or *Barn at Night*.

Incorporate Technology

Free-to-download lessons share ways modern farmers are using technology as a part of their jobs. Michigan Agriculture in the Classroom offers a nationwide online lesson database to providing free templated lessons for teachers. Drones in High-Tech Farming, available in a 3-5 or 6-8 version connects agriculture to engineering

design and problem-solving standards. Searchable by grade or standard, this database provides pre-k through twelfth grade lessons available at www.miagclassroom.org/matrix

Visit a Farm

There's no doubt field trips extend classroom learning by bringing textbook content to life. Farmers across the state have opened their barn doors to welcome school kids of all ages. Farm Bureau organizations exist in nearly every county across our state and bring local farmers together. These farmers enjoy engaging in their community through hosting field trips or bringing agricultural items as a guest speaker to your classroom. Find the organization in your county by visiting bit.ly/countyfarmbureaus

Connect with Us

Michigan Agriculture in the Classroom works to increase students' understanding and application of the ways agriculture connects to our daily

lives. Through farm field trips, free-to-download lessons, teacher workshops, lesson subscription boxes, and two mobile science labs, our programming helps help students apply science learning while connecting to your required educational standards. To learn more, visit our booth at the MSTA Conference and our breakout session on Saturday afternoon!

For more information visit www.miagclassroom.org or follow us on Facebook!



Programs & Science Education

2021: What a Year for MAEOE! Michigan Alliance for Environmental and Outdoor Education Highlights

Becky Durling | MAEOE Board of Directors, Williamston Community Schools

As 2021 came to a close, the Michigan Alliance for Environmental and Outdoor Education (MAEOE) looked back with pride. With the pandemic still at the forefront of our lives, MAEOE made the commitment to continue to provide programming, resources, networking opportunities, and a high-quality, in-person, conference. MAEOE's Board of Directors took the opportunity to think "outside the box" to continue to grow the organization and support its members.

Wildlife Weekend:

MAEOE, in partnership with the Michigan DNR, hosted a virtual Wildlife Weekend in February of 2021. Educators and environmental enthusiasts from around the state attended online sessions gathering resources and information from different wildlife and education experts.

MAEOE's 2022 Wildlife Weekend unfortunately has been canceled due to COVID-19.

Virtual Programming

MAEOE jumped into the virtual programming world with Tuesdays with MAEOE. This popular monthly Tuesday night programming featured educators from around the state presenting on a variety of topics including Sustainability at Interlochen, Michigan Wildlife, Early Childhood in Nature and more. Tuesdays with MAEOE kept our members connected to MAEOE and each other, keeping our mission in mind of getting everyone outside!

Partnership with Green Teacher

To continue to improve member value, MAEOE formed a special partnership with internationally acclaimed Green Teacher in 2021. Cindy Fitzwilliams-Heck, Michigan Green Teacher Regional Representative writes, "Green Teacher is dedicated to helping educators, both inside and outside of schools, enhance environmental literacy among young learners. Their quarterly Green Teacher magazine offers perspectives on the role of education in creating a sustainable future, practical articles and ready-to-use activities for various age levels, and reviews of dozens of new educational resources. The organization also publishes other resources, airs frequent inspiring podcast episodes and webinars, plus provides unique services for environmental and outdoor educators."

To learn more about MAEOE's Green Teacher partnership, visit maeoe.com.

MAEOE Meetups

MAEOE continued to host its popular Meetups during 2021. In February, nature enthusiasts gathered at Chippewa Nature Center in Midland for a snowshoeing adventure! Participants were able to explore



the grounds of the beautiful nature center, followed by a bonfire and networking!

Stay tuned for MAEOE's 2022 MAEOE Meetups!

Grants

MAEOE offers \$500 environmental and/or outdoor education grant opportunities twice a year to members. While COVID-19 delayed some of our grant recipients' projects, MAEOE was able to work with them to ensure their project and funding requirements could still be met!

If you are a MAEOE member and interested in applying for a MAEOE EE/OE grant, please visit maeoe.com for an application. The spring grant cycle runs from February 1-March 15, 2022. The fall grant cycle runs from September 1-October 15, 2022. Don't miss your chance to fund your project!

Spring 2021 Recipients

- Northville Community Foundation and Maybury Farm: Creating Pollinator Habitats
- Howell Nature Center: Outdoor Cooking Program
- Avril Weirs: Monarch Rearing Station

Fall 2021 Recipients

- Cass Arsenault: Our Changing Earth Program
- Dylan Kulik: The Plant Nutrient Experimentation Program
- Elizabeth Schultz: Bat Hike Program

Environmental Educator Certification (EEC) Program

MAEOE's EEC had a very productive year in 2021!

The EEC is now referred to as the EEC-Professional. *Earning the EEC-P demonstrates that you are a highly competent environmental educator who has the capacity for creating, implementing, and evaluating EE initiatives to evoke positive social-ecological*

change. The EEC-P is recognized by North American Association for Environmental Education (NAAEE) and the only certification in the state eligible for their accreditation.

In addition, a new certification was developed as the EEC-Associate. *Earning the EEC-A demonstrates an understanding of EE and a commitment toward restoring and protecting your local environment. This program option is for those people who are passionate and knowledgeable about EE but have not completed or pursued the EEC-Professional program.*

At MAEOE's annual conference six educators earned their EEC-P (professional) certification, and one educator earned the very first EEC-A (associate) certification!

Finally, a new online option for Strand 1 of the EEC program was developed and implemented. If you are interested in learning more about the EEC program, check out maeoe.com/get-certified.

In-Person Conference at Eastern Michigan University

Educators were excited to be able to gather, safely with COVID precautions in place, the first weekend in October at EMU for MAEOE's annual conference. One hundred seven attendees, about 80% of typical attendance, were treated to exceptional and well received sessions and field trips. Many sessions focused on Justice, Equity, Diversity and Inclusion in environmental and outdoor education. Field trips took advantage of the diverse Ypsilanti and Ann Arbor areas by visiting Waterloo Recreation Area, University of Michigan's Natural History Museum, and more!

In addition, MAEOE recognized exceptional educators in EE/OE at the annual awards dinner. New awards this year included a Rising Star award given to an EE/OE educator new to the field, Impact Award given to organizations in Michigan that support EE/

OE, and the Justice, Equity, Diversity and Inclusion Award.

MAEOE's 2022 conference is heading to Beaver Island (September 30-October 3). This conference will be one to remember as we explore all that Beaver Island has to offer. Our host is the CMU Biological Station. Look for more details coming soon!

MAEOE is looking forward to an exciting 2022, reconnecting with our members, promoting environmental stewardship throughout the state, and continuing to support and inspire a diverse network of individuals who have a passion for environmental and outdoor learning! If you would like to learn more about becoming a MAEOE member or the benefits of membership be sure to visit maeoe.com.



The K-5 Corner: Engineering Light in a Bottle in Elementary STEM

Crystal Brown | Elementary STEM Teacher, Gibraltar School District & MST A Regional Director

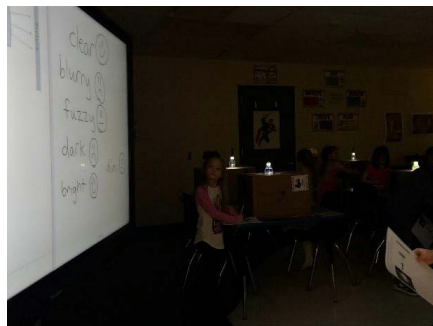
Teaching elementary science and STEM can be challenging in today's educational culture... check out the elementary corner for helpful tips and inspiring stories.

As an elementary STEM teacher, my job is to inspire curiosity in the extraordinary and the ordinary alike. My first graders had been studying light in their homeroom classrooms, but I wanted to give them the opportunity to create and problem solve with their newfound understanding.

I stumbled across an incredible free educator's guide and resource inspired by the stories presented in the DreamBig video. The activity is called [A Liter of Light](#). The movie shows how water bottles become light bulbs and how they eventually begin to use these recycled materials to create safe lighting in underprivileged countries. This was the perfect opportunity for my students to harness their understanding of light and use it to improve technology.

We started by watching portions of the DreamBig engineering movie, and then this short clip focusing on the Liter of Light project... https://youtu.be/o-Fpsw_yYPgm My first graders were amazed! I had my own bottle of light (a very small water bottle) in the classroom and used a small light to illuminate the bottle of water so students could see first-hand.

After observing the bottle and asking questions about what we could see, I asked students to model and draw



what they saw happening. We worked together with white boards to show the light entering the bottle and bouncing off the water molecules in the bottle before exiting the clear bottle.

Students were eager to ask questions about how the bottle works and asked, 'What if...' type questions. The next session, we experimented with these questions. I created different light boxes with different types of water bottles, different shades of plastic, and water with oil and another with food coloring. Students were asked to observe the difference in how well they could see a simple black and white picture, using words like 'fuzzy' and 'clear' and 'blurry.'

After 'researching' the effects of different types of plastic and water, students designed their own version of a light bottle to test. They created their bottle of light, and we had another class-wide test to compare the new designs to the old ones.



Overall, students were intrigued by the power of sunlight! They were also very curious about the power of water and how the molecules seemed to act like a 'magnifying glass' for light! I love how this project sparked so much curiosity but was also eye opening for students. They were able to see and ask questions about a place in the world where electricity is not readily available, and they felt powerful to be part of a project that is working to solve these problems.



www.msta-mich.org