

LINKS

LESSONS, INNOVATION & NEW KNOWLEDGE IN SCIENCE



FALL 2023



THE OFFICIAL MEMBER NEWSLETTER OF MICHIGAN SCIENCE TEACHERS ASSOCIATION



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Getting Students Excited About Science and Careers in Science at Lansing Community College = SteamFest!

Lu Anne Cuthbert | Lansing Community College

Lansing Community College has been hosting a Regional Science Olympiad Tournament for a few years already. In an effort to get more students excited about participating at a younger age, we started an event for elementary students. We looked at the national model and used a few ideas, but we wanted our event to be fun and non-competitive. So, it is more like a science carnival. All of that started over 30 years ago and except for a COVID hiatus has been going on ever since. We started out hosting it in spring but discovered it competed with soccer, field trips, etc. So, a few years after starting it, we switched to a fall event after most soccer and outdoor sports events had finished for that age group. Over time, the event went through several name changes, but it is now called the “SteamFest.” So now SteamFest is an outreach event for kids in K-6th grades. We take over the A&S building and fill as many rooms as possible with STEAM (Science, Technology, Engineering, and Art) related activities. The kids attend with an adult and can explore at their own pace. Earlier we had tried to run it with schools coming as a



group and paying a nominal fee but now it is free, and anyone can come.

So, what kinds of things do the visitors get to do? Besides seeing our relatively newly renovated building they get to touch, make, explore, test themselves, and see all the variety science and math has to offer. As the name implies, we incorporate engineering, technology, and art as well. I’ve done a variety of activities but the latest was an idea of my own, “Fun on the Farm.” I brought in products made from crops for students to see if they could figure out what they are made from, some easy like Corn Flakes, and some more difficult. I also brought in live animals such as a rabbit, and chickens and last time we had two pygmy goats which were a big hit. Nothing brings a group of kids in quicker than a crowing rooster!! I also had an assortment of farm toys, especially plastic animals which kept the kids busy. Occasionally a parent would be coaxing their children to leave for other events. That and the fact we always hear students at the closing whining “But I have so much more I want to do” makes the whole event worthwhile. Hopefully, some of them are interested in a science career or attending LCC in the future. At least we can help them see that science, math, art, etc. are fun and worthwhile and not just another thing they have to endure in school.

Here is a list of activities/rooms we've done in the past and hope to have a lot of them this year:

A is for Anatomy/No Bones About It, Beginning Botany, Beginning Chemistry, Chemistry Demos, Chill, Color Wheel, Create A Comet, Dental Hygiene, Elemental Extravaganza, Exercise and the Brain, Fantastic Frogs, Fun on the Farm, Gases, Solids, and Liquids, Geology, Have your DNA and Eat it Too, Heat and Temperature, Incredible Eyes, M&M Stats, Maps and More, Mystery Bags of Science, Owl Pellets, Pond Study, Plants, Planetarium Shows, What is a Robot?, Programming with Alice in Wonderland, Steam Distillation, Slime, Tangrams and Area Explorations, Weather or Not, Cardboard Construction, DNA Extraction, Estimania, Magnets, Tower Building, Sink or Float, Photography, Stage Combat, Theatre Games, Build And Test A Speaker, Make a Monster and a Science Escape Room.

Here is the information for this year's event.

Saturday, November 11th

9:30AM - 12:30PM

**A&S Building on LCC's Main Campus
Lansing, Michigan**

We are always looking for more visitors and of course, more ideas and volunteers.

If you are interested in helping out, attending, or hosting your own event, we'd be glad to talk to you or answer questions. The department contact is ASD-SAM-Info@lcc.edu or 517-483-1092

SAVE THE DATE!



2024 MSTA ANNUAL CONFERENCE

HOMEGROWN
SCIENCE

2.29.24 - 3.02.24 | LANSING, MICHIGAN



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From Teacher to Teacher Leader

Jackie Huntoon¹, Stephannie Tubman, and Marianne Semones | Michigan Technological University

Many classroom teachers don't see themselves as "leaders." Instead, they think of leaders as people with positional authority—such as principals and curriculum specialists. Nevertheless, the academic literature on leadership makes it clear that being in a position of authority doesn't necessarily make a person a leader. And, in contrast, there are many examples of people functioning as leaders, even when they lack positional authority.

So, what makes a teacher a teacher leader? Michigan's Teacher Leader Preparation Standards² provide guidance. There are seven standards (Table 1) and each standard is broken down into a series of elements that provide concrete examples of the types of actions that are taken by teacher leaders.

Table 1: Michigan Teacher Leader Preparation Standards.

Standard 1	Promoting a Shared School Vision, Mission, and Goals of Learning
Standard 2	Fostering a Collaborative Culture to Support Educator Development and Student Learning
Standard 3	Accessing and Using Research to Improve Practice, Student Learning, and Using Authentic Assessments
Standard 4	Promoting Professional Learning for Continuous Improvement
Standard 5	Facilitating Improvements in Instruction and Student Learning
Standard 6	Improving Outreach and Collaboration with Families and Community
Standard 7	Advocating for Student Learning and the Profession

Clearly, teachers who possess the skills and abilities necessary to satisfy all the standards

are extremely valuable to their schools and communities. These teachers can effectively advocate for their schools; promote and contribute to continual improvement efforts; mentor and coach colleagues; facilitate group interactions with colleagues and students; bridge cultural, ethnic, and linguistic divides; use data and research methods to inform decisions; and make appropriate use of new and emerging technologies that support teaching and learning.

Despite all the benefits that teacher leaders can provide, many teachers have few—if any—opportunities to build their leadership skills. And the question of how to go about building teachers' leadership skills is one that academics wrestle with on an ongoing basis.

University faculty and staff at Michigan Tech and affiliated with Mi-STAR³ have been grappling with issues related to building Michigan's capacity to develop teacher leaders for several years. From its inception, the Mi-STAR team included classroom teachers as leaders. Classroom teachers participated in the development of every unit in the Mi-STAR curriculum. In many districts, they also served as professional learning facilitators who supported their colleagues' efforts to implement instructional practices aligned with the Next

Generation Science Standards. It was clear from the outset of Mi-STAR that teachers know what actually works in classrooms, no matter what the academic research literature has to say. Teachers' practical experiences are too often undervalued and their voices are not heard when they are most needed.

To help build teachers' leadership skills, the Michigan Tech Mi-STAR team received funding from the National Science Foundation in 2018 for its project Michigan Middle School Master Teachers Fellowship Program (MTP; NSF Award #1758392). This project is nearing completion and the members of the first of three cohorts of Fellows "graduated" from the program in August, 2023. Members of the remaining cohorts will complete the program in the coming years.

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This project tested several strategies designed to build teacher leadership skills. The project included multiple opportunities for participants to grow as teacher leaders, including the following

- Participants who began the project without a master's degree earned a master's through the program.
- Every participant received formal training in teacher leadership based on Michigan's Teacher Leader Preparation Standards.
- All participated in a series of professional learning communities (PLCs); some led PLCs for other teachers in the project or for other teachers in their home district.
- All learned to use the Lesson Study process to collect evidence to enhance students' learning.

- Everyone was part of at least one book-study group that analyzed a text containing supports and strategies to overcome a common classroom challenge.
- Everyone learned how to design and conduct a research project to test a strategy developed to improve learning in their classroom or school.
- Many mentored new or out-of-field teachers in their home school districts.
- Many offered professional learning opportunities for other teachers in their home school districts or statewide.
- Several helped develop or test lessons, learning supports, professional learning opportunities, and/or assessments associated with the Mi-STAR curriculum.
- Almost everyone conducted outreach to peers by writing an article, by leading a workshop, or by making an oral or poster presentation at a professional meeting.
- Some wrote successful proposals to obtain grant funding for their classroom or school.
- While the leadership-development program was designed by project leadership during the early years, by the end of the program (years 4-5) participants were developing their own annual leadership development plan.

We are writing this article because all of the activities described above could potentially be undertaken by an individual district or by a group of districts if they have access to the resources necessary. One thing that cannot be overemphasized is that leadership development programs need to provide participants with numerous opportunities to be challenged to grow. Some failures are inevitable, and participants need to know that they will not be judged by their failures, but instead will be rewarded for their growth. The program needs to be a "safe space" for everyone involved. Therefore, it is best if no one in a supervisory position be involved in a leadership development program. This

means that the resources required for leadership development programs must necessarily include non-supervisory staff members who possess the skills needed to provide meaningful and ongoing leadership development, including coaching and mentoring, to teachers. Financial support is also needed to compensate everyone involved, including the teachers, for their time and effort. It is an unfortunate reality that few, if any, districts have both the people and funding necessary to offer teachers a true leadership development program. This is regrettable, because an investment in a teacher's leadership development has the potential to provide immeasurable benefits to students, schools, and communities.

For those who might wish to implement a leadership development program, some of the lessons learned from MTP include:

- *Recognize that leadership isn't for everyone.* Not everyone needs or wants to be a leader.
- *Building leadership skills takes commitment.* Teachers who want to take on leadership roles will need to challenge themselves to grow over time. This requires ongoing self-assessment and willingness to give credence to both positive and negative feedback provided by supervisors, peers, and others. Challenges also provide the opportunity for failure. Being comfortable with failure and extracting the lessons that failures can teach is important for growth.
- *People with positional authority who are developing future leaders (e.g., project leaders, school leaders) need to treat prospective teacher leaders as professionals and as peers.* If the goal is to create future leaders, one of the first things that current leaders can do is treat emerging leaders as equals.
- *Leadership development takes time.* Leadership is a skill that can be learned. Like any skill, performance generally improves with practice, and practice takes time.
- *Teacher leaders must be viewed by their peers as knowledgeable, effective in the classroom, and trustworthy.* People are only likely to

follow those they respect.

- *Teacher leaders need to know how to access published research results and conduct their own studies.* There is a lot of information available about what works in education, and it is important to be familiar with established best practices. Nevertheless, new knowledge is developed through research and teacher leaders must be prepared to ask questions and design plans to test out strategies that have the potential to improve students' learning.

¹Currently on assignment to the National Science Foundation through an Intergovernmental Personnel Act agreement with Michigan Tech.

²https://www.michigan.gov/-/media/Project/Websites/mde/educator_services/prep/standards/teacher_leader_preparation_standards.pdf?rev=b8efaecf6e8f4735971ac67ad50bfb17

³<https://mi-star.mtu.edu/>



Apply Now for NASA's Michigan Space Grant Consortium 2024 Awards!

Katie Klink | Michigan Space Grant Consortium

NASA's [Michigan Space Grant Consortium](#) (MSGC) is now accepting applications for our 2023-2024 awards until November 15, 2023. Featured below are a couple of our awards geared towards K-12 Teachers, specifically the [Educational Programs](#) and [K12 Teacher Incentive Awards](#).

EDUCATIONAL PROGRAMS:

Designed to lay the seeds of STEM workforce development by focusing on our youngest students, as well as their parents, guardians, and mentors. **Award Amount: Up to \$5,000 each, requires 1:1 Match**

Pre-College Education -

Programs aimed at the pre-college level and in-service teacher professional development for individuals. Activities may include both in-classroom work as well as informal programs of long and short duration occurring outside the classroom.

Informal Education/Public Outreach -

Education in informal settings designed to increase learning and educate students, educators, and the broader public on STEAM content areas in order to expand the nation's future STEAM workforce.

Teacher Training -

Promotes innovative higher education of pre-service (college level) and in-service teacher training. Eligible activities include the development of courses and supplementary materials, entry-level gateway courses,

conferences, and workshops for in-service and pre-service teacher education.

Augmentation Support - NO Match Required

Available to supplement funding for programs that target women, underrepresented minorities, rural, low-income and people with disabilities.

K12 TEACHER INCENTIVE:

The MSGC K-12 Educator Incentive Program is designed to encourage teachers to engage in STEAM educational enhancement activities, such as conferences and workshops as well as purchase materials and supplies for innovative instructional initiatives. Available throughout the year. **Award Amount: Up to \$400 for Conferences and up to \$200 for materials & supplies.**

Let the MSGC Team know if you have any questions at mispacegrant@umich.edu.

Environmental Educator Certification



MAEOE

MAEOE Presents 2023 Awards and Environmental Education Certification (EEC) Graduates

Becky Durling | MAEOE

Awards

The Michigan Alliance for Environmental and Outdoor Education (MAEOE) is honored to present our annual 2023 environmental and outdoor education award recipients. Each year MAEOE recognizes formal and non-formal educators and organizations from around the state, in seven different award categories. The awards are presented during MAEOE's annual fall conference.

Julian Smith Outdoor Education Award: *This award is given to up to one nominee and is named for the nationally recognized Director of Michigan State's Outdoor Education Project and is MAEOE's highest honor in the field of Outdoor Education. The Smith Award is most appropriate for those with a long career implementing and conducting courses for students with an outdoor education emphasis including hunting, fishing, camping, archery, forestry and nature study and others. The recipient must have demonstrated a lifetime of devoted service and have spent at least ten years working in Michigan.*



Jon Spieles, Michigan DNR

Jon began his career with the Michigan DNR in 1989. During his time with the DNR he has been a park ranger, lead interpreter and Field Manager for Statewide Interpretation. Jon is currently leading the Marketing and Outreach Division.

William Stapp Environmental Education Award:

This award is given to up to 1 nominee and is named for the University of Michigan's Dr. Bill Stapp and is MAEOE's highest honor in the field of Environmental Education. The Stapp Award is most appropriate for those with a long career conducting formal or non-formal programs that may focus on, but not be limited to, community awareness and stewardship of land, water, and/or air quality, solid and hazardous waste education, energy conservation and others. The recipient must have demonstrated a lifetime of devoted service and have spent at least ten years working in Michigan.

Dr. Cindy Fitzwilliams-Heck, Ferris State University

Cindy is a faculty member at Ferris State University, former president and board member of MAEOE, and is currently the state coordinator for MAEOE's Environmental Education Certification (EEC) program.



Rising Star Award: *This award is given annually to up to 2 nominees, to recognize an early career professional who is new to the fields of environmental and outdoor education.*

The nominee has demonstrated leadership, innovation, as well as exhibited best practices in environmental and/or outdoor education. Eligible nominees must have been in the field

less than 5 years.



Aja Edwards, Detroit Zoo
Aja is an Education Coordinator at the Detroit Zoo, who began her career as an intern with Potter Park Zoo and the Michigan DNR.

Drew Heckman, Lake Superior State University

Drew is a research technician at Lake Superior State University for the Center for Freshwater Research and Education. Drew received his degree from LSSU in Fisheries and Wildlife Management.



Recognition Award: This award is given annually to up to 2 nominees making significant contributions to the fields of environmental and/or outdoor education, in a specialized area such as journalism, photography, curriculum development, interpretation and/or an individual making significant contributions towards creating, delivering, managing, or sustaining environmental and/or outdoor programs.

Meaghan Gass, Michigan Sea Grant



Meaghan is an extension educator with Michigan Sea Grant who works with coastal communities in the Saginaw Bay region.

Christina Funk, Stage Nature Center

Christina is a naturalist at the Stage Nature Center in Troy, Michigan. Christina hosts many field trips and bird encounters for all ages.



Impact Award: This award is given annually to up to 2 organizations to recognize relevant programs and/or campaigns that enhance the quality and availability of environmental and/or outdoor education (e.g. newsletters, professional development, events, series, and/or new initiatives).



Lake Superior State University Center for Freshwater Research and Education

The Center for Freshwater Research and Education is working to sustain the Great Lakes resources through education, research, and community engagement.

Justice, Equity, Diversity, and Inclusion Award: This award is given annually to up to 2 nominees and is most appropriate for an individual who has made outstanding contributions to connecting diverse audiences to environmental and/or outdoor education in Michigan. The recipient's contributions should exemplify community engagement, research, teaching or other positive impacts furthering justice, equity, diversity, and inclusion in the fields of environmental and outdoor education.

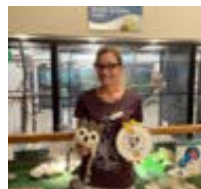
Taylor Mock, Belle Isle Aquarium

Taylor is the Education and Visitor Engagement Manager at Detroit's historic Belle Isle aquarium in which her roles include collaborating with Detroit University Prep High, leading field trips for Detroit Public Schools and more.



Volunteer Award: This award is given annually to up to 3 individuals who volunteer their time and skills for more than 1 year to a school, college, camp, outdoor center, zoo, nature center, a MAEOE committee, or other venue that promotes environmental and/or outdoor education.

Lila Link, Blandford Nature Center



Lila is a volunteer at Blandford Nature Center in Grand Rapids. Lila volunteers during the week and helps out with special events and community programs.

Environmental Education Certification (EEC)

MAEOE is proud to present our 2023 Environmental Education Certification graduates! After completing requirements of the EEC, graduates are presented with their certificates of completion during MAEOE's annual fall conference. For more information about MAEOE's EEC program visit maeoe.com

"The Environmental Educator Certification (EEC) program allows new educators and career professionals the opportunity to invigorate and align their program objectives and set personal and professional goals to improve Michigan's environmental education. The EEC is internationally recognized by and aligns with the requirements of the North American Association of Environmental Education (NAAEE)."

EEC-Associate Graduates

Jennifer DuBey
Mear Dunstone
Aja Edwards
Paige MacKinnon
Alisa Mellon
Trisha Smrecak
Tara Ward

EEC-Professional Graduates

Claudia Foerg
Bonnie Hollander
Erin Pavolski
Amy Sayers
Emily Schaller
Andrea Stay



Follow MSTA on Social Media





Spot It!

Katie Stevenson, Elementary Instructional Coach | South Redford School District & MSTA Elementary Director

Now that students are settling into routines, are you looking for more ways to build your classroom community - while trying to tackle curriculum? You need an activity that can get students excited, moving, and learning. Try a scavenger hunt outdoors to soak up a few more days of warmer temperatures, or indoors to pass a rainy day!

These are great for all ages and content and students love to play games. Knowing how important your instructional time is, try to think about using a scavenger hunt as a way to engage students in a new unit or apply what they have learned in a fun way. The best part about these activities? They can fit any topic you are teaching, and can be done with very little materials. Here are a few ways that I have had students searching and using their science knowledge!

Indoor Ideas:

- *Structural Engineers!* Give students 15 minutes to gather materials around the classroom that could be used to build the tallest building. You could also step up the challenge by adding weight, wind, or even an earthquake! This could be done when learning about physical properties of materials, force and motion, weathering and erosion, and weather. Add in time to draw a model and share in a gallery walk!

- *Energy Detectives!* Take a walk around the school having students looking for types of energy and energy transfers. You could have them categorize what they find into renewable and nonrenewable energy, seen and unseen, indoors and outdoors, or just the various types.

Outdoor Ideas:

- *Nature Walks!* Earth Day is right around the corner and we will start to see and hear the sounds of Spring. Take students outside to collect data or design a solution for any topic you might be covering in life science. For the youngest learners, they could find living vs. nonliving things. Lower elementary students could find types of plants, animal houses, or find the best place to start a garden. Upper elementary students could find examples of external structures or adaptations, find evidence of erosion, or design an outdoor learning space or community garden.

Students can even create their own scavenger hunt! Have them develop clues and items to look for while practicing communication and teamwork skills. This activity is really something ALL students can do, and could be sent home as a way for families to connect as well. Start small by thinking of ways you can take what you are already doing and bring in some fun to keep students engaged and moving!



Photo by Edwin Andrade on Unsplash

Driving Change in Science Education: Empowering Educators Detroit 2023

Sandra Yarema | MSTA & Wayne State University

Driving Change in Science Education: Empowering Educators was a two-day convening, co-sponsored by the National Science Teaching Association (NSTA) and the Council of State Science Supervisors (CSSS), which was designed to bring teams of science educators and state-based advocacy groups together to collaboratively advance strong policy and practices in K-12 science education. This invite-only meeting was hosted in Detroit, Michigan on Thursday, July 20 – Friday, July 21, 2023, at the Huntington Place Convention Center in Detroit, MI.

The Michigan team included Megan Schrauben (CSSS, MiSTEM, MDE), Leanne Weber (MDE), Rich Bacolor (MSTA President, Wayne RESA), Melissa Foster (MSTA, Upton MS in St. Joseph), Betsy Davis (University of Michigan), John Kraus (Northview Schools, MAVIN Project), and Sandra Yarema (MSTA Secretary, Wayne State University).

Multiple sessions were held each day, to explore ways to promote policy and practices in support of K-12 science education.

Thursday's events began with an opening presentation to welcome the participants and provide a frame for the events. Tiffany Neill, research scientist at the University of Washington's Institute for Science and Math

Education delivered the address, "What's at stake for science education? Centering Call to Action in Science Education and Recommendations/Challenges from the *Horizon Landscape/Carnegie Report*".

A discussion and Panel session to spotlight the power of advocacy was next on the agenda. The panel included the moderator: Jim Cowen, Executive Director, Collaborative for Student Success, Autumn Rivera, 2022 Colorado Teacher of the Year, Amanda Aragon, Executive Director, NMKidsCAN, and Tafshier Cosby, Senior Director for Organizing and Partnerships, National Parent Union. The panel expressed the purpose of gathering together to discuss the need, importance and potential of strong advocacy around science education, and responded to questions to guide further discussion.

Navigating Curriculum Adoption & Implementation: Local & State Policy Levers was the title of the next session, presented by Jocelyn Pickford and Kate Poteet, (HCM Strategists). The presentation explored the processes, policies, and variation surrounding state and local curriculum adoption and implementation efforts. The session described key characteristics of the high-quality instructional materials policy landscape, and invited participants to identify potential areas for action to expand access to quality materials,

elevate curriculum-based professional learning, and consider strong implementation data practices.

The final morning session, presented by Patrick Dillon, (Partner, Hilltop Public Solutions), was *Policymaker Engagement, Political Structures and Environment*. Education policy is increasingly a flashpoint in state legislatures, and multiple actors and interests from across the spectrum are engaging ever more aggressively and loudly. It is more important than ever that reasonable, fact-based voices on the front lines of implementation are equipped to constructively engage in the policymaking process - and, crucially, the political environment in which it happens. Effective advocacy is critical to making sure those voices are not just heard, but ultimately influence outcomes. The session introduced participants to an overview of the policymaking and political landscape, providing a greater understanding of how it works in reality vs. on paper, and the key components of building an effective advocacy plan.

The afternoon sessions were practical advocacy workshops. The first, *How To Write Persuasive Commentaries For News Media: An approach for educators and advocates*, informed attendees of the key tenets of successful opinion-writing for an advocacy campaign, including: the “how to’s” of effective persuasive writing for mass media; how to think like a reporter or editor to improve the writing; and, how to make newsworthy commentaries, thereby improving the probability of being published. Participants had the chance to outline and explore an ideas for their own OpEd.

The second workshop of the afternoon was *Mastering Digital Media: Social Media, Email Campaigns, and other Advocacy Tools*. The presentation highlighted understanding the target audiences (state legislators, district leaders) and the digital advocacy landscape, provided a grounding in the best pathways of key digital channels to reach the target audiences, i.e. Twitter, LinkedIn, Facebook, Instagram and Email,

and shared a brief background on native digital platform tools, content strategy and ways to review and optimize performance.

The first day closed with a brief reflection on the day, state teams were prompted to discuss takeaways amongst themselves.

Friday’s sessions began with a presentation, *Making the Case for Science Education*, and a panel discussing how increased investment in science education actually helps math and English language arts performance and test results. The panel was comprised of the moderator: Erica Shugart, (President, NSTA), Stephen Pruitt, (President, Southern Regional Education Board), and the respondent: Tiffany Neill, (Research Scientist, University of Washington, Institute for Science and Math Education).

The next two sessions were group conversations among the state delegates. The first discussion centered on *The State of Curriculum Implementation*. Attendees were prompted to consider how states are moving from adoption of high-quality instructional materials which lays the foundation toward implementation through curriculum-based professional learning, and to compare where different states (or districts) are in the process of implementation - early use, ongoing implementation, and sustainability. State groups were encouraged to explore how they could use lessons learned from different states to support implementation in their own state.

The second discussion session focused on *The State of Assessment*. The National Academy of Sciences’ Call to Action for Science Education recommended that “State Departments of Education should act now to include science in their accountability systems for K-12 education.” Attendees were asked to consider which key components a state-level assessment system should include, and then to discuss strategies to ensure that these assessments drive positive change, like the adoption of high-quality

curricular materials and access to resources in all classrooms. Groups from different states were encouraged to share their experiences to help each other avoid pitfalls and build successful accountability systems.

The next session was a State Team workshop. State teams had time to reflect on the sessions from both days, engaged in guided discussions around their own state contexts and priorities, developed a draft team agenda and aligned next steps for science leaders to act on within their state.

The convening closed with a plenary session presented by the NASEM Action Collaborative & State Team Learning Network Group: Heidi Schweingruber (Director, Board on Science Education), The National Academies of Sciences, Engineering and Medicine, and Jim Cowen (Executive Director, Collaborative for Student Success).

This convening was a powerful kick-start to advocacy for science education in Michigan, supported by a broad group of organizations (and the individuals who form them), including MSTA, MiSTEM, MDE, Universities, regional and local school districts across the state, as well as national groups such as NSTA and CSSS.

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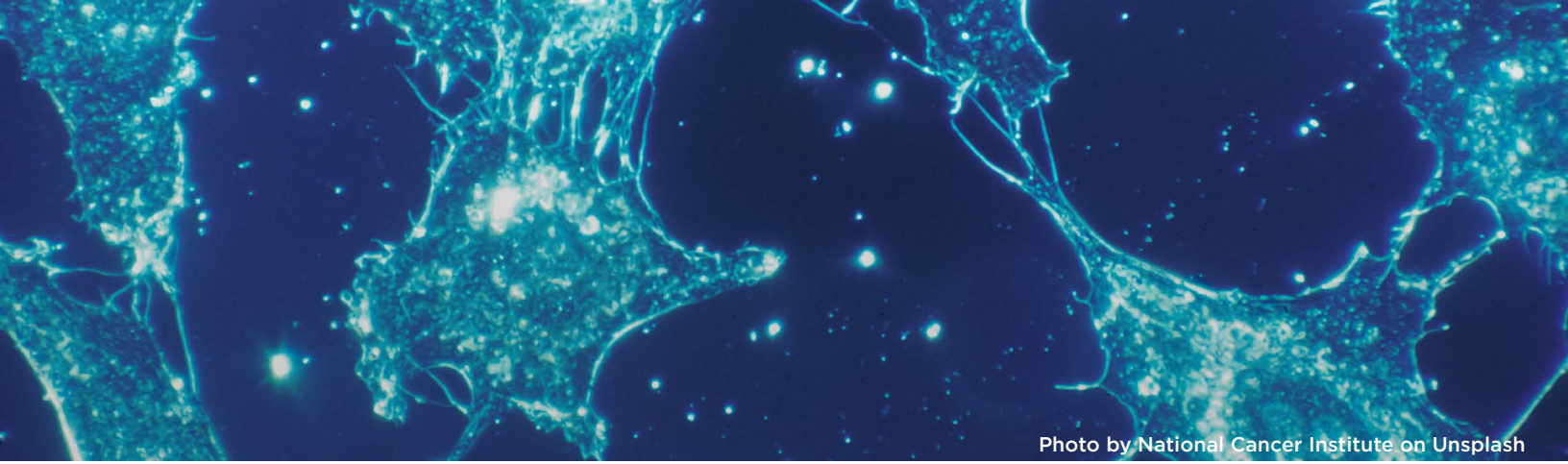


Photo by National Cancer Institute on Unsplash

The Immortal Life of Henrietta Lacks

Written By Rebecca Skloot

Michelle Mason | Portage High School

For all of my science friends out there, you should first know I'm not a life science person. I leave the science of living things to others. But even I found the story of Henrietta Lacks to be incredible. The nonfiction book chronicles the journey of the author as she researches the Lacks family and the use of HeLa cells in science. I learned so much about the root of one of the most popular cell cultures sold worldwide and was amazed at how many medical discoveries owe tribute to them.

The book details Lacks family and all of the characters that make up their world. Readers are shown the mid-1900s; a time of poor African-American families trying to scrape by and taking medical care as they can get it from black-only hospitals. The stories, people, and details behind the controversy of non-consensual removal of cells from the patient Henrietta Lacks that led to a multimillion-dollar industry, the sale of HeLa cells in culture, without the family's knowledge or understanding. Skloot creates an immersive environment as she personally interviews family members and works to uncover the truths of the past for the Lacks family.

Although published in 2010, this story became relevant again in August, as Thermo Fisher Scientific settled a lawsuit with the Lacks family that was filed in 2021. This marks the first time

in some 70 years that the Lacks family will receive money from any corporation that has used, purchased, or sold the popular HeLa cells, and one of the few times credit has been given to their family as the origin of the work that brought us the polio vaccine, genetic mapping, and even COVID-19 vaccines. It's incredible to believe that something such as a cell line so invaluable to scientific work has received neither comparable recognition nor financial benefit. As the author points out, the Lacks family couldn't afford much medical care and did not have medical insurance, and all the while the HeLa cells were so important to the medical community.

This would be a great read for anyone who wants some great stories regarding medical ethics, and cellular research, or for a lover of historical science. Thinking along the lines of science for ALL students, this story brings forward many equity issues of the past, as the author explains basic biological principles to family members to help them understand what was happening. This book, or excerpts from it, provides good foundational knowledge or possibly a case study in how important science education is and why we must try to bring it to all students.



Photo by Talha Hassan on Unsplash

Increasing Student Choice in Labs

Patti Richardson | Forest Hills Central High School

If you walk into any science classroom you can often find students doing some type of a lab. Labs are designed for students to collect data, analyze that data and explain why the data is valid scientifically. In the past I often did labs to verify what I had already taught my students so they knew what to expect and how the lab would end up before they even did it. All the groups did the same thing, got the same data, and followed the “cookbook” directions. As I learned more about inquiry and student learning through many professional development opportunities I began to wonder if there was a better way to get my students to discover the content through a lab experience instead of my traditional teaching. Over much trial and error, I have found students are able to do this with practice, scaffolding and a lot of planning on my end.

As I plan my units I always ask “What can my students do with the content to learn it?” Something I have found that helps is taking a lab I have done traditionally towards the end of a unit and moving it to early in the unit. All groups do the same variable that I am sure will give good and consistent data. This helps students to learn the lab protocol, combine class data, start to question why something happened and wonder “what would happen if.” As a class we can then look at the class data together and I can use it to build their understanding of the content. We refer back to it as we are learning our content in

the unit and layer in the depth of the concept around that data. After students have gained some knowledge around the topic we revisit the lab with students now having a choice in what variable they want to change. This can then create varied data sets that students share out with each other and have to support their thinking as other students testing other variables may have a different interpretation of why something is occurring. Students are talking scientifically and asking questions about the data and experimental design other groups used.

Giving students a choice of course increases their engagement but also creates more chaos in the classroom. To minimize this they are not always given free rein on the variables to test. We can have a class discussion about what we all think may alter our baseline results from the first experiment and generate a list of variables. I can then say, “These are all great but we are limited to testing.....” based on the equipment, materials, time, and safety constraints we have. I will then allow groups to pick the one they want to test or I will assign one to each group. If groups are assigned a topic I may even provide the protocol with the modified directions for their new variable. This can save time since students do not have to rewrite investigation plans. If investigation plan writing is the skill we are working on they will write it modifying the protocol they learned in the baseline

experiment. Google Sheets has saved a lot of time for students since they can create their own and share it with their group and collect their data right there. If I know they are ready to create their own sheets I will create one for them and they just change it to fit their variable. Another way to save chaos I have learned in the process is to make sure to know what materials each group will need for their experiment. I will walk and talk to each group as they are planning and I guide them in their discussions and make sure their design is doable in the time we have. I ask each group to create a list of materials they will need and also the question they are attempting to answer which they must give to me before they leave that day. This allows me to create a tub of supplies for each group to pick up the next day so they have everything they need to run their experiment. I also have a place in my room with common supplies that all groups may need for the experiment.

Of course, we cannot do this with all units or all labs. So I pick and choose the ones that I feel will give students success and are manageable for them and for me. It does take a lot of scaffolding, which I have learned the hard way. I start the year with a low-stakes experiment that I know they can get data and the protocol is not too challenging. For freshmen biology, I use seed germination where they alter the setup and collect



data to analyze but don't need to explain. It is used to learn and practice experimental design skills. For AP Biology I use sow bugs and choice chambers. Both of these lab protocols are simple so as students change variables and are trying their own tests they are not struggling with equipment. Then as they work through other labs and content they gain more skills and are ready for more complex experiments with student choice. There is a gradual release of parts of the lab experience to them and different labs allow for different parts of the process for choice. I have

found by practicing these gradually and giving some choice students then are able to do an independent research project at the end of the year coming up with their own questions and investigation to get an answer to the question they are truly interested in. Without building up to this independence they struggle with the freedom of choice and do not get data that is usable. They gain the realization that many times a variable has no impact on an experiment which of course they think is "wrong" the first time it happens when there is no change.

My suggestion is to start small. What is one lab where you could give half the groups one variable and the other half a different one? What is a lab that you could do and then have a brainstorming session around other variables that could change the outcome? Then have materials for two or three that you know will work and let students test those. What is a lab that you do that could be done as a phenomenon to start a unit then repeated later to test what they have been learning with new variables? Ultimately look for a way for students to interact with the content as they ask their questions to build their learning and science skills using your content.

Building a Stronger Chemistry Network in Michigan

Mary Jordan-McMaster | MCTA

Whether you are a brand new chemistry teacher or a seasoned pro, there is no doubt that having a strong network of colleagues is a valuable tool for an educator. Throughout the state there are teachers teaching in relative isolation due to many factors. What if there was a way that chemistry teachers could connect in the months leading up to the Michigan State Science Teachers Conference? An opportunity to network, collaborate, ask questions, and share ideas with each other? An opportunity to pitch in to make the MSTA conference a jackpot of best classroom practices for teaching and learning chemistry?

These are the goals of the upcoming virtual PLC series, *Building Chemistry in Michigan*. Join chemistry teachers throughout the state as we share ideas, plan chemistry sessions for the conference, discuss classroom tips and tricks, and work together to meet the needs of our students in our classrooms.

BUILDING CHEMISTRY IN MICHIGAN

JOIN FELLOW CHEMISTRY TEACHERS FROM
AROUND THE STATE AS WE SUPPORT EACH OTHER
IN TEACHING AND LEARNING.

SESSIONS WILL BE VIRTUAL
9-11 AM

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PROGRAM

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WHAT MAKES A GOOD SCIENCE CONFERENCE? YOU!
CHEMISTRY SESSIONS AT THE MSTA CONFERENCE ARE PRESENTED BY TEACHERS LIKE YOU. GET A CRASH COURSE IN HOW TO BECOME A CONFERENCE PRESENTER.

NOVEMBER 11

IT IS THE MOST WONDERFUL TIME OF THE YEAR!
WE WILL DISCUSS SAT PREP AND SHARE HOLIDAY CHEMISTRY IDEAS

FEBRUARY 2

TIPS AND TRICKS IN THE CHEM CLASSROOM
FROM FOLDABLES TO PEAR DECK, WE ALL HAVE OUR FAVORITE TOOLS TO SUPPORT STUDENT LEARNING, LET'S SHARE

MARCH 2

MI CHEMISTRY TEACHERS MEETING @ MSTA
MEET IN LANSING TO NETWORK, CONNECT AND PLAN WHAT IS NEEDED TO CONTINUE TO BUILD CHEMISTRY IN MICHIGAN



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