MSTA Newsletter

From the President's Desk

Message from the MSTA President, Brian Peterson:

From the Desk of Your Executive Directors

Betty Crowder and Robby Cramer, MSTA Co-Executive Directors

The MSTA Board of Directors is dedicated in its efforts to tap into its membership's ideas and needs. This winter the MSTA Board of Directors spent time polling and talking with MSTA members. This is the time of the year when the Board of Directors gives a weekend to focus on developing a strategic plan for the work of MSTA during the 2019-2020 year and beyond. We have gathered data about the needs and wants of our members regarding our professional organization in a variety of ways. We looked at your comments from the 2018 conference and just last month we gathered your thoughts about the 2019 conference. During the conference on Friday, regional directors had lunch with conference scholarship winners from their areas. The directors asked probing questions to understand what parts of the conference these educators were enjoying and uncover needs not met. At the Muffins for Members MSTA membership meeting, attendees raised issues of needing mentors. The need to help young science teachers who are "The Science Department" was clearly articulated. Conference attendees stopped by the registration

tables offering thoughts about the state conference throughout the three days! Finally, many of you completed the conference surveys adding specific recommendations to help craft the 2020 conference. We are listening and we are responding.

It has been many years since MSTA leadership reviewed both the journal and newsletter. A number of board members brainstormed a variety of changes that would make our publications current. We decided to analyze the format, organization of the content, and policies regarding the selection of the articles. To assist with this process, a survey was crafted and sent out to all MSTA members early this spring to gather their ideas. Thank you for your comments! In addition to your feedback, MSTA's mission, ". . .to stimulate, support, and provide leadership for the improvement of science education throughout Michigan," will guide the decision. Stay tuned to hear about new changes in these two platforms!

We wish you all a satisfying closure to the 2018-2019 school year.

Reflections from the MSTA 2019 Conference Scholarship Winners

2019 Scholarship Winner: Jessica Parks: Using the 7E Model for Chemistry:

When many people picture a teacher, it's a scene of an instructor standing in the front of the room with their pupils seated, looking straight at them. What most don't see though is the extent of our profession beyond the classroom that is equally as important – teachers teaching other teachers. I am into my third year of teaching and was excited to finally be able to experience MSTA. It was overwhelming to choose only one session to attend during each time slot as I pieced together my day's schedule like a puzzle. I combed through the session titles, trying to narrow down everything I wanted to take away from the day: writing NGSS assessments, keeping students engaged, classroom tips and tricks, cool science experiments. When the day came, I was bouncing from session to session, writing information down frantically. I felt the comradery of our profession as I listened and learned from the successes and mistakes of other educators.

As a newbie teacher, I have heard many acronyms and teaching strategies thrown around but never have enough time to try them on my own and evaluate them. I was able to attend a presentation on the 7E model related to middle school chemistry and walked away with an extension on two parts of my teaching. The first of the two was teaching middle school chemistry. Students have always struggled to grasp the concept of the atom. On top of trying to understand something students can't see, they also learn what happens during a chemical reaction and how to know if a chemical reaction occurred! Phew, so much for something so small.

When I attended the 7E Model in a Gifted Science classroom led by Emily Kwon, I was able to learn about a lesson on properties of substances. We began activating student learning by matching vocabulary words with diagrams. The activity was great as it made students try to connect terms with drawings they will be using in the class, rather than just asking a class if a vocabulary word sounds familiar and half the class raising their hand. Guilty! As we worked through the example 7E lesson, we were able to light cotton candy on fire, use yeast to produce carbon dioxide to see if a balloon rises, and solve a crime scene. Even though these activities were used in a gifted classroom, so many of them could be modified to fit into a general seventh grade classroom – where we receive students of all reading and math levels.

Not only did I walk away with a chemistry experiment I wanted to try at home and in my classroom, I also learned about the 7E model as a way to structure my lessons. I certainly had heard about the framework, but I never observed a classroom where it was implemented. After seeing how the model was carried out in a lesson, I realized how helpful of a framework it is to make sure the different parts of student thinking are targeted. As a newer teacher, I know I have to be intentional in designing my lessons, so I have gone back to evaluate previous lessons using the 7E model. Looking at the 7 "E"s can be overwhelming and intimidating. By talking with Emily and walking through a model lesson, I was able to understand what learning and engagement should be present during each step.

Attending MSTA allowed me to be part of a group of educators who are eager to work together to help make each other better. Learning about veteran teachers' classrooms and being able to have discussions with other educators, I was able to find ways I could improve my lessons and supplement them. The day was a reminder our profession is not one of competition but of community.

2019 Scholarship Winner: Kari Keith

The opportunity to spend a couple of days with like-minded individuals was invigorating and inspiring! I consider myself fortunate to be a scholarship recipient, without which I would not have been able to attend the 2019 Michigan Science Teachers Association's Annual Conference. It was a great two days spent immersed in subject matter that I am passionate about!

I attended a session about engaging students in NGSS using invasive species. My students will be visiting a local park to learn how to identify, report and remove invasives. The strategies presented in this session will be a great way to get students engaged. I also learning about the Michigan Alliance for Environmental and Outdoor Education (MAEOE). This, too, will hopefully be a valuable resource for educating my students about the effects of invasive species. I hope to grow this project and partnership with our local parks and recreation department into an annual field trip with students in which we track and compare the growth of native and invasive species over time.

I also attended a session titled Reducing Stress and Enhancing Learning with Mindfulness. I have always been interested in bringing mindfulness into my classroom and had some success doing so in my elementary classroom. Middle school students, however, are not as readily open to the idea. Through strategies presented in this session, I learned how to effectively implement mindfulness in the middle years! I can't think of an age group who would benefit more from such tools!

Additionally, I was a first-time presenter! I presented a session titled *Managing Group Talk and Teamwork*. I have been teaching NGSS/Michigan Science Standards using Mi-STAR for a year and simply cannot express how much I love it! I was thrilled to be able to share the strategies I use to get students engaged in classroom discourse as this is an integral piece of the Mi-STAR curriculum experience. Presenting was a positive experience and I hope that those in attendance walked away with valuable information.

Between sessions I enjoyed the time spent with other educators sharing triumphs, swapping ideas and resources and discussing challenges. I came away from this conference reinvigorated and full of new ideas to add to my toolbox!

Conference Reflection from J. Pashak Scholarship Winner

I am so grateful that I was awarded a scholarship to attend the 2019 MSTA conference. This is the third year I have attended the conference and I have never been disappointed. I have come away with so many great ideas that I can easily implement in my classroom immediately. An example of this is a method I learned about while in a session called, "Asking Questions and Planning and Conducting Experiments: Using the Question Formulation Technique" by the amazing presenters Jim Clark and Samantha Johnson of Next Gen Science Innovations. The QFT method is designed to shift the focus from the teacher to the students by having them formulate questions they are invested and interested in. We began by using "I notice, I wonder, It reminds me of, and Could it be?" to work on making observations, develop curiosity, and increase conversation among a group. In addition, Jim and Samantha

also had everyone who attended the session work through a phenomenon that required us to develop testable questions that could then be used to carry out an investigation and conduct research. I felt very excited about the process and knew my 8th grade science students would be as well.

Two days after I returned from MSTA, I was able to start using the QFT technique in my classes.

Students loved looking at interesting pictures and natural phenomenon to practice making observations and formulating questions about them. I then tied that experience into the new phenomenon that was introducing our new topic, genetics and heredity. I noticed immediately after practicing this that students were more engaged, could make better observations, and were thinking at a higher level that they previously had. The questions that they were able to come up with were much more in depth and mature. Although this was the highlight of my two days at MSTA, I came away with several other valuable techniques, practices, and ideas that I was excited to use. The caliber of this conference is invaluable to all teachers in the science community.

2019 Scholarship Winner: Laura Molyneux

I am very grateful that I was able to attend the Michigan Science Teacher Association conference in Grand Rapids this year. I attended on Friday, March 1 and was able to take part in seven sessions. I believe the most beneficial sessions of my day centered on ways to incorporate engineering practices in my classroom and the Grand-Slam 3-D Assessment session.

2019 Scholarship Winner: Laura Molyneux *continued*

As the middle school science department chairperson, I have been deeply embedded in the restructuring of our curriculum map. We feel that we have created a great scope and sequence but are noticing that we fall short incorporating the engineering practices in our classrooms. We had questions. How do we truly teach engineering when it takes a lot of time, money, and resources? Engineering encompasses a totally different way of doing things. How do we keep the engineering activities authentic within the parameters of school and curriculum?

In the session I attended, I learned there were three basic components of engineering. They include students designing a solution to the problem, the design must have constraints (time, money, available materials, etc.), and students need to design, build, test, and redesign on their own. I liked Derek Maynard's introduction to engineering practices that he utilized in his classroom. They were cost effective, engaging, and made students work through the process design, test, and redesign. They were also activities that I could embed into my own middle school curriculum. He incorporated whole-class discussions between models that were built so students could redesign, keeping in mind the successful and failed strategies the other groups used. The Dixie Cup Tower Challenge is an activity I can see starting my school year off. It not only gives students the opportunity to build the tallest structure possible with a certain number of cups and floors, it also encourages team-building and helps develop a classroom culture. Lastly, Derek Maynard also included examples of an oven and lunar lander that he had students build that incorporated the engineering practices.

The other session that I found insightful and engaging was the session on 3-D Assessment led by TJ Smolek and Mary Starr. In this session, I learned that there really are four types of formative assessment that we use in our classrooms. They are student-focused assessments, cognitive assessments, cultural assessments, and data driven assessments. What I found most interesting was our lack knowledge of how culture affects assessments. "Who is engaged in, or excluded from classroom activities? Who is treated as a "knower" in the classroom? What is practiced in the classroom? What ways of knowing are recognized and privileged in the classroom?" So often we don't necessarily think about ways we phrase questions or conduct discussions are impacted by a student's cultural

background, or the culture we ourselves have created and nourished in our own classroom. We need to be aware of these factors because they have a tremendous impact on student learning. The last take-away I had from the 3-D Assessment session was developed through a discussion on how data-driven we are when we assess. So many districts expect students to show a certain percentage of growth from the pretest to the posttest. This influences the way teachers teach content and often is a factor in "missing out" or excluding an awareness on how culture affects formative assessment. Some districts have found that remediation with the goal of any growth, not a specific predetermined percentage, has decreased teacher anxiety and has led to more productive remediation. As I left this engaging session, I began to think about how I assess in my classroom and ways I can improve my methods. Even though I have been teaching for twenty-four years, I know there are multiple ways I can become a more effective teacher. Already, I have become more aware of how I culturally assess in my classroom and am trying to be more equitable for all students.

NEW! GLOBAL SOUNDSCAPES

Immerse your students in the amazing sounds of our planet with the new Global Soundscapes film in MiSci's Toyota Engineering Theater!

Through giant screen images, surround sound, and live presentation, Global Soundscapes takes you on an ear-opening journey into the science of sound and the emerging field of soundscape ecology.

Now booking for fall field trips! Visit Mi-Sci.org or call 313.577.8400.

Call for 2020 MSTA Awards Nominations

Look around you! Are you working with someone whom you consider an excellent science educator? Does this person do an outstanding job in the classroom and/or in your school district? Does this person contribute to the profession by taking leadership roles within the educational community and show a willingness to share ideas with colleagues by presenting seminars and workshops, and by publishing science related articles in professional journals?

If you know someone who exhibits these attributes, then please **NOMINATE HIM/HER** by July 1, 2018 by visiting http://www.msta-mich.org for one of the following categories

- Elementary Teacher of the Year

- Middle School Teacher of the Year

- High School Teacher of the Year

- College Teacher of the Year

- Teacher of Promise

- Administrator of the Year

- Informal Science Educator of the Year

Awards are issued based on the following criteria:

The winning Elementary, Middle School, High School, and College Science Teachers of the Year will be chosen for using or modeling best practices, inspiring their students, demonstrating innovative teaching strategies, being excellent role models for students and other teachers, demonstrating leadership, exhibiting a passion for science and teaching, and who have taught for five or more years. There has been some confusion about fifth grade teachers. If the teacher works in an elementary school, nominate him/her for the Elementary Award. If the teacher works in a middle school or junior high school, nominate him/her for the Middle School award.*

The winning Science Teacher of Promise will be chosen for inspiring students, demonstrating innovative teaching strategies, demonstrating the potential for science leadership, and exhibiting a passion for science and teaching. Eligible nominees must have taught fewer than five years.

The winning Administrator of the Year will be elected based on dedication to and support of science education in the district and community, and for

Nomination Deadline: July 1, 2019

being a strong advocate of science teaching and curriculum. Eligible nominees include all levels of district administrators, curriculum directors, ISD/RESA chairs, Math/Science Center people, and higher education administrators.

The winning Informal Science Educator will be chosen for unique and extraordinary accomplishments, active leadership, scholarly contributions, and direct and substantial contributions to the improvement of non-school based science education over a period of time.

* Please be advised that no member of the current MSTA Board of Directors is eligible to receive one of these awards while serving on the Board.

Once the nomination is received the nominee will be contacted and sent the appropriate material. If you have any questions, contact Marlenn Maicki, Awards Chair at maickimj@aol.com

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The Gradual Integration of Technology

By Stacy Maynard, K-4 Science & Technology Teacher at Ida Public Schools & MI Makerspace Ambassador

Seeking ways to deepen learning of the NGSS with your students? Technology reaches across boundaries to connect student experiences with their learning. In this article, I share some ways connecting with my students by using technology has created a learning environment where students are eager to learn more; therefore, deepening their understanding of performance expectations. Although this is focused on science standards, consider ways the method can be integrated across content areas.

What methodology do you consider? It is helpful to begin with the end in mind. Asking some of the following questions is one way to begin. What standard is being addressed? What standard am I preparing for? What is the I can... statement students are expected to understand? How can technology assist with delivering the content?

What Technology and When?

In what ways could technology help deepen the learning experience for your students? It is more than just does it "fit" with the curriculum, or does it heighten the learning experience, but HOW and WHEN does it make sense to integrate it into your lessons?

Engage: Building Blocks of Matter with Bloxels

Of the 5E's the most informative for teachers is the Engage. This provides the opportunity to identify misconceptions and who the experts are of the topic in the room versus who doesn't have much conceptual understanding or personal experience with the learning standard.

Bloxels have proven to be an extremely effective tool to engage 2nd grade MI Science Standard 2-PS1-3; Building Blocks of Matter. Students must identify ways a constructed object can be disassembled and made into a new and useful object. Bloxels are small cubes that can be assembled on a tray to create any character or 2D object. The created object on the tray can then be scanned into the Bloxels App with an iPad and the object or character becomes part of a 3D active part of the video game. I use them as an engage because students love referring back to them throughout the rest of the unit.

In my classroom; students are introduced to a scenario in which they are expected to design a Master Builder (character) who must make it to work on time to continue building a huge playground. I first demonstrate how to draw a character using cubes on cm graph paper, this is a new concept for them versus drawing on regular paper so it takes a little practice. They are provided 15 minutes to draw their character. Next, in each science team of 4 to 5 students, jobs are assigned.

Jobs:

Builder (1) – builds their character on the black Bloxels tray.
Builder Assistant (1) – helps find the cubes for the Builder and makes sure their creation on the tray matches their paper (as close as possible).

Workers (2) – Use the iPad to play the pre-created game in the Bloxels App. They are trying to help the neighborhood workers get to work on time.

The Gradual Integration of Technology *continued from page 8*

We rotate jobs over a period of 3 class periods until everyone has been a master builder. Bloxels allows them to see how the cubes build their characters and then come to life in the game. The rest of my unit on Building Blocks of Matter is easy to refer back to our first 3 days.

In addition, the chart below highlights ways I further integrate Technology into the MI NGSS Science Standards:

Engage	Explore	Elaborate
Technology: **Bloxels** Grade: 2nd Standard: Building Blocks of Matter, 2-PS1-3	Technology: **Vernier Interface & Light Sensor** Grade: 1st Standard: 1-PS4-3	Technology: **Ozobots** Grade: 4 Standard: Changes to Earth's Surface, 4-ESS2-1
Technology: **K'Nex** Grade: Any Standard: Science & Engineering Practices	Technology: **Mice Robots** Grade: Kind. Standard: K-ESS3-1 Coding Mouse Exploration through STEM in Action	
	Technology: **Dash** Grade: 3rd Standard: Observe Object's Motion, 3-PS2-2	

Engage: Science & Engineering Practices with K'Nex

If there is a more diverse technology than K'Nex, I would love to hear about it. Set a tray of these cool tools in front of any age students and see what amazing ways they use this priceless piece of technology.

For younger students (K-1), I show how the pieces fit together then hold up my "gadget" and ask what they suppose it might be used for. Next I tell them how much I like their ideas but it is actually a… (make something up here such as a chocolate syrup slinger or all-in-one toothbrush. Next, the kids go to their seats and begin free-design time in their science teams. I always allow time to periodically stop, ask for listening scientist, and have students share their creations. If pressed for time, I have each engineer share within their design team.

The second time they use the K'nex, I show how they can draw on graph paper and create a blueprint for their design before building. I limit their number of pieces to 5 so what they draw is actually buildable. Matching their drawing to the actual prototype is emphasized. If they draw a long gray piece with white pieces at the end, that is what it has to actually look like.

2nd – 5th grade and older: These students are assigned a mission. They must build an obstacle course. Next, they design a blueprint and actually build a gadget to move a ball through the obstacle course in less than 2 minutes. Every member of the design team has an opportunity to test their gadget. For re-design, students have to modify their blueprint BEFORE changing the prototype.

The Gradual Integration of Technology *continued from page 9*

Explore: Waves and their Applications in Technologies for Information Transfer: 1-PS4-3 VERNIER Devices

Explore is the inquiry component of the 5E learning model. These hands-on opportunities provide depth of content to heighten conceptual understanding. Rigor is embedded by providing connections to prior content, real world applications as well as questioning validity of observations. Educators are facilitating cooperative groups rather than entire group instruction.

Then what about the "Technology for Information Transfer?" Is it necessary for a 1st grade standard to be so wordy? Vernier Interface conveys this expectation perfectly. How? Vernier offers digital read-outs providing an opportunity for quick interpretation. As students move the light sensor around, the Lumens change; providing immediate feedback.

If you would like to view a tutorial of how to use the Vernier interface, follow the link to my YouTube page where I created a two-part tutorial.

https://youtu.be/rfewChj1VlU?list=PLrGNFQYt03io_
OCHczIji7KaVzwUt8C3E

When first reviewing NGSS in 2012, I was immediately reminded of my lesson on Light I had taught for years aligned with the MI GLCEs. I have shared this idea for the past 7 years with other teachers, including in Boston NSTA14, and every time teachers have said they never thought about how effective sensors would be at teaching this Performance expectation.

Material	Lumens
Felt	
Wax Paper	
Aluminum Foil	
Blue Tissue Paper	
Rubber	
Blue Plastic Wrap	
Red Plastic Wrap	
Yellow Plastic Wrap	

Lumens measure how much light is given off by a visible light source. *We will graph your results in the computer lab to see which objects made the darkest shadow.

Question: How can we make the darkest shadow?

Claim

Evidence

1-PS4-3 focuses on the opacity of materials and their ability to be used to communicate. I love doing this around Halloween because it is a perfect time to illustrate making a big dark scary shadow on a house versus one that can barely be seen, not much of a scare factor!

I post the following question; "Which material makes the darkest shadow?"

To provide the "hands-on" time with the devices, I first pass out a Scale to science teams and explain the numbers represent Lumens, or how much light we can see. They place a counting bear on the scale then walk around with their partner trying to find a place in the room that matches the number on the scale. One person holds the interface and the other moves the sensor. They love communicating with one another when doing this! We discuss briefly then begin the investigation to answer our driving question.

Lumens Scale passed out to Science Teams

The Gradual Integration of Technology *continued from page 10*

Vernier Interface and Light Sensor

Phenomena – How dark is a shadow?

Driving Question – Which material makes the DARKEST shadow?

Directions:

1. Place ruler in front of you with 0cm touching the edge of the table.

2. Hold material A up at 10cm.

3. Turn on the light source.

4. Hold the light sensor BEHIND the material at 30cm.

5. Measure how much light is blocked by the material.

6. Record in your table.

7. Do two more trials.

8. Repeat steps 2 – 7 using material B.

9. Repeat steps 2 – 7 using material C.

Draw the data table below:

Was the design of this experiment able to answer the driving question? Justify your answer.

_____

Add your own question here regarding the experiment. Why would you ask this question?

_____

I am facilitating while students are experimenting.

Questions to consider as you walk around:

- "Are kids using specific vocabulary?" (a key indicator to their conceptual understanding)

- How are they interpreting the data?"

- "Who is disengaged in the group and what can be done to bring them back?"

Ways I integrate technology with the new MI Science Standards have been briefly highlighted. My lessons don't change because of how quickly technology is changing; but rather evolve in quality because of the opportunities technology provides. By focusing on the technology already available where I teach, I can integrate its added value; therefor, providing greater learning opportunities for my students. If you would like to read more; follow www.opendoorcurriculum.com where I regularly post my lessons as well as how I *modify* lessons from our district's purchased curriculum.

ICSAM Teacher Development Workshop at MSU – August 5-9, 2019

Integrate Computation into your High School Classroom

Integrating Computation in Science Across the Mitten (ICSAM) is an NSF-funded initiative that aims to support high school teachers who wish to integrate computation into their physics classroom. The ICSAM workshop is an opportunity to learn the value and potential of computational modeling as a dimension for students to learn and understand physics while also providing them with a grounding in the tool of 21st century physics.

In this week-long workshop, participants, with the assistance of the workshop coordinators, will develop a viable, personalized plan for integrating computation into their high school classroom(s) to be implemented in the upcoming academic term.

If you are interested in participating, please go to the following link: **tinyurl.com/icsam**

Teachers participating in this workshop will be provided a stipend

If you have any questions about the ICSAM workshop please contact us by email at icsam@pa.msu.edu.

New Federal 5-Year STEM Education Strategic Plan Released

By Jackie Huntoon, Michigan Technological University[1].

On December 4, 2018, the United States Office of Science and Technology Policy released the new federal 5-Year STEM (Science, Technology, Engineering, and Mathematics) Education Strategic Plan: *"Charting a Course for Success: America's Strategy for STEM Education."* The report was prepared by the Committee on STEM Education of the National Science and Engineering Technology Council through a collaboration of the entities that make up the Federal research and development enterprise.

The report outlines *"a vision for the future where all Americans have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment"* (p. v), and makes it clear that STEM education is the foundation for innovation, economic prosperity, and, national security.

Many sections of the report are closely aligned with concepts that have been the focus of discussions in Michigan for some time. For example, in the discussion of the vision for the future of STEM education in American (p. 1), the following statements are made

> *"The best STEM education provides an interdisciplinary approach to learning, where rigorous academic concepts are coupled with real-world applications and students use STEM in contexts that make connections between school, community, work, and the wider world. Leaders in STEM education continue to broaden and deepen its scope and further transcend the fields of study beyond just a combination of the four disciplines to include the arts and humanities. Modern STEM education imparts not only skills such as critical thinking, problem solving, higher order thinking, design, and inference, but also behavioral competencies such as perseverance, adaptability, cooperation, organization, and responsibility."*

The report outlines three goals for American STEM Education: to build strong foundations for STEM literacy; to increase diversity, equity, and inclusion in STEM; and to prepare the STEM workforce of the future. In order to achieve these goals, the report identifies four pathways to success.

- Develop and enrich strategic partnerships by:
  - o Fostering STEM ecosystems that unite communities,
  - o Increasing work-based learning and training through educator-employer partnerships,
  - o Blending successful practices from across the learning landscape.
- Engage students where disciplines converge by:
  - o Advancing innovation and entrepreneurship education,
  - o Making mathematics a magnet,
  - o Encouraging transdisciplinary learning.
- Build computation literacy by:
  - o Promoting digital literacy and cyber safety,
  - o Making computational thinking an integral element of all education,
  - o Expanding digital platforms for teaching and learning.
- Operate with transparency and accountability by:
  - o Leveraging and scaling evidence-based practices across STEM communities,
  - o Reporting participation rates of underrepresented groups,
  - o Using common metrics to measure progress,
  - o Making information on program performance and outcomes publicly available,
  - o Developing a Federal implementation plan and tracking progress.

The report is intended to guide the work of Federal STEM agencies and will influence the allocation of budgets from those agencies for the next five years. Several agencies (Department of Commerce, Department of Education, National Science Foundation, and Department of Agriculture) have already committed to contribute to attainment; of the plan's goals by taking mission-specific actions in all of the areas outlined above.

As a lifelong science educator, I am happy to see that this report strongly reaffirms the Federal government's commitment to STEM and education through this report. The work that science teachers do in Michigan and around the nation is important—our nation's future depends on it!

1. Huntoon served as a member of the Federal STEM Advisory Panel that reviewed and provided feedback on the report before it was finalized

5th Active LENS Workshop: Summer 2019

The 5th annual Avida-ED Active LENS Workshops will be held this summer. This year, we are offering two options: one, at the University of Texas, Austin, June 12-14, 2019 and one at Michigan State University August 7-9, 2019 in East Lansing, MI. The purpose of this workshop is to train instructors in the use of the Avida-ED software package, developed to help students learn about evolution and the nature of science, so that workshop participants can both implement classroom interventions using this software and also train other educators. Participants will learn to use Avida-ED and how to best incorporate it into courses that they teach. Travel and expenses related to the workshop will be covered for the 20 participants for each workshop as part of an NSF-funded IUSE grant. Selection priority will be given to *teams of two*, but we will also consider applications from individuals.

Avida is a digital evolution software platform used to study evolutionary processes, and harness evolution to solve engineering problems. Avida-ED is a free, user-friendly, browser-based version of Avida developed specifically for educational purposes, with a graphical user interface and visualizations that allow the user to observe evolution in action. (See http://avida-ed.msu.edu/ for more information.) Organisms within this software are self-replicating computer programs, competing for computational resources supplied by the environment. Their replication is imperfect, resulting in mutations in some of their offspring, which may alter the ability of those organisms to make use of their environmental resources. Populations studied over the course of generations therefore display all of the elements necessary for evolution by natural selection: variation, inheritance, selection, and time.

Avida-ED has been developed for undergraduates and advanced placement high school students to learn about the nature of science and evolution in particular. Users have significant control of the environment, and are able to change parameters such as the world size, the mutation rate, and what resources are available. Individual organisms can be saved in a virtual freezer, analyzed individually to watch how they perform tasks and replicate themselves, and used to start new evolutionary runs. Because digital organisms grow and divide much faster than even the fastest microbes, Avida-ED allows users to test evolutionary hypotheses over the course of hours or minutes. By generating hypotheses, collecting data, and analyzing results, users gain experience not just with concepts in evolution, but with the nature and practice of science as a whole.

Workshop participants will join a growing community of educators using digital evolution to let their students directly observe evolutionary processes through inquiry-based exercises that advance reform-oriented active learning. Participants will develop new lesson plans and will help collect assessment data from their classroom implementations. They will help disseminate materials and train other science educators; financial support is available for this. We will expect a brief written on participants' implementations after their course has ended.

The team application form for the Active LENS Workshop must be completed online on the following page: https://avida-ed.msu.edu/active-lens-train-the-trainers-workshop-2019-edition/ If you have any questions or difficulties with the application, contact Michael Wiser (mwiser@msu.edu).

Chuck Schepke of Roscommon High School Receives National Teaching Award

By Steve Mattox, GVSU

Mr. Chuck Schepke was selected by the American Association of Petroleum Geologists foundation as an Honorable Mention for the 2019 Teacher of the Year (TOTY) program.

Letters in support of Chuck's nomination highlight his depth of engagement and dedication to his students. Cris L. DeWolf of the Michigan Earth Science Teachers Association noted that Chuck provides "opportunities that few students in rural schools have, opportunities to actually do science as they learn about the world around them." Dr. Jackie Huntoon of Michigan Technological University commented that "Chuck exemplifies the characteristic of "teacher-leaders" by being a great teacher for his students and also helping other teachers achieve similar levels of excellence" by conscientiously "sharing his knowledge and skills with other teachers throughout the years." Students at Roscommon High School have been taking Chuck's geology course and Steve Mattox of Grand Valley State University has been testing them for college credit. Steve reported that in "the last two years, 15 of 17 of Mr. Schepke's students passed the exam. This level of student success exceeds 13 other schools that have participated in the program and is on par with a teacher with 20 years of experience teaching at the college level.

Many of these students are starting university as science or engineering majors." Professor Randy Schaetzl of Michigan State University was out coring a frozen lake with Chuck's students. He asked them what makes Chuck a good teacher. They responded "...that he is very skilled at explaining things in different ways so that every students can "get it." They said the attitude in the classroom is always positive and up-beat; they love going to class. They said he is the most caring teacher in the school. They all said the same thing. They clearly love the guy." Professor Schaetzl noted that Chuck takes his students to state and nation science meetings, often paying their expenses out-of-pocket. These Roscommon students are the only high school students at these meetings.

Please take a moment to congratulate Chuck and thank him for his years of excellent teaching.

The AAPG Foundation will be awarding Chuck with $500 and two maps, including an AAPG Tectonic Map of North America and an AAPG Geological Highway Map, for his classroom.

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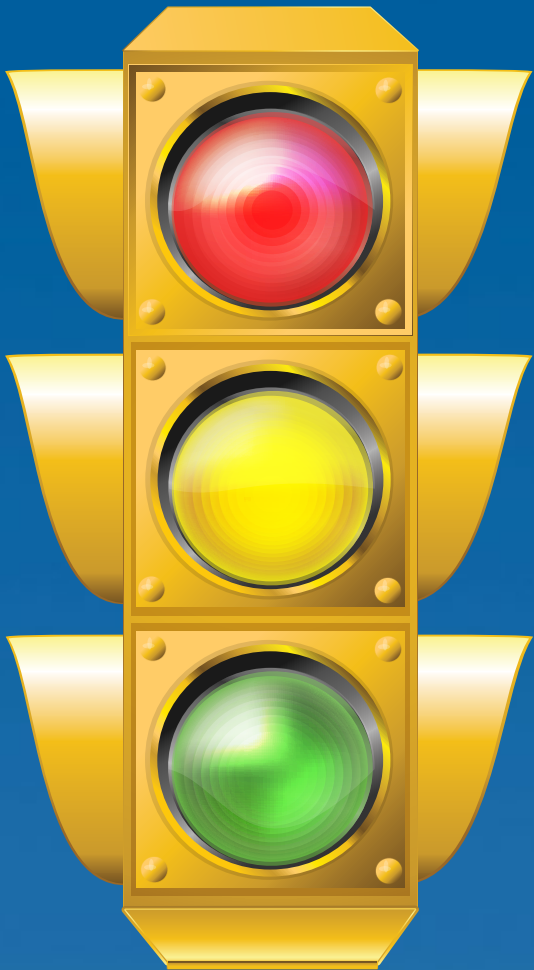
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