From the President’s Desk

By Jen Arnswald, MSTA President

Happy 2017! Many teachers in Michigan have begun their NGSS journey. As I work with educators I often share the many resources that Achieve has created to help support the implementation of the Next Generation Science Standards. The supports I will share were created over many months and years. I personally was one of the honored collaborators on the projects. I hope that you find them useful.

Bundling the NGSS-
http://nextgenscience.org/resources/bundling-ngss

What is bundling? “Bundles” are groups of standards arranged together to create the endpoints for units of instruction. Bundling is just one step in a curriculum development process; many other steps are required to create instructional materials designed for the NGSS.

Why bundle? Bundling is helpful step in implementing standards because it helps students see connections between concepts and can allow more efficient use of instructional time.

continued on page 2

From The Desk of Your Executive Director

From Robby Cramer, MSTA Executive Director

These are interesting times for our nation and our state. All Michigan educators have new science standards! No matter where you are in your personal transition of changing your professional practice, attending the 64th MSTA Conference will enable you to gather excellent resources! The theme of our state science conference is Putting Legs on the New Science Standards. There will be over 240 sessions provided by your fellow Michigan teachers and science leaders during March 24 & 25, 2017. There will be many opportunities to explore a variety of ways to implement the new Michigan Science Standards.

MSTA Preconference

On Thursday March 23rd we will offer a pre-conference with either half day or all day sessions to explore a variety of topics in depth.

For example, we encourage you to dive into phenomena with Joe Krajcik’s CREATE for STEM Institute’s staff. Experience a newly developed, free, online resource, SageModeler, to support students in creating, using, revising and sharing their models for explaining phenomena in the classroom.

Or see and discuss how 3rd and 4th grade teachers bring science to life for young learners. Experience Three-Dimensional Project Based Learning in the context of 8 interdisciplinary units. Learn about free resources under development, overviews, and storylines.

See the link below to read about all of our preconference sessions.
March 23, 2017 - Pre-conference sessions

Plan to join us at the beautiful Suburban Collection Showplace in Novi, Michigan for support, ideas, and suggestions to your questions as you continue your personal journey implementing these new standards in your setting.

Watch your email and the MSTA website for conference updates and information on the registration process for the 64th state science conference Putting Legs on the New Science Standards!

MSTA 64th Annual Conference
Evidence Statements-
http://nextgenscience.org/resources/evidence-statements

NGSS Evidence Statements provide educators with additional detail on what students should know and be able to do. These are statements of observable and measurable components that, if met, will satisfy NGSS performance expectations.

EQuiP Rubric for Lessons and Units-
http://nextgenscience.org/resources/equip-rubric-lessons-units-science

The Educators Evaluating the Quality of Instructional Products (EQuiP) Rubric for science provides criteria by which to measure the degree to which lessons and units are designed for the NGSS.

The purpose of the rubric and review process is to: (1) review existing lessons and units to determine what revisions are needed; (2) provide constructive criterion-based feedback and suggestions for improvement to developers; (3) identify exemplars/models for teachers’ use within and across states; and (4) to inform the development of new lessons, units, and other instructional materials.

NGSS Appendices-
http://nextgenscience.org/get-to-know

Each appendix clarifies a component of the NGSS. Appendices for the three dimensions, college career readiness, engineering, middle and high school course mapping, conceptual shifts, and many other topics are included.

The transition to the new Michigan Science Standards will take time. Remember to stay positive and collaborate with peers! I look forward to seeing you at the MSTA conference in March to do just that! http://mstaevents.org/

Information retrieved from http://nextgenscience.org

Standards Update from MDE

By TJ Smolek, Science Education Research Consultant, Michigan Department of Education

New Science Pilot for Spring 2017
The Michigan Science Pilot Assessment will be available for Spring 2017 testing for students in grades 5, 8, and 11. This assessment is based on Michigan’s recently adopted K-12 Science Standards. The MDE is seeking schools and districts to volunteer for participation in the Science Pilot Assessment. This assessment is only offered online, and there are no accommodations provided other than typical online tools (highlighter, magnifier, color chooser, etc.). The science pilot will be conducted during the M-STEP testing window (April 10- May 26, 2017). Each participating student will be administered one item cluster consisting of a scenario and 5-8 questions. These item clusters are designed to take students 10-15 minutes to complete. There will also be a short survey for students at the end of the pilot assessment. Schools may decide whether an entire class is participating in the pilot, or a subset of the class. Since this is a pilot assessment, no data will be returned to schools or districts. The data captured will help MDE create a valid operational test for the Michigan K-12 Science Standards in the future. If your school or district is interested in participating in Michigan’s Science Standards (MSS) Pilot this spring, you do not need to contact MDE, just please complete the following steps.

Pre-Identification
• Participating students in grades 5, 8, and 11 must be pre-identified on the Secure Site (www.michigan.gov/secure) to the Spring 2017 MSS Pilot. The MDE will not pre-identify students for the Spring 2017 science pilot.
• Pre-identification on the Secure Site will be available starting January 19, 2017 and is open until May 26, 2017.
• The initial data pull of pre-identified students to eDIRECT will be on February 27, 2017, after 5:00 PM.
• Schools will have access to the pre-identified students and test sessions in eDIRECT on March 7, 2017.
• After the initial load of students into eDIRECT, any new or additional students must still be pre-identified on the Secure Site. The students will be copied into eDIRECT twice a day through the end of testing.
• Students can be pre-identified on the Secure Site using any of the following methods:
  • Pre-ID File Upload
  • MSDS Copy
  • One Student at a Time

Complete instructions for pre-identification of students for the Spring 2017 MSS Pilot can be found on the Secure Site Training web page (www.michigan.gov/securesitetraining) by clicking on “Pre-Identification of State Assessments” under the Pre-Identification/Student Search section.

Test Session Creation
• Pre-identified students will need to be put into online test sessions.
• Schools will not put students in test sessions on the Secure Site as done with other state assessments.
• Schools will need to place students into test sessions in eDIRECT once the students have been transferred to eDIRECT. All students must be pre-identified in the Secure Site first in order to be transferred to eDIRECT and then placed into test sessions. Students can be pre-identified for testing up through May 26, 2017.
• If you do not have access to the Secure Site and need access, instructions can be found on the Secure Site Training web page (www.michigan.gov/securesitetraining) by clicking on How do I get access to the Secure Site?

IMPORTANT NOTE: The Science Pilot Assessment is an optional assessment, and is in ADDITION to the required M-STEP science assessment in grades 4, 7, and 11. The Pilot Assessment does NOT REPLACE the M-STEP science assessment. Please make sure this information is communicated to all assessment staff in the pilot-participating school.
Putting Legs on the New Science Standards

The 64th Michigan Science Teachers Association Conference is quickly approaching. This year’s conference will be held on March 24 & 25, 2107 at the Suburban Collection Showplace in Novi. This is a NEW location for us, and we are very excited about new opportunities here. The location is easily accessed from various interstates, parking is FREE, and you will be conveniently located near a selection of hotels and restaurants. Below are some of the highlights you can expect this year!

Anticipation is building about the newly adopted Michigan Science Standards

Let the MSTA conference be your guide to the understanding the new Michigan Science Standards (MSS). With over 250 sessions, you are sure to find something to take back to your classroom! Special strands exist for Elementary, CREATE for STEM, MSELA, Mi-STAR, the MI Math/Science Centers, and more. The purpose of the strands is to offer educators the opportunity to attend in-depth, grouped sessions based on a specific need or interest. These strands will be offered in addition to the informative sessions for which MSTA is known. There are many sessions being offered by teachers just like you sharing what they are doing in the classroom to embrace MSS, including the engineering practices and more.

More in-depth professional development sessions are available

The Professional Development workshops on Thursday, March 23rd encompass a morning of informative sessions covering topics such as 3-Dimensional Learning, Project- Based Learning, MSU-Create for STEM, Using the Framework to expand your understanding of the vision and application of the document in science, and more. These sessions do require pre-registration, so be sure to watch for the information on our website regarding these soon.

Check out available materials and resources

Visit the exhibit hall to see the largest concentration of science educational materials available anywhere in the state. Enter drawings for giveaways from the exhibitors. Also visit the always popular MESTA rock shop and NSTA book store.

We have a Field Trip this year

Catch the transport over to MSU’s Tollgate Farm to learn how MSU Extension Outreach Programs can support your educational goals in growing school gardens or greenhouses, youth development programs, community food systems education, and agriculture and natural resources. Using research-based curriculum and methods, Tollgate promotes food system awareness through exploring the sustainable, nutritional, and cultural aspects of agriculture. The field trip takes place on both Friday and Saturday, so you can choose the day that works best for you.

Our Keynote Speakers are not to be missed

Tricia Shelton is a high school science teacher and teacher leader with a BS in Biology and MA in Teaching, who has worked for 22 years in Kentucky, driven by a passion to help students develop critical and creative thinking skills. As a 2014 NSTA Distinguished Teaching Award winner for her contributions, a Professional Learning Facilitator, and NGSS Implementation Team Leader, Tricia has worked with educators across the U.S. to develop Best Practices in the Science and Engineering classroom, moderates #NGSSchat on Twitter, and conducts virtual and face to face PLC work. Tricia’s current work centers around the Next Generation Science Standards as well as helping STEM students develop the 21st Century Skills of critical and creative thinking, collaboration, and communication.

continued on page 4
Putting Legs on the New Science Standards

continued from page 3

Greg Gage is the co-founder and CEO of Backyard Brains, a company he started with lab-mate Tim Marzullo while graduate students in the Neural Engineering Lab at the University of Michigan. Greg is a published neuroscientist and engineer, and has helped developed tools, curriculum, and experiments that allow the general public participate, hands-on, in neural discovery. He is senior fellow at TED and has given many TED talks, a director’s innovation award winning investigator at the National Institute of Health, and was recognized in a White House ceremony for being a Champion of Change for his commitment to citizen science.

even numbered years. That makes the event a ‘Lansing only’ event. If you are interested in participating, set aside the science materials you no longer need and bring them to our 2018 conference to pass on to other teachers!

Please remember that as always, there is an ‘early bird’ registration savings. Visit the website for details and deadlines. www.msta-mich.org

We look forward to seeing you make this MSTA Conference your Pure Michigan destination for “Putting Legs on the New Michigan Science Standards.”

Some important reminders
The MSTA Garage Sale is only held every other year, on

Karen Kelly
Conference Chair

Sandra Yarema
Conference Co-Chair

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www.mstaevents.org

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Data Nuggets: Inspired by Teachers, Created Using Authentic Research Data

By Elizabeth Schultheis and Melissa Kjelvik, Data Nuggets, Michigan State University

We were first exposed to science education through the GK-12 program at the Kellogg Biological Station (http://kbsgk12project.kbs.msu.edu) when we were both graduate students at Michigan State University. We were each assigned a partner teacher who would mentor us as we taught lessons and shared our research with students for the first time. The experience of standing up in front of 30 middle school students was definitely intimidating! Initially we struggled to simplify and explain our research, while also making it engaging for an audience who may never have thought about these ideas before. However, we quickly improved as the teachers stood in the back of the classroom and waved their arms when students checked out because we’d used too much jargon or started to nerd-out. They pushed us to describe why the things we were doing day-to-day mattered for the big picture. The teachers’ infectious enthusiasm boosted the passion we had for our research. Working with these teachers and their students quickly became our favorite time of the week.

These same teachers shared that their students were struggling when faced with data from classroom inquiry projects that turned out messy or did not follow predictions. Typically, students are only exposed to research and data published in textbooks, leading to the misconception that all science is a completed product with well-established ideas and clear results. As graduate students, we had access to tons of messy data from our own dissertations, and we felt by sharing our research stories we might be able to help students realize that when doing “real science” things are bound to be unexpected and unclear. Over time, we developed Data Nuggets (http://datanuggets.org) from these ideas. Data Nuggets are classroom activities that bring students through the entire process of science, sharing the story of the scientist behind the data and an authentic dataset from their work. Students are challenged to graph and interpret the data, determining whether the data supports the scientist's hypothesis or what future research would be necessary to fully answer their questions. Data Nuggets are also a way for us to share what we learned as GK-12 fellows with other scientists, as we guide them through the process of creating a Data Nugget of their own.

This past summer we were lucky to work with some of these same teachers again. As a group, we read through student responses to Data Nuggets. This was a powerful way to identify areas we could improve to encourage...
deep student thinking and rich classroom discussions. While reading student responses, the teachers collectively noticed that students had a difficult time using evidence to support their claims, so they developed a tool to scaffold students into this process (http://datanuggets.org/resources/professional-development/). To learn more about Data Nuggets and the tool they developed, make sure to come to our MSTA workshop Data Nuggets: Scaffolding claim-evidence-reasoning using real data in context.

As we continue to develop Data Nuggets, we are exploring the challenges and opportunities created when using real data in the classroom. Today we have 54 Data Nuggets (and counting) on our website (http://datanuggets.org/search-current-data-nuggets/), freely available and used by thousands of teachers and students. We are currently funded on a National Science Foundation Discovery Research pre-K-12 grant. The main objective of the collaborative grant (https://bscs.org/scientific-data-schools), between MSU and Biological Science Curriculum Study (BSCS), is to assess whether Data Nuggets increase students’ quantitative reasoning abilities, along with their understanding of, and engagement with, science.
Full STEAM Ahead with Model Bridges

Emily Cizmas, Crescent Academy High School

The new Michigan Science Standards represent a major shift in science education. One of the most important changes is that students must think and work as scientists and engineers, not simply receive and memorize information. As a teacher of high-needs students with little access to materials, it can be challenging to successfully implement the new standards. I attempted to immerse my 11th grade physics students in the science and engineering practices with a model bridge challenge.

Step 1: Set the Stage

We began our bridges unit with two videos: Building Big: Bridges and Nova: Super Bridge. The former provides a good overview of the history and types of bridges. The latter provides an excellent introduction to the engineering design process as it follows the construction of one bridge from start to finish. My students were particularly intrigued by the human element depicted in this documentary. After we watched both videos and answered related questions, many students were already asking, “Can we build bridges?”

Step 2: Scale

I assigned each group of 3-4 students a real-world bridge. Each bridge was a different type (truss, suspension, beam, etc.). I provided each group with a picture of its bridge with only one dimension labelled. Students were instructed to measure the labelled dimension and use it to make a scale for the picture, similar to a scale on a map. Next, they used the scale to determine all of the remaining measurements of the bridge. This part of the project targeted the practice “using mathematics and computational thinking.”

While I could have provided students will all of the dimensions at the beginning or told them to research them online, I found the scaling activity to be very beneficial. Many of my students did not understand the concept of a scale prior to completing their computations. I also enjoyed seeing the various ways students approached the problem using ratios and equations.

Next, we discussed the concept of a scale model and why it is important to not simply “guesstimate” how big each piece should be, particularly in real-world situations. I told students that their model bridges should be 4-6 feet long. Students then used their completed dimensions to find an appropriate scaling factor for their bridges. Finally, students used their scaling factors to scale down each piece of their bridges and develop blueprints for the models they would build.

continued on page 8
Full STEAM Ahead with Model Bridges  continued from page 7

Step 3: Build

After the careful work of scaling was complete, students were eager to begin building. The only materials I provided were popsicle sticks, straws, wood glue, hot glue, tape, string, and paint… and they hit the ground running! Students experimented with different materials, discussed options, and troubleshoot. Each group also produced a presentation about its bridge type.

Results

I was very impressed with my students’ work on this project. Their bridges turned out even better than I had hoped. More importantly, though, were the non-tangible products.

My high-needs students are often uninterested in and intimidated by STEM. They have difficulty working together productively and staying focused on traditional assignments. There was a major improvement in the overall tone of the classroom when we began this project. Students raced to class early rather than coming 10 minutes late, eager to continue work on their bridges. One student even told me that the only reason she came to school one day was to work on her project. The conversations and collaboration I witnessed among students was the best I’ve seen from them.

Each student found his or her special role in this highly-differentiated project. Technically-minded students enjoyed all of the measurements and computations. However, other students who normally do not enjoy STEM were also engaged, particularly artistic and kinesthetic students.

Lastly, I think the greatest result of this project was the pride I saw students take in their work. Students who normally copy work from other students (or don’t do their work at all) were proud of the work they had produced themselves. All students were excited to display their completed models in the hallway and beamed when they received compliments from other students and staff. While they had to overcome setbacks and frustration throughout the project, students saw that they are capable of great achievement when they persevere. Practicing “grit and determination” in addition to the science and engineering practices is important for all students. Fun, relevant, hands-on activities are an effective way to start!
Creating the Periodic Table of Elements

Andrew J. Frisch, Farwell High School

In 1869 Dmitri Mendeleev organized the known elements into a series of rows and columns according to their chemical and physical properties. The organization scheme Mendeleev developed allowed him to predict the existence of elements that had not yet been discovered as well as many of their characteristics.” Over the years his organization has been used for a multitude of predictions, calculations, and ultimately discoveries of enormous value. But how did he get it right? He used index cards!

This is an activity that is similar to the procedure that Meedeleev himself used. Meedeleev first wrote down important information about the chemical properties of each element. Since he wrote the information on cards, he was easily able to move the cards from one row or column to another without destroying the entire organization. Little by little, piece by piece, all the known cards fell into place. Empty spaces had to be left in the rows and column to be filled in as the “missing” elements were identified.

Set-up:
You will need to create a set of 28 cards for each group of students. I find three students per group is an ideal amount.

Each set will consist of 28 cards (four sets of seven). You will need four different colors of construction paper or colored index cards. Each set will need seven cards for each of the colors. See figure 1 for how to label the cards with numbers and shapes.

Remove two cards from each set of 28, and set those cards to the side. Then shuffle the remaining cards in each set into a random order.

Introducing the Activity
Explain to your students that Meedeleev created index cards for each of the known elements. Each card had specific information (valences, boiling and melting points, metal or non-metal, along with other known information) that was unique to each individual element. He then laid the cards out and arranged them and rearranged them many times until a logical, meaningful, and periodic organization was achieved. Once the order was discovered anyone could easily identify the patterns within the organization. This is the objective of the students.

Procedure
Hand out a set of 26 cards (remember to remove two cards from each set) to each group. Show the students a random card from the deck, emphasizing that each card is a specific color with a number on it and a specific
Creating the Periodic Table of Elements  

continued from page 9

shape in varying amounts. It is the students’ objective to describe the missing card(s). They will need to identify how many cards are missing, what color, what number, what shape and how many shapes are on the missing card(s). This must be achieved by arranging the cards into a logical, meaningful, and periodic organization.

Allow the students time and space to arrange and rearrange the cards into an organization. Once the students think they have their cards organized they should explain the pattern to their teacher. Remind them that it should be a simple organization. It should be simple enough that a kindergarten can understand the pattern.

Discussion With Each Group

At this point it is really not about the missing card(s), it is about the organization itself. I like to use a meter stick and lay it along a row (side to side) and ask the students, “What do all of the cards have in common?” When the say they increase by one. I say, “What else to the have in common?” They will discover that they are all the same color. Ask them one more time, “What else to the have in common?” This one may take a little more time, but they realize they all have the same shape on them.

Then I move the meter stick to a column (up and down) and ask them the same questions, only twice for the columns, however. The patterns in the columns are they all have the same number of each shape, and their numbers increase by seven.

Finally, I ask how many cards are missing and what color, number, shape, and number of shapes must be on the missing cards? I have them retrieve their missing card(s) from the pile that I set aside. It will be pretty obvious to them what card they are looking for. It will be the only cards that allow the pattern to continue.

Conclusion

Tell students that the process they used to organize the cards is similar to what what Dmitri Mendeleev did over 100 years ago to create the periodic table of elements. The increasing numbers on the cards represent the increasing atomic number of the elements. The cards in each column all have the same number of shapes drawn on them, just like the elements in a column of the periodic table have the same number of valence electrons. Tell students that Mendeleev did not know about all of the elements that we have on our periodic table today, but that his table predicted some of the properties of unknown elements that would be discovered later, just like they were able to predict the missing cards. Mendeleev’s periodic table was expanded and refined over time as new discoveries were made.
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Integrating Michigan Science & Social Studies Standards into Middle and High School Recycling Lessons

By Erika Vye, Joan Chadde, and Brian Doughty, Michigan Technological University Center for Science and Environmental Outreach and the Western UP Center for Science, Math & Environmental Education

Early experiences affect students’ future behavior and help to develop lifelong habits. Therefore, middle and high school students in Houghton County are being introduced to waste reduction and recycling strategies with grant funding for recycling education from the Michigan Department of Environmental Quality (DEQ).

The grant was awarded to Houghton County, in partnership with the Copper Country Recycling Initiative. The goal is to increase recycling by households and businesses and provide a new cardboard recycling facility in Houghton County. With funding from the grant, the Western Upper Peninsula Center for Science, Mathematics, and Environmental Education (WUPC) is leading the education outreach program which focuses on Grades 4-12 students in Houghton County. The DEQ grant is supporting Phase I of a long term plan to become a Zero Waste Community.

Lessons on recycling and waste reduction have been developed that align with the new Michigan K-12 Science and Social Studies Standards: Earth’s Systems (4-ESS3-2; 5-ESS3-1), Human Impacts (MS-ESS3-3; MS-ESS3-4), Human Sustainability (HS-ESS3-1), and Engineering and Design (3-5-ETS1-1, 3-5-ETS1-2; MS-ETS1-1); Citizen Involvement (4-8-P4.2.1; 4-8-P4.2.2), Environment and Society (4-G5.0.1; ), and Humans and the Environment (6-G5.1.1). Lessons meet teachers’ curricular needs and capture students’ curiosity through inquiry, building on prior knowledge and varied learning styles. Over the 2-year grant period, WUPC will engage over 40 teachers and more than a 1,000 students in a variety of activities that promote waste reduction and recycling:

- Middle school classes participate in 1-2 hour classroom presentations that encourage waste reduction, reuse, and recycling through demonstrations, small group discussion and several hands-on activities. Students will:
  - (i) brainstorm what to do with their trash by considering reuse options and learning which items can be recycled locally, and what the items can be recycled into
  - (ii) be challenged to design a way to separate different materials in a single waste stream
  - (iii) consider how to pack waste-free lunches by avoiding single use packaged items, using a reusable box or bag, and using durable items instead of disposable materials
  - (iv) examine package engineering to recommend ways to reduce excess materials used in the packaging of consumer goods and to think about what kinds of packaging they might refuse as a consumer
  - (v) discover how to make and use environmentally-friendly and effective cleaning products

- High school classes conduct a ‘garbology’ study or waste stream audit in which they analyze trash at their school to determine how much garbage could have been recycled. Students record data on how much trash and recyclable materials get thrown away in their school each day, and develop a plan to reduce their waste stream at school.

- A recycling activity kit has been created for classroom use and may be checked out from the Copper Country ISD by area educators.

continued on page 13
Integrating Michigan Science & Social Studies Standards  continued from page 11

- Family recycling events are held at the public library.
- Teachers are attending two recycling and waste management workshops.

The ultimate goal is to empower students to make a difference in their schools and local communities. Students are encouraged to think critically about the choices they make and how they personally can reduce the amount of garbage generated.

Feedback from 5th grade students participating in the recycling classroom presentations delivered by WUPC staff is very enthusiastic:

I already knew a lot about recycling, but I didn’t know that rotting is good. My mom has a compost bin that we throw food in.

I already know some things, but I didn’t know that people that package things think about recycling. It seems like they would just grab a box, and send it.

I’m happy that you came because I love recycling products such as cans, paper, bottles, glass bottles. I’m happy for you giving us information and I wish I had your job ☺.

WUPC works in partnership with the Michigan Tech Center for Science and Environmental Outreach, and the Copper Country Intermediate School District, to implement this educational program.

Link to the classroom lessons and activities: http://wupcenter.mtu.edu/

Classroom Resources from Consumers Energy

EmPOWERed Kids is a fun, interactive educational app that teaches children in the communities we serve about electricity and natural gas. This year, we added a carbon monoxide safety program to educate students about this hazard. By going through the carbon monoxide portion of this app, kids will learn about the dangers of this invisible gas while also identifying what types of things in a house could potentially emit it.

Carbon Monoxide is an odorless, colorless and tasteless gas that can come from certain appliances, home generators and even car exhaust. Consumers Energy wants to equip students with carbon monoxide knowledge and educate them on the dangers associated with it.

We believe having a Consumers Energy presenter visit your classroom to engage with students is the most effective way to educate students on electric, gas and carbon monoxide safety, and we will continue to offer our free in-class presentations on these topics. We also know that due to scheduling, location, and popularity, a live presentation is not always possible. This teacher’s guide, which will be available on our website www.ConsumersEnergy.com/kids in February, will give you the information you need to successfully navigate the material with your students using the EmPOWERed Kids app, available for FREE through the Google Play or Apple App stores.

If you have any questions about the new material or the app, please contact us at education@cmsenergy.com.
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The Wind Energy Project: When Partnerships are a Breeze

By Sam McLaren-Fahey, Outreach Programs Manager, Ann Arbor Hands-On Museum

Background

Solar and wind energy are rapidly gaining momentum in the United States and so too are education programs that focus on renewable energy resources. Energy education can be found in both museums and classrooms and the United States Department of Energy (DOE) is actively working to be a part of that movement. In 2015, the DOE partnered with the City of Ann Arbor Energy office in Ann Arbor, Michigan to fund and manage a grant specific to wind energy education in the Ann Arbor and greater Washtenaw County area. The Energy Office approached the Ann Arbor Hands-On Museum to create and deliver education programs and exhibits because of the Museum’s reputation for delivery high quality information science educational experiences.

From October 2015 to January 2016, a team from the Ann Arbor Hands-On Museum worked with the Great Lakes Renewable Energy Association, the Clean Energy Coalition, Windustry, REcharge Labs (formerly KidWind), and Woven Wind, a student organization from the University of Michigan, to create the content for the exhibits and educational programming. Through this programming, the content was broken down into three parts: what is wind and where does it come from? How can we harness, store, and use wind energy? How does wind energy fit into the grid with other renewable and non-renewable resources?

Educational Programming

Through the Museum’s Outreach department, which serves off-site locations, and the ScienceWorks department, which serves field trips on-site at the Museum, the staff designed and implemented three versions of educational programming:

Wind Energy Family Night: Two-hour events held after hours at schools around Washtenaw County that served up to 500 members of the public at a time. Students and their families moved at their leisure through 10 Wind Energy activities and 5 larger Wind Energy demos that were all created through the grant. Activities and demos included things like anemometer construction, designing turbine blades that could lift the heaviest load, a large wind tube and air cannon, and an activity in which students have to site the best location for a wind farm while considering endangered species and other important factors.

Wind Energy Workshop: 50-minute in-class workshops that served 30 students at a time. In this experience, students delve into the three over-arching wind energy questions and spend half of the class period designing, building, and testing their own wind turbines. Through construction, students learned how many blades harnessed the most wind energy and which blade shapes and angles were most successful.

Wind Energy ScienceWorks Lab: These 50-minute labs were identical to the workshops that were taken out to schools, but instead served the populations that came to the Ann Arbor Hands-On Museum on fieldtrips. These labs also served 30 students at a time and included chaperones in the classroom.

The grant focused on 5th to 8th grade students in Washtenaw County and covered the cost that would normally come with booking an Outreach or ScienceWorks program. Initially, the Museum set out to provide 36 programs for schools in Washtenaw County. An email was sent out on a Sunday morning to schools in the area and within 24 hours, more than 60 requests had come in. From January to September 2016, they ended up delivering 93 educational programs and attended 5 large-scale festivals including the Detroit Maker Faire. Through programming alone, the Wind Energy project served over 18,000 thousand people in an 8 month span.

continued on page 16
The Wind Energy Project continued from page 15

Exhibits
Throughout the implementation of the Wind Energy programming, the exhibits team from the Ann Arbor Hands-On Museum worked with Larry Hutchinson of Larry Hutchinson Studios, with input from the other project partners to create 5 traveling Wind Energy exhibits. These exhibits include:

- A Wind Table that allows visitors to feel the wind and see its effects as they test out different devices
- A Flow Tank that discusses how gases and fluid behave similarly and visually shows laminar and turbulent flow
- A Wind Turbine Design station that allows visitors to design and test a wind turbine with various blade numbers, shapes, and angles
- A Storage exhibit which visitors generate and store energy while learning of the various storage methods that are being explored in renewable resources

An Electrical Power Grid exhibit in which visitors work as commercial grid operators and have to respond to scenarios. They combine wind, natural gas, coal, nuclear, solar, and other energy sources to solve grid scenarios. These exhibits have been on display at the Ann Arbor Hands-On Museum since October 2016 and will begin touring in January 2017. The first stop is the Impression 5 Museum in Lansing, Michigan and the exhibits will continue from there to tour museums and libraries across the state for the next year and a half.

Through this partnership and grant opportunity, the Ann Arbor Hands-On Museum has reached thousands of students and visitors and demonstrated the outcome of a successful collaboration. These programs have been added to the Museum's regularly offered programming and a Distance Learning class on Wind Energy has been developed and added as well. These programs continue to reach students and visitors and can be booked through phone call at 734-995-5439 or email at outreach@aahom.org.
Congratulations to the Winners of the 2017 MSTA Educators of the Year!

By Marlene Maicki, MSTA Awards Chair, mmaicki@dcds.edu

The Michigan Science Teachers Association would like to extend our congratulations to the winners of the 2017 MSTA Educators of the Year!

MSTA applauds the innovation and commitment that these educators have shown to their students and to the teaching profession. The winning Elementary, Middle School, High School, and College Science Teachers of the Year were 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, and exhibiting a passion for science and for teaching. The following educators have been selected from a statewide pool of applicants:

Elementary Science Teacher of the Year -
Robert Thomson - Ella M. White Elementary School, Alpena

Middle School Science Teacher of the Year
Leigh Ann Roehm - Saline Middle School, Saline

High School Science Teacher of the Year -
Scott Milam - Plymouth High School, Plymouth

College Science Teacher of the Year -
Dr. Janet Vigna - Grand Valley State University, Allendale

The winning Science Teacher of Promise, Hadley Brill from Hillside Middle School, Northville was chosen for inspiring her students, demonstrating innovative teaching strategies, demonstrating the potential for science leadership, and exhibiting a passion for science and for teaching.

Administrator of the Year, Thomas TenBrink of Jenison Public Schools, Jenison, was chosen for dedication to and support of science education in his school district and community, and for being an excellent role model for students and teachers.

The winning Informal Science Educator Brandon Schroeder of Michigan Sea Grant / Michigan State University Extension, Ann Arbor, was chosen for his 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.

Congratulations! Thanks to all who applied but were not selected to receive an award in this year’s competition. The MSTA Educators of the Year Awards are given annually at the MSTA state convention. This year the presentation will be on Friday, March 24, 2017.
The IDEA Lab
Emily Garcia, Imagination Station, Toledo, OH

With advancements being made in technology, medicine, science and a variety of other fields, there is a greater need than ever before for people with strong skills in the fields of science, technology, engineering and mathematics (STEM). The importance of STEM education is evident, and Imagination Station, Toledo's Science Center, recognizes the need for STEM-specific skills with the tinkering-focused learning world, IDEA Lab.

In May 2016, Imagination Station opened its new learning world focused on developing 21st century skills. The mission of this space is simple – it is about the process, not the product. Educators are encouraged to use the space to expand their students’ creative capabilities by using familiar materials to make something new, design something practical, or create something unlike anything else before. The skills that are practiced in this space, such as problem solving, communicating ideas to others, teamwork and collaboration, are vital skills necessary for almost any job or career in today’s working world. Tinkering develops student’s minds by motivating them to think for themselves, come up with their own solutions to problems, create something inventive and learn from mistakes, trials or challenges to find the best solution or design. It is with this philosophy in mind that two additional spaces were incorporated into IDEA Lab - The Tinkering Space and the Think Tank.

The Tinkering Space
This space features monthly activities that are available for students to participate in during their field trip. Educators and students can stop by for a few minutes or a few hours to tinker around on a creation that is completely their own. The activities in the Tinkering Space are designed to introduce a small amount of struggle which creates a memorable learning experience when their creation is complete. Each month focuses on different topics that align with both the Michigan Science Standards and the Ohio Revised Learning Standards. Topics have included Squishy Circuits, Frankentoy, Shadow Puppets and Linkages.

The Think Tank
Educators craving a deeper level of engagement for their students can sign up for a workshop hosted inside the Think Tank. Think Tank Workshops can be added to any field trip and allow students to use real tools, familiar materials and lots of freedom to explore their own ideas in a small-group experience, designed for kids and adults. Activities in this space include Cow Eye Dissections, Blinky Badges and Intro to LEGO® Robotics and also align with both the Michigan Science Standards and the Ohio Revised Learning Standards.

For more information about IDEA Lab, the Tinkering Space and Think Tank Workshops, visit imaginationStationtoledo.org/Idea-Lab.

Follow MSTA on

Exposing students to STEM

By Amy Rauch

Exploring computer science through animated storytelling, acting as architects and engineers to develop their dream playground, building 3-D models that illustrate forms of bacterial genetic recombination, and interacting with real-world professionals—these are just a few examples of how students across the state are exploring STEM subjects through Project Lead The Way (PLTW).

Today, nearly 300 Michigan schools have implemented PLTW to create high-quality career learning experiences for students. PLTW’s K-12 pathways help students develop a strong foundation in computer science, engineering, and biomedical science, explore a wide range of STEM-related career opportunities, and perhaps most importantly, ensure that they develop transportable skills they’ll need in any career they choose—skills like communication and collaboration, problem solving, and critical and creative thinking.

“[In PLTW], students work collaboratively to find a solution to a problem and discover that there is not just one right answer or just one way of getting to the answer. The level of engagement I see with my students is extremely high,” says Tessa Lee, fourth-grade teacher at Mars Elementary School in Berrien Springs.

“We noticed right away that the students were thinking at deeper levels and making connections to what they have experienced in their lives,” says Lee’s principal, Darla Campbell.

STEM-focused educational programs are growing across Michigan as data shows an increasing need for STEM-prepared students. A 2015 report from the Michigan Department of Technology, Management, and Budget shows that through 2020, STEM job opportunities are expected to grow by 11.8 percent, compared to 8.5 percent for all occupations. Nationwide, Michigan ranks 10th in total STEM occupational employment, with mechanical engineers, industrial engineers, and computer specialists comprising the top STEM-related occupations.

For school districts, however, going from identifying a need for a STEM-focused program to implementing one isn’t just a snap of the fingers. PLTW works closely with districts to provide the support and resources schools and teachers need to be successful, including in-depth teacher training.

“PLTW makes it easy because of how the content is displayed and delivered,” says PLTW Biomedical Science Master Teacher Katie McGormley at Madison High School in Adrian. “All activities build up to a project or problem which makes the content and skills connect in a way traditional science classes have lacked.”

As educators, we know that real-world connections are at the heart of true learning – engaging students, providing relevancy to their work, and in many cases, leading to career choices.

“One day as I was coaching high school girls’ soccer, we were reminiscing about their time spent in middle [school],” says Bill Rae, PLTW Gateway master teacher at Lake Fenton Middle School. “One athlete said, ‘I remember that class – it was HARD, but fun!’ Hard work and fun - what a way to spend time with kids. I love watching the light come on for my students, but it’s even better when they tell you they are going to college to become an engineer as a result of their courses.”

Amy Rauch serves as a Director of School Engagement for PLTW, working directly with schools in Michigan. Before joining PLTW, she worked for over 20 years as a teacher and administrator. Connect with her at ARauch@pltw.org.

1 http://www.mistempartnership.com/cm/dpl/downloads/content/491/STEM_Talent_in_Michigan.pdf
My Experience at the MAEOE Conference

By Mark Wilke

Over the past fifteen years in education, I have noticed many different changes that have occurred in science curricula. Trying to find a happy medium between creativity and meeting students' needs has always been a difficult task for any teacher. Over the past school year I had the privilege of attending the MAEOE conference. This conference was put on by the Michigan Alliance for Environmental and Outdoor Education committee and includes many science educators throughout the state. The conference I attended was in Sault Ste. Marie in the Upper Peninsula of Michigan. Normally conferences include small group sessions, keynote speakers and a mixture of opportunities to get to know key educators in the field of science. The one area that makes this conference completely different are the field trip opportunities.

The field trips are related to the environment that the conference is located in. I was able to drive the Whitefish Bay scenic highway and observe a fish hatchery in Sault Ste. Marie. This allowed me to understand how fragile our environment is and how as a society we need to work together to help eliminate the pollution that is created. Stopping by the Point Iroquois light house was a highlight of the field trip. A guided tour of the lighthouse allowed me to immerse myself in the lifestyle of the era and environment that light keepers experienced. The last stop on the driving field trip was to the final resting place of the Edmund Fitzgerald. The boat sank off the tip of Whitefish point on November 10, 1975. The lighthouse and museum located there offered many insights to the final moments in the cargo ship’s life.

The activities that alongside the conference allowed me opportunities to network with professionals, build up my scientific library, and get in touch with my creative side. Understanding how to integrate environmental education with your everyday curriculum was the main focus of the conference. How to use different colored leaves to build bar graphs, identifying the migrating habits of fish and creating “leaf man” were some of the highlights of the workshops that I attended. If you are looking for professional development that is outside of the box and brings a completely different way of thinking, then consider attending the MAEOE’s conference next fall!

Mi-STAR Teacher Honored for Teaching Excellence

Dawn Kahler, a key contributor to the Michigan Science Teaching and Assessment Reform Project (Mi-STAR), has received a Catalyst Education Award for exceptional teaching.

Kahler teaches eighth grade science at Milwood Magnet School for Math, Science and Technology. She joined the Kalamazoo Public Schools in 1993, first teaching fifth and sixth grade and then, in 2005, teaching middle school science. She is among four teachers from southwest Michigan to receive a Catalyst Education Award, which is sponsored by the economic development group Southwest Michigan First.

This is the inaugural year of the awards, which “celebrate great educators in our community who are uplifting our next generation.”

Kahler has played an active role in Mi-STAR, which is developing a middle school science curriculum that aligns with the Next Generation Science Standards. In addition to helping to write the curriculum, she has also piloted two units in her classroom. “Dawn has been especially valuable to help us design science units to be engaging, to drive inquiry and to foster critical thinking skills,” Mi-STAR curriculum development coordinator Douglas Oppliger wrote in nominating her for the Catalyst Award. “Dawn’s skills as a teacher and communicator have been invaluable to the project.”

Kahler has long focused her efforts on teaching critical thinking skills and incorporates interactive science journals in her classes. The journals help students demonstrate what they have learned and make connections between prior learning, current learning and the real world.

Among her many honors and accomplishments, she has been named an Exemplar of Excellence at Western Michigan University, where she completed her undergraduate education; has served four times as a speaker for the Michigan Science Teachers Association conference; and has trained as a Next Generation Science Exemplar, exhibiting mastery of the Next Generation Science Standards. She has also earned an MS in Applied Science from Michigan Technological University.

Kahler received her Catalyst Award at a Jan. 26 ceremony in Kalamazoo. The honor includes $2,500 for each recipient, plus an addition $2,500 to fund the school project of their choice.
Updated Mi-STAR Academy Included in Free NGSS Workshops for Michigan Science Teachers

By Marcia Goodrich, Michigan Science Teaching and Assessment Reform

Science teachers from across Michigan can now enroll in an updated version of the online Michigan Science Teaching and Assessment Reform (Mi-STAR) Academy.

The academy is a self-paced, online course that helps teachers deepen their understanding of the new Michigan Science Standards and Next Generation Science Standards. Modules address topics such as the structure of the standards; understanding science and engineering practices, crosscutting concepts and disciplinary core ideas; engineering in K-12 science classrooms; and how the standards can be applied to curriculum and assessments.

Mi-STAR Academy will be provided free to approximately 1,200 teachers participating in the five-day Next Generation Science Exemplar (NGSX) professional development series, which is being funded by the SMILE program. Science, Math Integrating Literacy and Engineering (SMILE) is a project of the Michigan Mathematics and Science Center Network, funded by a Mathematics and Science Partnership through the Michigan Department of Education.

The five-day NGSX sessions combine face-to-face work in a study group format and a web-based environment. Participants receive training in the NGSS and gain the skills to help other teachers implement the standards in their classrooms. Teachers also receive credit toward professional recertification.

“We needed professional development to get teachers up to speed in the NGSS, and the Mi-STAR Academy was a good fit,” said Shawn Oppliger, director of the Western U.P. Center for Science, Math and Environmental Education, one of 33 centers offering the NGSX workshops.

The Mi-STAR Academy format allows teachers to pick and choose what parts to cover, based on their prior knowledge of the NGSS. The usual $25 fee will be waived for those participating in the NGSX workshops.

“We’re excited that the Mi-STAR Academy has been chosen to be part of SMILE,” said Brenda Bergman, Mi-STAR director of operations. “Teachers who participated in the Academy through Mi-STAR gave us great feedback, which inspired us to develop this version for all Michigan teachers.” Mi-STAR is developing an NGSS-aligned curriculum for the middle grades.

To participate in NGSX Workshops, Michigan science teachers should contact their local Math and Science Center. Web links to local Math and Science Centers can be found on the Michigan Math and Science Center Network website. To register for Mi-STAR Academy, see the application form here. For more information on Mi-STAR Academy, contact Marianne Semones at 906-487-1210 or msemones@mtu.edu.

Climate Change Student Video Competition

The Climate Cost Project, a non-profit educational and documentary project on the climate change impacts that are happening in American communities, is sponsoring a student video competition. The Witnessing Change Video Competition gives students the chance to work with members of their own communities to document the climate impacts currently happening in America and to tell powerful stories about the costs of climate disruption. Submissions for the 2016/2017 contest are due May 1st. To learn more, visit the Climate Cost Project online at http://www.climatecostproject.org/
Brining Hip Hop Into the Science Classroom

Rich Lund, St. Johns High School

As the science and hip hop worlds continue to merge in education throughout the country, the Tungsten Clan has continued to push the envelope with their newest release, “Who’s The Monster?” (https://www.youtube.com/watch?v=wfAxzn8dA2A) which takes on the question of scientific responsibility through a classic, cross-curricular theme. In this rap battle between Victor Von Frankenstein and his resurrected Creature, both plead their old school case with modern grooves and beats as to why the other party is the true Monster of Mary Shelley’s 19th Century tale. Is the true villain of the story the Creature, who obviously has done unethical work throughout the story, or is it the Doctor’s irresponsible use of scientific discovery and experimentation? This hip hop video is something a critical thinking science classroom could use to deliberate on the necessity of responsible decisions in modern scientific efforts, but also easily fits into a British Literature lesson plan to help explore the heart of Shelley’s literary theme.

In recent years, #HipHopEd has been an online and classroom movement to engage students in learning through hip hop music. Classroom friendly YouTube channels, such as Coma Niddy (https://www.youtube.com/comaniddy) and Science With Tom (https://www.youtube.com/tomcfad) expose both educators and students to this quickly expanding merger of science and hip hop.

The Tungsten Clan represents Michigan’s own effort to engage students in educational hip hop tracks. We are a group formed from multiple Michigan teachers in the fields of science, mathematics, and literature. To see more of our previous work “on fleek”, the Tungsten Clan videos are all featured on the YouTube channel, MrLundScience (https://www.youtube.com/MrLundScience).
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Maybe We Can Get Along: A More Civil Society with Argumentation

Chris Geerer, Parcells Middle School

Middle school can be a social crucible for youngsters struggling to emerge from their childhood personae. So it seems like there's no better, and more challenging, place to teach the protocols of reasoning and respect. That's one of the things that NGSS-aligned curricula and pedagogies can accomplish through the science practice of engaging in argument from evidence.

In curriculum being developed by the Michigan Science Teaching and Assessment Reform project (Mi-STAR), students are routinely asked to construct arguments based on solid evidence to defend their positions. They must also respectfully provide and receive feedback from their peers. As I've reflected on my work with the Mi-STAR program this year, it's become clear that arguing from evidence is a valuable practice in life, as well as in science.

Defending one's position is a common experience. We want our kids to think logically, and for years we've asked them to do that. What's different about the new Michigan Science Standards is that through focusing on scientific argumentation, we can help students learn to argue civilly. Our students are learning that it's possible to have a disagreement without feeling personally attacked.

Certainly middle schoolers aren't the only ones who could benefit from a little civility, especially during the aftermath of a bitterly fought election.

We as adults live in a country divided. We are desperately in need of people who can have different points of view and discuss them without taking offense. We also need citizens who are good “consumers” of information—that is, able to evaluate data and assertions in order to draw their own independent conclusions. These practices are a big part of what the new science standards are all about.

I've come to deeply appreciate what Michigan Tech and the Mi-STAR curriculum are doing to help kids hone their argumentation skills. The Mi-STAR curriculum has the potential to make all of our lives better—if our students take those lessons of logic and civility in argumentation to heart and apply them as they grow into tomorrow's citizens.

Think about it: If everyone had the skills to have civil discussions and argue from evidence like a scientist, we would have a more peaceful world. We always knew it would be science teachers who save the world, right?
Exploring Coding Creatively

By Jennifer Sitton, National Inventors Hall of Fame, North Canton, OH

Coding is everywhere! It permeates every aspect of our daily lives. Children frequently use coding, but may not realize it. Coding is the process of arranging symbols in a specific pattern to produce a reaction—it is a way of communicating. Watch any gamer frantically hit the “A” button while playing their favorite video game to get a character to jump over obstacles, observe how people stop at a stop sign, or think about the ways we read sheet music while playing an instrument—these are all examples of people interacting with code.

You don’t need a TV, computer, or tablet to explore coding. Have you ever played the Candy Land® game with colored squares? By moving your character to these squares in response to a matching card, you were reading code! More than 20 years ago, Dr. Radia Perlman created the first technology while at MIT that allowed young, preliterate children to perform computer programming (http://www.invent.org/honor/inductees/inductee-detail/?IID=526). This past year, we asked her for the best methods to teach children the foundation of coding and computational thinking.

Radia gave us great insight! She told us to “know what problem you are trying to solve before you try to solve it.” This simple advice has prompted us to emphasize being thoughtful and empathetic while employing design thinking. For example, we had children watch video clips of people using ear buds and see for themselves the challenges people encounter. They then applied personal observations in design thinking to create consumer-friendly solutions.

Elementary students attending our Camp Invention® program hear the story of Dr. Barbara Liskov, a computer programming language pioneer, and create a beaded bracelet that codes for their name using the binary language of 0s and 1s representing letters (http://www.invent.org/honor/inductees/inductee-detail/?IID=464). In another activity, they make secret messages with stamps to have their friends decode and discover how to match up different LED prong lengths to change the color of the light while exploring squid communication.

No child is too young to start coding. Invention Playground® explores programming and other STEM concepts with preschoolers. In one experience we designed, preschoolers work together to compose a piece of music by arranging cards with images of musical instruments on a wall coding the order the instruments will play. They discover that placing multiple instrument cards vertically codes for all of those instruments to play simultaneously. Then we had preschoolers move in different ways (e.g., jump) in response to different colored pieces of paper. They take the coding a step farther by combining movements when the color held up is a combination of two other colors (e.g., If yellow=spin and blue=jump, then green=spin and jump.)

Coding is a highly creative tool that inspires critical thinking and enables people to communicate ideas in new and innovative ways. Take a fresh look at the symbols around you and be inspired to get kids of all ages problem solving and coding. After all, it is an important language of their world!
Are you familiar with the Maker Movement? Being a Maker means you are an independent inventor, designer or tinkerer. Dale Dougherty, the founder of this concept, is credited with the term Maker Movement, which has brought the idea of making and inventing to the forefront of education. Students are now being encouraged to think in new ways. Being exposed to design thinking, learning how to share ideas while listening to others, and collaborating to create something new, is the premise of Maker education.

A MakerSpace is a designated area for people to plan and create. The MakerSpace concept goes beyond a fad or a trend, but is a new way of learning that incorporates design-thinking ideology. In our early childhood building, we are excited to have a MakerSpace designed for children ages 4 through 8 years old. Students spend time working and problem-solving together to make their ideas a reality. They are able to learn about something that interests them and then follow the design thinking process—empathize, design, ideate, prototype, and test—to create something of value. This learning is meaningful to our students because the end result is a product of their creativity.

This space, known as La Ruche or The Hive; a center busily occupied by people and filled with materials that students use to create something from their imagination. We have transformed a former kindergarten classroom into a space that welcomes young and old with its various creative sections. Cupboards, baskets, and bins hold varieties of tape and fasteners, recycled materials, craft supplies, sewing products, woodworking tools, the list goes on and on.

Pre-Kindergarten students have begun to identify needs and use the MakerSpace to design and create products to fill those needs. During October, a class decided they needed pop-up ghosts to frighten visitors as they entered the classroom. They used MakerSpace time to design and create ghosts on pulley systems that would move when people walked past an area in their room. Another classroom designed and created holiday gifts, using recycled materials, to deliver to specialist teachers throughout the building before the holiday break.

Older students have built instruments out of recycled goods to support class projects. Children realized they had inadequate pillows for everyone in class, so they sewed pillow covers and covered pillows from home. Students studying Native Americans researched Native American dwellings, found materials in La Ruche, and created models of those dwellings. Students are learning how to use a hammer, screwdriver and a saw. Their projects have meaning and are of value to them.

In addition to these everyday items, cutting edge technology is available for the children. PK3 and PK4 students are learning the most simplistic form of writing code using new interactive coding robots such as Code-a-Pillar and Cubetto. Ozobot, Spheros, and Dash and Dot are favorites of the Kindergarten through Grade 2 set.

Along with helping children to think beyond the obvious and use problem-solving to create, one of the most unexpected outcomes has been the verbiage that students use when communicating with each other. “Here let me help you.” “Would you like to use these?” “That’s a great idea!” “Can you help me?” are just some of the awesome examples we hear from our students.

The possibilities are endless! As we continue to learn, we share new ideas with our students. They design, tinker, build, explore, create and test. What an amazing opportunity we are providing for these youngsters. We’re so very proud to be part of this wonderful initiative.