VIRGINIA TECHNOLOGY AND ENGINEERING EDUCATION ASSOCIATION

TECHNOLOGIZE

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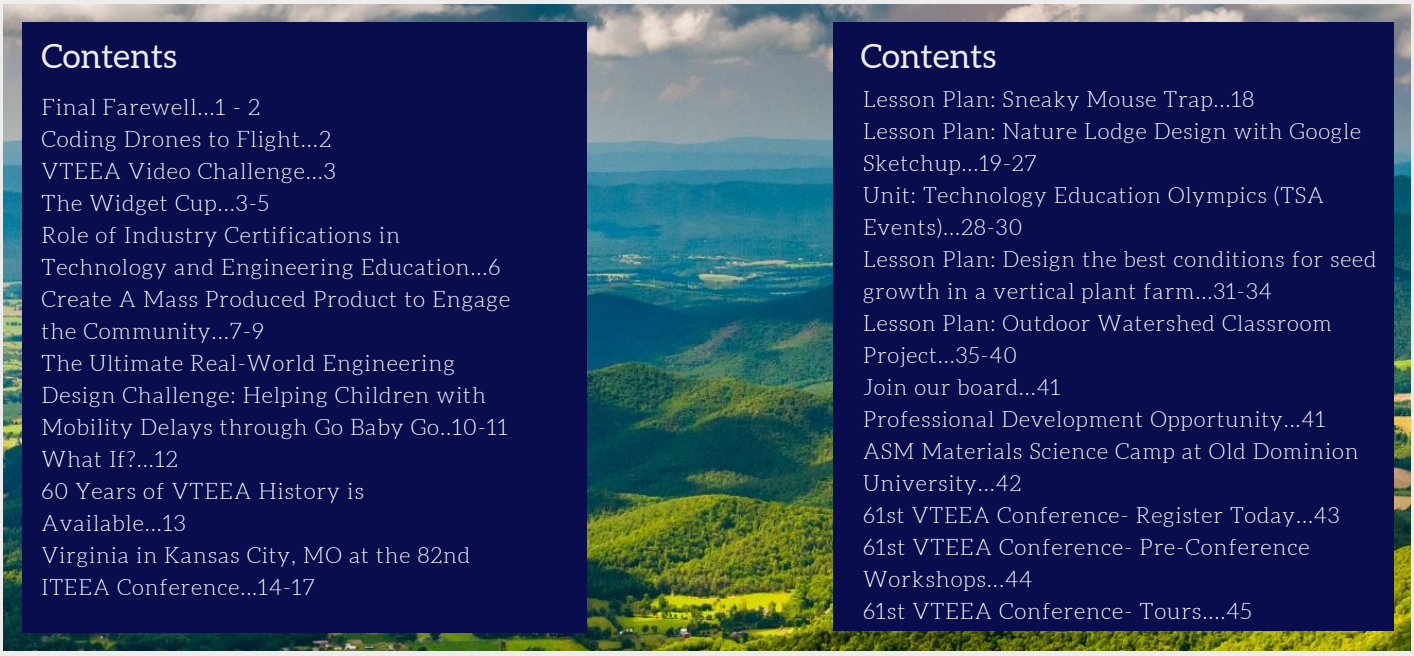

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Final Farewell

BY GEORGE BISHOP, VTEEA IMMEDIATE PAST PRESIDENT

Once again Spring has sprung, the school year is winding down, but this year I find myself writing my final message as a member of the VTEEA Board of Directors. Over the course of the past seven years, it has been my distinct privilege to work alongside many distinguished educators and administrators in and out of the Commonwealth. The experience of serving as President-elect, President, and now Immediate Past President has certainly opened my eyes to a multitude of opportunities to serve Technology Education and Career and Technical Education. One of the opportunities that presented itself was a call from the Virginia Association for Career and Technical Education to stand for the office of President.

"On June 10, 2019, I will be installed as Virginia ACTE President."

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Spring Board of Directors Meeting took place on Thursday, April 11 at the CTE Resource Center

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For that honor, I must thank Mr. George Willcox who first floated the idea a few years ago and has provided wise counsel and guidance. I am very aware of the job that is done on behalf of all nine of the divisions under the VA ACTE umbrella and the advocacy that occurs both within and outside the Commonwealth promoting our Career and Technical Education programs.

Within the VTEEA, we have seen tremendous strides with integrating technology, conference planning, and ensuring our members see the Association's Board of Directors working to improve the scope and focus of the association. Our young educators have risen to every challenge presented over the past few years and we've moved into the world of integrated payments for membership and conference registration, migrated and updated the vteea.org website, and re-established our presence as one of the premier state professional associations. Thank you to each member who has contributed to the overall health of the Virginia Technology and Engineering Education Association!

I also ask that each of you look around the Commonwealth at your fellow educators and nominate one or more for the various awards presented by the VTEEA each summer at conference. Nomination forms can be found on the Association website following the Membership, Awards and Scholarships links. Please take the time to help recognize the many talented educators within Technology Education in Virginia.

Going forward, I hope that each of you will feel free to call upon me for whatever assistance you may need and that you will join or renew your membership in the Virginia Association for Career and Technical Education. It is only through strong professional associations that we can truly influence the direction of Career and Technical Education within the Commonwealth and your voice is a vital component that needs to be heard.

Please continue to support the Virginia Technology and Engineering Education Association, the International Technology and Engineering Education Association as well. Get your "Early Bird" conference registration in for the VTEEA Summer Conference in Roanoke, July 23-25, 2019 and look at attending the VA ACTE Leadership Seminar in January 2020.

Again, thank you for the opportunity to have represented the Association. It has been an honor and a privilege. I look forward to seeing each of you in Roanoke at conference this summer!

Coding Drones to Flight

BY SAMUEL LEONE, VTEEA SOUTH CENTRAL REGIONAL PRESIDENT

One of the coolest things I learned at the 81st annual ITEEA Conference in Kansas City was what a program in Louisiana was doing with drones. Drones have become a really cool piece of technology that attracts different groups of people, whether it be used for military, education, or for the average hobbyist. They even have drone racing on ESPN, so being able to have students learn about drones, the biomimicry behind them, their importance, and how to safely fly them can be found in any STEM classroom. Some drones are autonomous, or controlled from far away. This educational program was using "Tynker" a block coding software to teach students how to program the autonomous flight of a drone. I looked further into this free "Tynker" coding software as it not only can program drones, but other robotic devices such as Lego robotics. In addition, the "Tynker" software has tutorials and puzzles to solve that allows students to learn how to read and create code. These puzzles can be related to other core subjects such as mathematics, history, or science. As I was watching the block code demo and how the "Tynker" software was changing which blades moved on the Parrot Mambo drone, I thought what a cool computer science and engineering unit this could develop into with all the cross-curricular connections with the students coding the drone to fly.

VTEEA Video Challenge!

BY DANIELLE MEYER, VTEEA PRESIDENT

During CTE Month VTEEA was seeking Virginia school divisions to submit a three minute video highlighting all the amazing work that is taking place within our discipline across the state. The challenge details are listed below.

Video Challenge Design Brief

Client	VTEEA
End User	• VTEEA • Individual CTE Programs (CTE Month Promotion + Program Advertisement) • Teachers
Designers	Virginia Technology and Engineering Teachers
Problem Statement	VTEEA is looking for each county in Virginia to develop a video to highlight what technology and engineering education looks like in Virginia.
Design Statement	Design, produce, and finalize one county video for your division.
Criteria	The video needs to: • demonstrate proper safety procedures and practices. • incorporate teachers, students, supervisors/directors/coordinators. • be free of any text errors. • be creative and engaging. • incorporate both lab experience, classroom instruction, and peer to peer interaction.
Constraints	The video must: • be exactly three minutes in length. • highlight at least three different areas of technology and engineering. • be appropriate for all audiences. • be uploaded to YouTube no later than 3:00pm on Friday, February 15, 2019 and a copy of the video link emailed to vteea1985@gmail.com with the subject heading: VTEEA Video Challenge- County Name

VTEEA is pleased to share with you the top video submission! Please help us in congratulating Charlottesville City Schools in the Valley Region! A huge thank you to Ms. Teresa Amasia, iStem Teacher at Venable Elementary, students, and colleagues for producing such a great program highlight!

Check out the winning video! https://youtu.be/EshWw4VBuYU

The Widget Cup

BY BRITTANY CARPER, VTEEA VALLEY REGION MEMBER

The Widget Cup partners local schools and community businesses to work together to showcase skills attained through Career and Technical Education (CTE) and Science, Technology, Engineering, and Math (STEM) coursework.

What's a Widget Cup? The Widget Cup is an annual competition engineered by the Frederick County Economic Development Authority (EDA) in Virginia to highlight the talents of the area's CTE students in a design/build challenge. Eight-person teams from Clarke County High School, James Wood High School, John Handley High School, Millbrook High School, and Sherando High School compete as they design, build, and pitch a pre-determined widget prototype to the project client and a panel of judges. Business leaders from the community participate as judges, resource leads, material providers, and overall event sponsors.

A team selected from each school consists of 4-5 students on the build team and 2-3 students on the A/V team. The build team designs and builds the product, and the A/V team documents and prepares the presentation for the final product pitch to the client.

The teams are not aware of the challenge until the day of the event. Students are first introduced to the client, and then given the task and parameters of the challenge. The client is usually a local non-profit that is in need of a specialized product.

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"There are three phases to the competition, Design, Build, and Pitch."

During the Design Phase students on the build team are given one hour to plan out and draw a prototype based on client-provided design specs. Local business professionals labeled as “Resources” consult and sign off on final designs.

After designs have been approved, teams move into the Build Phase. Teams have three hours to bring their concepts to life. Students utilize a fully-equipped shop provided by the host school and materials donated by local businesses. Resources circulate throughout the shop for consulting as well as the team coach, a teacher from their home school. The coach is only given a five minute period in which they can offer some advice or point out areas for reconsideration. Parents and supporters are able to watch via a live-feed in the auditorium.

Teams can make or break their hard work during the final phase, the Pitch Phase. The audio-visual team members orchestrate and edit the presentation, but the team, as a whole, works out the pitch. Some teams choose to develop their visuals as an all inclusive video, some will put together a slideshow, and some will mix video and still slides. The presenters can come from both sides of the team. The teams are given another resource professional to consult with as they design and practice for their final presentation. The team is allowed up to ten minutes to present how their product prototype best meets the client’s needs on stage to the client and a panel of judges.

Judges use a rubric throughout the day to rate performance in design, efficiency, appearance, safety, teamwork, communication, etc. The presentation is evaluated for visuals, sales pitch, ergonomics, and verbal communication. In trying to best represent a real-world experience, the teams are told that there is only one winner, and no other honorable mentions will be given.

The 5th Annual Widget Cup was held on April 5, 2019 at Sherando High School in Stephens City, VA.

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"Teams from Frederick County, Winchester City, and Clarke County used ingenuity, teamwork, and problem solving skills to design organizational solutions for the Winchester Little Theatre's shoe wardrobe."

Shoes needed to be able to be organized by type, protected from damage, and easily accessible while meeting specified size constraints. Sherando High School won the Widget Cup, making this their third victory of five years in the competition.

The Widget Cup competition is possible because of the support and collaboration of area businesses and the local school systems. Business leaders from the community participate as judges, resource leads, material providers, and overall event sponsors. Without these community partnerships this event would not be possible.

Check out the webpage!

https://thewidgetcup.com

Customer History

2019
Winchester Little Theatre
Widget: Shoe Storage Solution
Winner: Sherando High School

2018
Museum of the Shenandoah Valley
Widget: Gates for the Glen Burnie Gardens
Winner: Clarke County High School

2017
Bright Futures Frederick County/Winchester
Widget: Volunteer Cubbies
Winner: Sherando High School

2016
Shenandoah Valley Discovery Museum
Widget: Three-Sided Book Shelf with Storage
Winner: John Handley High School

2015
NW Works
Widget: Work Benches
Winner: Sherando High School

Role of Industry Certifications in Technology and Engineering Education

BY SAMUEL LEONE, VTEEA SOUTH CENTRAL REGIONAL PRESIDENT

When I moved down to Virginia four years ago I had no idea the impact that industry certifications had. Although Perkins V is adding a focus to work based learning (WBL) opportunities for students, industry certifications will still have weight and are important for students to earn.

> "Industry certifications carry the same weight as a student's SOL test in the CTE world."

By earning these credentials, it shows that the students have learned the content, but to also apply the content in a realistic environment. When I did my Manufacturing Technician Level I (MT1) training, I became aware that manufacturers put applicants who have this certification at the top of their lists as student have an understanding of mechanisms, manufacturing, and how a business is run.

This year one of my students is doing a CAD internship over the summer where he will be on a team creating airplane terminals. The employer was impressed with his CAD drawings and his AutoCAD certification. The more certifications we can have our students earn the better as it can help them land future internships and jobs.

Industry credentials are not only a graduation requirement, it is a stepping stone that puts our students at the top of the list when it comes to job opportunities. The table down below maps out which industry certifications can be implemented into our Technology Education programs.

Sequence	Course	Certification	Engineering & Manufacturing Course
9	Technical Drawing	Autodesk AutoCAD	MT1 or similar NOCTI certification should be implemented in a hands on, PBL engineering, manufacturing, or materials processing course.
10	Engineering Drawing	Autodesk Inventor	
11	Architectural Drawing	Autodesk Revit	
12	Adv. Drawing & Design	MT1	

Let's Be Social!

Here's what you're posting about!

Don't forget to #VTEEA every time you post and you can be featured here!

Create A Mass Produced Product to Engage the Community

BY RON VICKERS, VTEEA HISTORIAN

Sherando High School Technology Education students started with one wooden crate designed to hold VCR tapes and the production evolved into farm markets in our community buying them for produce and school wide sales of crates personalized with a name or logo. In my first year at Sherando, I utilized multiple departments within the school and involved close to 100 students in this endeavor.

When I taught at Rappahannock County High School that had only one Technology Education teacher and limited businesses in the county. I had students mass produce mini wooden crates similar to the ones Dave Magnone made at East Rockingham High. It is an easy project to make that has multiple tasks to get a whole class assigned a job. We screen printed our school mascot and name on one end that made them special for the kids. After I moved on to Luray High School again I produced crates with the new logo and gave away a bunch to other teachers. There I had to get our art teacher to make us a photo emulsion screen to improve the design on the end. Both of these schools I taught a Technology Foundations course and this was our only line production for the course. Now that I work at Sherando High, where we have 3 Technology Education teachers, and whole departments in CTE that I did not have before, I decided to again produce wood crates.

Using #2 shelving board from the local Co-Op (better price than Lowes) and standard 2x4s, we again started with the crate designed for original VCR tapes. I approached our Marketing Teacher to ask if his students might be interested in submitting marketing plans for our crates. Selling and distributing products is one of my least favorite tasks. He got onboard quickly and after I gave a tour of our labs, Mr. Uhry had over 12 plans submitted for approval. My students and myself read over them and selected one to win the bid.

Marketing students immediately started planning advertisements and how to go about selling the crates. They came back with the idea of making crates for local farm markets which would produce bulk sales. We redesigned the crate for a half bushel size and made some prototypes. My department head agreed to make a screen so we could print designs as before. They also made us a screen with a sentence identifying my class as our “maker’s mark” on the bottom slat. The Technical Drawing teacher got two students to draw up CADD plans for the 2 different sized crates. This worked well for her as she selected the student way ahead in course work to take on the computer work. I placed example crates in our trophy case and displayed them to several others in the school to get the idea out. Marketing students produced an order form that was placed on the counter in the main office. As the word got out I was getting lots of questions if we could personalize the words and graphic on the crate end. I enlisted the Advanced Graphics teacher for her students to start creating designs in vector format that I could use.

Our school has Versa laser Engravers and I used the Adobe Illustrator graphics to burn designs onto several ends.

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This lead to getting key folks names on the crates along with our school mascot logo and name as thank you gifts for their efforts. I tried to use a laser cut cardboard stencil and spray paint to apply the design without success, and I even used spray adhesive to hold the stencil to the wood. It left a sticky residue and almost clear design.

We tried painting in the burned laser cut and then sanding it to make the lettering clear but this did not always work and took too much time. So we settled on laser engraving or screen printing. Marketing students convinced us that the laser engrave was something that folks could not easily buy elsewhere and that would create sales of our product.

After working for several days in the lab, I decided to have the production students keep track of how many minutes they worked each day on a spreadsheet. I wanted to get an idea of how much profit we could make.

I determined the smaller crate could be made for about $2.13 of materials and it could sell for about $7. The larger half bushel crate would sell for $12 We charge an extra $2 for a personalized design.

As of today I have contacted several business and I have contracts with them to make sales to the local Page Co-Op, Shenandoah Valley Electric Cooperative, Cabin Rentals, Hawksbill Brewing Company and Survivor Farms. Marketing students obtained a bulk order for West Oaks Farm markets. I was very glad to have a couple of Advanced Graphics students who I could go to every day with emails or paper logos from prospective clients for a proof of the design before making the crates.

As days went by, I took pictures of students involved, and started making a tri-fold display board of the process with printed color pictures and captions. This helped me to display the idea to more folks. We called our business SHS Crates Co.

I know this is not very original and think I'll spend more time thinking about how we can teach trademark and branding for future classes. We had many questions on how workers would get paid. It is hard to get cash to students in schools so we determined the marketing department would receive a percentage of the sales as their commission. After money is deposited into the Technology Education local account, we will transfer an agreed upon amount to their department funds. My own students have listed what they personally want on a crate that will get made within the production line.

To explain quickly how crates are made we used 1x6x10' and 1x8x10' boards for the ends cut to length with the sliding miter box saw. Two holes, 1" diameter spade bit, are created using the drill press measured 1 ½" from the top edge and 2" in from each end. Lines are drawn tangent to the holes for the handle slot. A sabre saw is used to cut the interior piece out. From here a round over bit on a router table is used to shape the top edge and both sides of the handle slot.

Pad sanding is required to remove blemishes in the wood. Sometimes a wood file is necessary to help shape the slot to remove bumps. Slats are cut to length on the sliding miter saw and then jointed on one edge to square it up. I took the job of ripping ¼" strips of these 2x4s until it was used up.

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I plan on creating a jig to make ripping thin strips on the table saw easier for 15 year olds for the next time I teach this. I was just not comfortable having students get their fingers that close to the blade for the 1 ½" tall cut. To eliminate a lot of sanding, each strip was chamfered on 4 edges, one side with the router table. Finally assembly was done with glue and ¼" x ¾" staples and pneumatic staple gun. It did not take too many production days to get a slew of mistakes and "do overs". I created a slideshow and checklist on Quality Control making every employee responsible for visual inspection with errors identified quickly.

We have classes for 90 minutes on an every other day schedule so participation assessments are given every two classes. Students missing a class had the next class for me to decide how many of 50 points they earned for working the next 90 minutes. My guys could not seem to work a solid 90 minutes without a break and I found feeding them apple slices and peanut butter at 2pm got solid work for the last 30 minutes of class. I originally bought the first bag of apples that I used my home apple slicer to quickly slice up. Our cafeteria has a "share bowl" near the garbage cans for students to leave behind unused food items for others. After the end of the lunch shifts I began picking up at least two apples every day to make my feeding less expensive!

As sales are beginning to come in, I approached the business teachers to see if there students could produce a profit/loss statement for SHS Crates Co. I was interested in counting up the work-hours of labor to see how much we would have to charge for crates if I paid minimum wage. Research showed us Walmart charging $12.42 for a crate similar to our larger one. It is not nearly as well made and definitely lacked any personalization with laser engraving. I have two manufacturing Systems I classes meeting the first period of the day and last period on the same day 1. I called them 1st shift and 2nd shift. My TSA kids met each week on Wednesday after school so we created a 3rd shift to screen print the maker's mark on the bottom slat.

In the smaller counties I worked I used to write an article , take pictures and more or less do all the work for the local weekly newspaper to get it published. In Frederick County I first filled out a google form to get permission for a fundraiser. Then I submitted the information to the activities director for him to decide if images would get published on the school web page. From that point the central office has a media unit that video tapes stories for submission to local media in the county. I'm hoping to get approval and see my students in the Winchester Star or even the local television station. Several administrators have heard about our work and shown interest in what we are doing. I think the idea of working with other CTE departments along with the community will make this happen.

The last exciting event to happen will be getting pictures of students delivering crates to area farm markets. We have a standard design with "Locally Grown in Frederick County" that has an apple design that will really look good with local produce inside ready for public sales. I have enjoyed approaching business I know to get orders.

"This effort has introduced my program to folks outside the school system."

The order from the brewing company resulted in creating a crate with partitions to separate 4 growlers and now a pick your own blueberries farmer with us creating a specialized crate for his customers to use on the farm.

Our marketing has included me posting images of our production on Instagram and Facebook using the hashtag #shscrates. I also regularly use #sherandoteched and #sherandotsa It has been nice to get comments from folks asking how they can get a crate. Check us out! I am open to comments and suggestions on how I can further improve this production run and collaboration. You can contact me on social media, send a text to my cell (540) 860-2807 or an email to vickers@fcpsk12.net

The Ultimate Real-World Engineering Design Challenge: Helping Children with Mobility Delays through Go Baby Go

BY ETHAN LONGENECKER, VTEEA VALLEY REGION MEMBER

One of the greatest moments of my life was watching my daughter take her first steps. Seeing the excitement on her face as she gained the ability to explore the world around her nearly brought tears to my eyes. I quickly realized this awesome ability to navigate was going to lead to me spending countless hours baby proofing and chasing my little terror around the house. This ability, however, is extremely important in the development of the human brain. Children learn a lot about their world through exploration. Sadly, not all children get to experience mobility in the way my daughter did.

"Our elementary student at his final car fitting. This car will have additional padding, a lap bar, and some aesthetic upgrades when finalized."

This car has been designed by
Ethan Longenecker & Dave Curry
Technology and Engineering Education
Teachers at Admiral Byrd Middle School
with assistance from Sherando High School
Graphics Teacher Brittany Carper

This realization is what led to the development of the Go Baby Go Program. This national movement for mobility was started by Dr. Cole Galloway, a professor in the Physical Therapy Department at the University of Delaware with a focus on physical rehabilitation for children. I was first introduced to the Go Baby Go Program at the ITEEA Conference in Atlanta, where Cole Galloway was a keynote speaker. His inspiring tales about modifying ride-on electric cars for youngsters with mobility delays, and the impact these cars have had on their development, were a powerful call to action.

As a Technology and Engineering Department, we decided in Atlanta that we needed to be involved in this program. We began to try to learn as much as we could about the program and how to get started. A few months after our Atlanta trip, we attended the 60th VTEEA Conference in Alexandria. At this conference, a duo from Marymount University presented on the Go Baby Go Program. After attending their session, and having the opportunity to ask many questions, we embarked on the Go Baby Go Journey.

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We began our Go Baby Go Program this school year. I started out by identifying a partner with which to work. This partner needed to be someone in the field of Physical Therapy or Occupational Therapy. Through our school system, I received the contact information for the Physical Therapist who works with the population within our building and the neighboring elementary school. After conversing about the program and our goals, we identified a kindergarten student who would benefit from the modification of a ride-on car. After getting parent permission, and obtaining a signed release form, we scheduled an initial planning meeting.

At this meeting, we discussed our goals for the car, took essential measurements, and came up with an overall plan for the build. From there, with the help of modification guides from the Go Baby Go Connect Online Forum, we began our first build. Our first modification was the addition of a "kill" switch as a safety mechanism for the parents of the child. After the kill switch, we wired a "big red button" to replace the pedal to actuate the car. We also added an electromechanical relay to our electronic modifications. The last part of our modification involved adding additional supports to the seat to meet the needs of the child who would become our driver. Once the modifications were complete, we added some custom vinyl graphics designed by students in our high school graphics program. With the car complete, we met again with the soon-to-be-driver and his PT for a final fitting. Watching this youngster begin to figure out how to use his car, and begin exploring his world was awesome to see. According to his PT, the car fitting was the longest the child had sat upright in quite some time.

Since our initial build, we have met with three more children and have a build day scheduled for later this spring. At this build, twelve of our eighth grade Technological Systems students will be making all the modifications. We hope to continue to grow and expand the program in years to come.

"So why get involved with Go Baby Go as a Technology and Engineering Educator?"

Putting the obvious and aforementioned benefits to the child who will receive the car aside, this program is a huge benefit to our students. Real world design challenges are few and far between. We regularly try to "make up" design challenges that simulate real life experiences. We see the value when students can relate to what they are designing. From our experience, there is no better real-life design challenge than Go Baby Go. We have designed and 3D printed everything from the top half of a steering wheel which holds a push button in place and meshes precisely with the existing bottom half, to a set of snap clips that hold a piece of PVC in place, and a ball and socket joint that attaches to a tennis ball launcher. These are the types of real world design challenges our students need. One thing that often lacks from engineering curriculum of any type is the "human factors" element of design. All Go Baby Go cars have some level of customization. Modifications are designed specifically for each user and customized to fit their needs. In my opinion, it would be hard to find a better real-world engineering design challenge that incorporates empathy.

I see the Go Baby Go program as being beneficial in so many ways. It is great for the students in our Technology and Engineering classes, great for the young children who will become mobile (in some cases for the first time), and great for the community at large. I encourage you to take a deeper look at the Go Baby Go Program, and see if it is right for you and your program.

"Be warned, you will make a difference in the lives of children in your community."

What If?

BY DR. LAGUNA FOSTER,
VCEC, BOARD OF DIRECTORS

As the principal of an urban high school, I routinely have the opportunity to observe students participating in numerous school academic activities and clubs that enhance their high school experiences, college preparation and global work potential. Two of our highly requested classes are our Cyber Security classes and Robotics Teams. Both are high in popularity and significantly equitable in regard to participation between girls and boys. We are especially proud of the teams as they prepare to compete in the 2017-2018 Virginia State Robotics Competition.

Reflecting on the success of these teams, I often wonder where and how far advanced these participating students would be if their elementary instruction encompassed basic Science, Technology, Engineering & Math experiences. Would their elementary instructional experiences of design briefs and project based lessons place them in higher tiers of STEM success? After graduating, how many would consider majoring in this concentration? So often, students who are interested in the Sciences of Technology, Math and Engineering discover these experiences on their secondary school levels.. At this juncture, the reality of their prior knowledge of robotic competitions, team solving problem and basic understanding of STEM is accelerated ultimately settling into their world in a tailspin of "learn as you go along". Unfortunately, these types of experiences are undeserving and puts students in situations where they lose interest, become uncomfortable due to potential failure and make academic choices they truly don't want to make.

During my tenure as president of the Virginia Children's Engineering Council, I wrote an article titled, STEM! Many are called, but few are chosen.

"Through this article, I shared my thoughts about the increased interest in STEM and the new educational conversations amongst school boards, superintendents and educational consultants."

My challenge was, as conversations lead to reality, when and how will the real work begin?

When and how will it ultimately land, take root and nurture elementary students. Take a moment if you will and google STEM. As you can see, the results explodes with pages and pages of what was only a concept several years ago. Now, in multiple directions, STEM is now embedded in curriculums, PBL's, stand alone academies, summer camps and in some school districts, strategically developed as STEM elementary schools that feed into secondary middle and high schools. Thus creating seamless STEM experiences from elementary through high school graduation. As a STEM advocate,I am excited about the concept of seamless STEM experiences! Imagine the potential! An example...Mr. Dyson, an engineer who perpetuated new designs for vacuum cleaners has created a school for just such promising young engineerings to explore and sharpen their intellect in engineering and design.

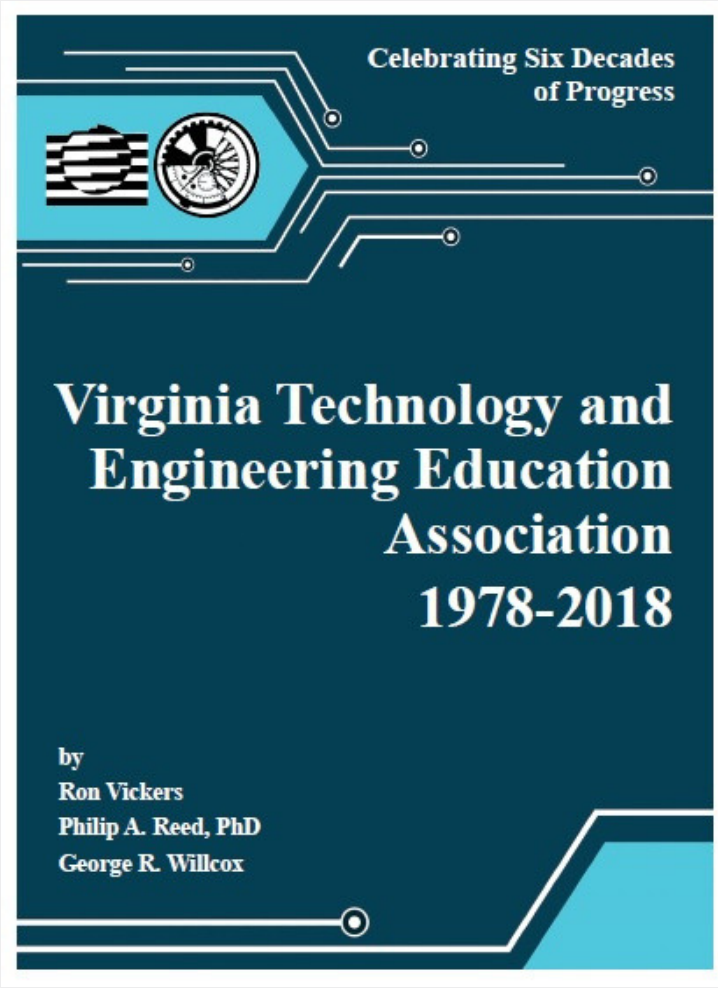
There are also countless gladiator classroom teachers and specialist matching the same willingness in their classrooms, day to day doing research, buys materials and taking relevant field trips. These are the elementary experiences needed to nurture our students as they transition to their secondary experiences.

Today's students are very talented with technology and adaptive to Science, Technology, Engineering and Math. And in spite of pockets of limited to no experiences in these areas, a large percentage of student do make it successfully! However, what if?

60 Years of VTEEA History is Available

BY RON VICKERS, VTEEA HISTORIAN

Last spring I compiled a book including every VTEA / VTEEA President since 1978 along with our summer conference information in an effort to preserve our association's history. Philip A. Reed, PhD worked to get ODU's library to become our permanent repository of written and digital files. Mr. George Willcox was an integral resource with this effort with his listings of past awards for Teacher of the Year and Program of the Year.



"This publication was funded by Amtek Company and Ronald A. Williams Ltd."

Two hundred copies were printed and those of you that attended the 60th Summer Conference in Alexandria received one at one of our dinner functions. Since that time I have been able to present a copy to individuals I come across at TSA events and other meetings.

The next major historical project that I am working on is collecting any digital images from the past 60 years. We are still determining the best way to get the digitized images available to members. Blog posts or a Google drive folder are in consideration. Just about every one of us has taken some pictures in our careers that we need to preserve for the next generation. If you have paper copies and can scan them at a high resolution please send any and all files to me in .jpg format. I will also take any paper prints, scan them in, and return the original prints to the owners. The metadata that goes with the picture is almost just as important. The more information you can provide about each picture, the better. I keep my photos in folders on a hard drive that has an event name and/or date. Help us preserve our history by contacting me about getting your images in the collection!

"Researching and writing our association's history was a very enjoyable process. I was afforded the opportunity to communicate with my former college professors and others in our field that have been the leaders. I think it is a good read and mix of historical data."

How can I obtain a free copy?

Contact Ron Vickers at vickersr@fcpsk12.net

Mail Ron your mailing address with a note indicating your mailing address and postage payment of $2.75.

Ron Vickers
Technology Education Department
Sherando High School
185 S. Warrior Drive
Stephens City, VA 22655

Virginia in Kansas City, MO at the 82nd ITEEA Conference

BY MOHAMAD BARBARJI. VTEEA ITEEA REPRESENTATIVE

The 82nd ITEEA annual conference was held on March 27th at the Westin and Sheraton in Kansas City. The conference, as usual, was a huge success. This year conference was focused on the following theme" Bringing STEM to Life to All Children PreK-12 and Beyond". The pre-conference workshops and all other events were fully attended. From Virginia about 70 teachers and professors attended the conference. On March 28th at 7:00 am, the presidential round table was the kick off for the conference, during that meeting, all the ITEEA representative from region 1 were able to meet with the Region 1 Director, Debra Shapiro. Every representative gave a brief description about their annual conference and upcoming events. During that meeting the ITEEA Rep, Mohamad Barbarji, was awarded a free one year membership for increasing g the number of members in the association in VA.

At 9:00 O'clock in the morning, the first opening session was held to recognize and honor the recipients of the "Program of Excellence Award". From the State of Virginia the following schools were recognized: Jennie Dean Elementary School, Swift Creek Middle School, and Cosby High School. The program was sponsored by Paxton/Patterson. The recipients were also invited to a breakfast on March 30th, which was also hosted by the same company.

On March 29th , the second annual session was held at 9:00 O'clock to recognize the individuals that received the Teacher Excellence awards. The following individuals were recognized: Byron Clemsen and Dr. Charlotte Holter

ITEEA Program of Excellence Recipients

Elementary School

Jennie Dean Elementary School

Manassas City Public Schools

Middle School

Swift Creek Middle School

Chesterfield County Public Schools

High School

Cosby High School

Chesterfield County Public Schools

ITEEA Teacher of Excellence Recipients

Elementary School
Dr. Charlotte P. Holter
Rockingham County Public Schools

Middle School
Jay Brockman
Goochland County Public Schools

High School
Byron Clemsen
Winchester Public Schools

Dr. Charlotte P. Holter

Byron Clemsen

Special Awards

Academy of Fellows
Rosanne White

Special Recognition Award
Roger Hill, DTE
William Havice, DTE

Wilkinson Meritorious Service Award
Charles H. Goodwin, DTE

Lockette/Monroe Humanitarian Award
Laura Hummell, DTE

Award of Distinction
Thomas Roberts

Prakken Professional Cooperation Award
Gavin Wood

Public Understanding of Technology and Engineering Education Award
Scott Bartholomew

Gerhard Salinger Award for Enhancing STEM Education Through Technological/Engineering Design-Based Instruction
Millersville University's Integrative STEM Education Methods (ISEM) Program Faculty and Research Team

William E. Dugger Exemplary Collaboration Award
John Ritz, DTE

Emerging Leaders Award
Joan Harper-Neely
Emily Loving

Emerging Leaders Award
Emily Loving

Emerging Leaders Award
Joan Harper-Neely

Virginia Technology and Engineering Dinner Gathering in Kansas City

On Thursday evening during the ITEEA Conference 29 members from Virginia attended the social dinner at a delicious local restaurant.

Emily Birkler

Old Dominion University

Technology Education Student

3rd Place in the TEECA Poster Session

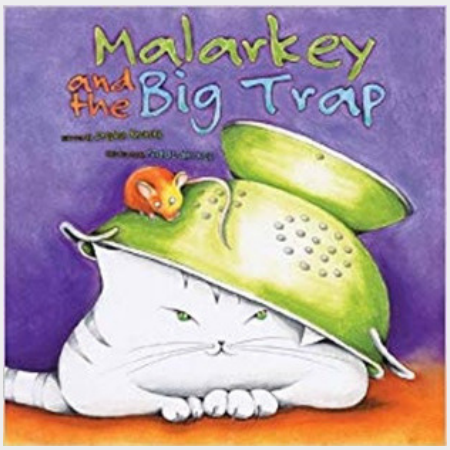
Kathleen Ferguson
Donald Maley Spirit of Excellence
Outstanding Graduate Student Citation

John Ritz
Inaugural William E. Dugger
Exemplary Collaboration Award

82nd Annual Conference
ITEEA
BALTIMORE
MARCH 11-14, 2020
INTERNATIONAL TECHNOLOGY AND ENGINEERING EDUCATORS ASSOCIATION

For more information about both VTEEA and ITEEA awards please visit the websites.

Lesson Plan: Sneaky Mouse Trap



SUBMITTED BY HEATHER RUSSELL, VTEEA SOUTH CENTRAL REGION MEMBER

A little about the teacher: Heather Russell is an elementary STEM educator at Ecoff Elementary School in Chesterfield County Public Schools.

Grades: 2nd - 5th

Background

You will begin by reading the story "Malarkey and the Big Trap" by Stephen Krensky. In the story Malarkey builds a Rube Goldberg style trap to catch a mouse he wants to eat. The trap has some difficulties performing this simple task and at the end of the story Malarkey decides to just be friends with the mice instead of eating them. After reading the story, have students see a Rube Goldberg machine in action by watching the youtube video from Sci-Show Kids "The Coolest Machine Ever!".

Challenge:
Can you help Malarkey create a trap that will catch a sneaky mouse? You must code the mouse to the cheese and trap him when he gets to it.

Criteria:
-Rube Goldberg style trap
-Must code the mouse to the cheese
-Have a cage ready to trap the mouse once he gets to the cheese

Constraints: .
- You have two weeks to build.
- You can only touch your device once to activate it.

For more information
please contact
Heather Russell at
heather_russell@ccpsnet.net

@HRussell_STEAM

Procedure:
1. Review simple machines.
2. Have teams do a talk, pair, share to brainstorm a series of simple machines they can put together to trap a mouse. What would their trap look like?
3. Once teams have drawn out and labeled their trap, they will build a prototype of it.
4. Encourage teams to test their trap as they build it.
5. Have each team share their design with their classmates by coding their mouse to the trap and starting their Rube Goldberg machine.

Materials: - Learning Resources Code and Go Robot Mouse (1 for each team)
- Marbles - bouncing balls -ramps -foam blocks -KEVA blocks
- Square colored tiles - string/yarn -K'nex pieces - Legos - plastic cups

STEAM/SOL Standards of Learning Connections:
STEAM- Designing Potential Products, Exploring Design, and Creativity Applying the Engineering Design Process
Computer Science- coding (using arrows on the coding mice), debugging algorithms.

Assessment: Using a rubric to assess students overall project.

Lesson Plan: Nature Lodge Design with Google Sketchup

SUBMITTED BY JAY BROCKMAN, VTEEA SOUTH CENTRAL REGION MEMBER

A little about the teacher: Jay Brockman is the Career and Technical Education department chair and STEM Lead Teacher at Goochland Middle School in Goochland County. Jay was the recipient of the 2018 VTEEA Middle School Teacher of the Year award.

Note: This project is a modification of the Richmond Chapter NAWIC Building Design Program, and draws heavily from their Project Cost materials.

Topics Incorporated:

3d Modeling, Calculating Area of Rectangles and Triangles, Construction Cost Calculation

Background

We offer Technological Systems as an 18 week course to 7th graders at Goochland Middle School, and one project specifies that at least one component be designed and 3D printed specifically for that project. In order to make sure students are competent with the 3d modeling software (Google Sketchup), they first complete 3 tutorials outlining the basic tools of Google Sketchup, at which point they are tasking with designing two buildings; their dream bedroom, and a prospective Nature Lodge for Goochland County. Finally, students are responsible for calculating potential building costs of their Nature Lodge and presenting their project to the class.

Lesson Progression:

Part 1: Introduction

Students are initially introduced to Google Sketchup, and shown how to use the program via 3 self-paced tutorials. These tutorials are available publicly through the 3D Warehouse (https://3dwarehouse.sketchup.com/?hl=en), and are titled:

-"Start a Drawing Part 1"
-"Start a Drawing Part 2"
-"Start a Drawing Part 3"

For more information please contact Jay Brockman at jbrockman@glnd.k12.va.us

@BrockmanSTEM

Part 2: Dream Room

Students are introduced to the 3D Warehouse, which is a repository of items other users have drawn and submitted. Students are shown how to import objects from the 3D Warehouse and how to manipulate them using the move and rotate tools. In order to practice with the program, students are tasked with designing their dream bedroom. Students are given virtually no constraints at this point, and are allowed to import practically anything they want into their bedrooms; designs typically range from fairly moderate to completely ridiculous.

3D Warehouse Icon

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Part 3: Nature Lodge

Goochland County owns much of the wooded land surrounding Goochland Middle School, and students are tasked with taking on the role of an architect and designing an auxiliary building to accompany a prospective nature trail. Students are paired with partners, then introduced to the project using the attached Nature Lodge PowerPoint. Students are guided through very basic construction practices and materials, then introduced to the Project Cost Worksheet which they will use to make decisions regarding design elements incorporated into their Nature Lodge. At the very minimum, each student's Nature Lodge must conform to the same basic constraints:

-A building no larger than 30' x 30'
-Seating for at least 25 students
-A way for a teacher to deliver a digital lesson
-At least 3 nature displays

Students design their Nature Lodge using Google Sketchup, then use both the Project Cost Worksheet and Quantity Take Off Worksheet to calculate their building's cost (note: both of these worksheets borrow heavily from the Richmond Chapter NAWIC's Building Design Program). Finally, students are asked to create a brief presentation documenting their Nature Lodge to share with the class; a picture of the Nature Lodge, total cost and justification for major decisions are expected to be included in this presentation.

Nature Lodge Example

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Nature Lodge

7th Grade Construction System

Nature Lodge

- You are going to take on the role of an ARCHITECT, contracted by Goochland County Public Schools to design a potential project.
- Goochland County owns much of the land surrounding the GMS/GHS complex. GCPS wants you to design a hypothetical NATURE LODGE to accompany a prospective nature trail through the woods.

Nature Lodge

At *minimum*, your NATURE LODGE must include the following:

– A building no larger than 30’ x 30’
– Seating for 25 students
– A way for a teacher to deliver a digital lesson
– At least 3 nature displays

Designing a Building

- Style

OPEN, POLE BARN

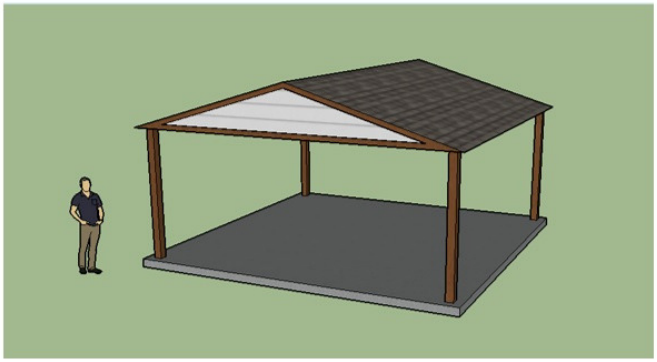
ENCLOSED

Designing a Building Continued

All buildings should be designed on a 6” thick concrete slab.

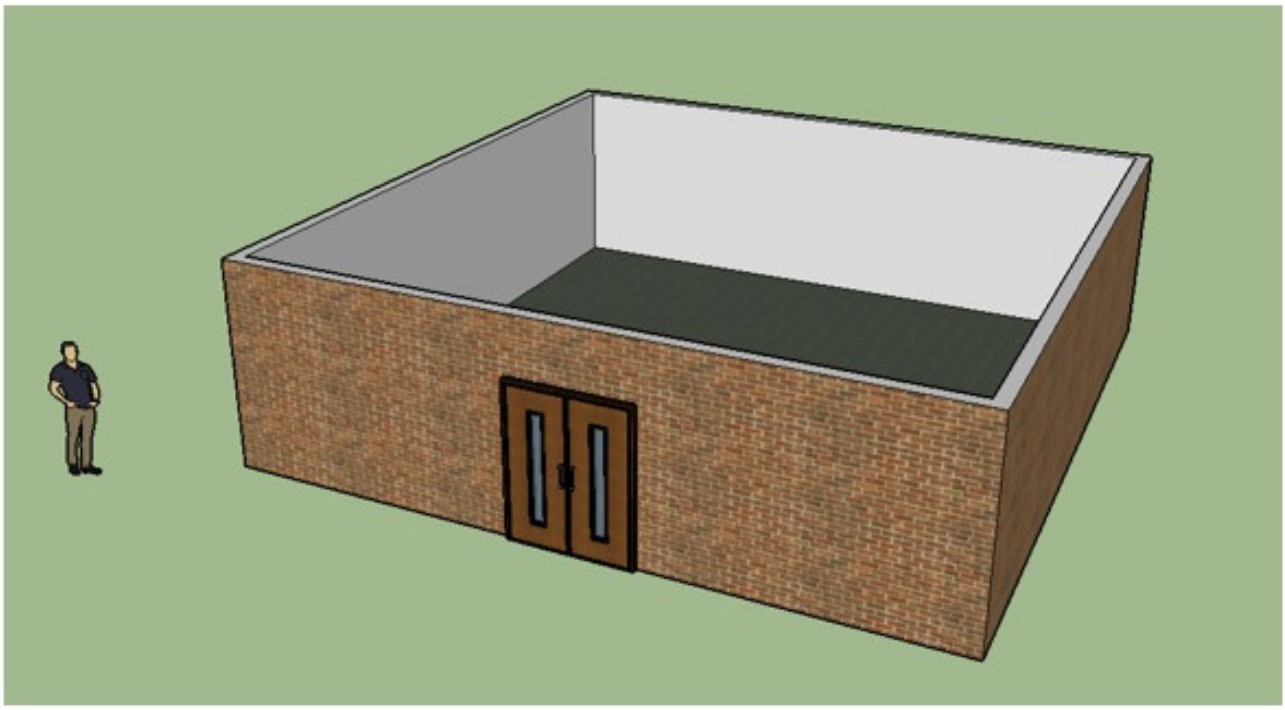
If designing a pole barn, posts should be 6x6 dimensional lumber (5.5” x 5.5”).

Open Structure

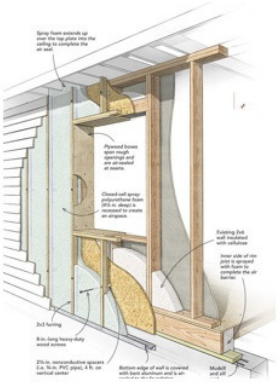


Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Enclosed Structure



Enclosed Structure



Designing a Building Continued

- If designing an enclosed style building:
  - Exterior wall studs should be 2x4 dimensional lumber (1.5" x 3.5" – make your walls 3.5" thick)
  - Interior wall covering:
    - Add 0.5" for sheetrock
  - Exterior wall covering:
    - Brick – Add 3.5" to the outside of the wall
    - Siding – Add 1" to the outside of the wall
- So, total wall thickness for enclosed buildings should be:
  - Brick: 7.5"
  - Siding: 5"

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Project Cost Worksheet

Names:

Project Cost Worksheet
GCPS Nature Lodge

Items that are checked are mandatory on all projects.

	Description	Cost			Quantity
Building Preparation					
✓	Site Clearing	$4,000.00	/	ea	
✓	Concrete Slab and Footing	$7.00	/	sq. ft.	
Exterior Walls or Posts					
	2x4 Stud w/ R11 Insulation	$6.00	/	sq. ft.	
	6x6 Pressure Treated Post	$20.00	/	ea	
Porch or Deck					
	Porch/Deck Framing	$20.00	/	sq. ft.	
Siding					
	Vinyl	$3.50	/	sq. ft.	
	Cedar	$5.00	/	sq. ft.	
	Brick	$10.00	/	sq. ft.	
	None (Pole Barn Only)	$0.00			
Roofing					
✓	Roof Framing	$3.00	/	sq. ft.	
	Shingles, 25 yr.	$1.50	/	sq. ft.	
	Shingles, 30 yr.	$1.80	/	sq. ft.	
	Cedar Shake	$7.00	/	sq. ft.	
Doors					
	Exterior 3' x 6'-8"	$250.00	/	ea	
Windows					
	Bay, 60" x 42"	$1,500.00	/	ea	
	Picture, 60" x 42"	$650.00	/	ea	
	Double Hung, 2'-8" x 5'-2"	$350.00	/	ea	
	Double Hung, 2'-4" x 4'-6"	$265.00	/	ea	
Flooring					
	Vinyl	$18.00	/	sq. yd.	
	Carpet	$25.00	/	sq. yd.	
	Wood	$9.00	/	sq. ft.	
	Bare Concrete	$0.00			

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Quantity Take-Off Worksheet

The values from this worksheet should be entered into the "Project Cost Worksheet" to calculate the total cost of your Nature Lodge.

1. Concrete Slab Foundation

The floor of the Nature Lodge will be a concrete slab with integrated footing placed at or slightly above the surrounding soil. This item is measured in square feet (sq. ft.).

Formula: (length in feet) x (width in feet)
Calculations:

2. Exterior Walls

2a. Enclosed Building Only: The walls are measured in square feet (sq. ft.).

Formula: (length) x (width) for each wall, then add all areas together.
Wall 1 Calculations:
Wall 2 Calculations:
Wall 3 Calculations:
Wall 4 Calculations:

Total Formula: (Area 1) + (Area 2) + (Area 3) + (Area 4)

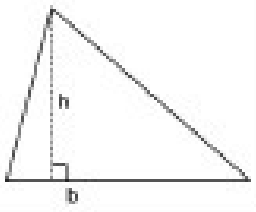
Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Quantity Take-Off Worksheet

2b. Open Building Only: The cost of each post is calculated individually.

Formula: (Number of Posts) x ($20.00)
Calculations:

2c. All Buildings: Roof Walls

Formula: (0.5 x Base x Height) x 2
Calculations: 

3. Exterior Porch or Deck

These items are measured in square feet (sq. ft.).

Formula: (length) x (width)
Calculations:

4. Siding

These items are measured in square feet (sq. ft.). You will use the same area you calculated for the Exterior Walls.

5. Roof Framing

Roof framing measures the area of the roof in square feet.

Formula: (width of diagonal x length of roof) x 2
Calculations:

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Quantity Take-Off Worksheet

6. Flooring

These items are measured in square feet (sq. ft.) or square yards (sq. yd.). To convert from sqare feet to square yards, divide the square footage by 9.

Sq. Ft. Formula: (length) x (width)
Sq. Yd. Formula: (floor length x floor width) / 9
Calculations:

7. Painting Interior Walls

This item is measured in square feet (sq. ft.). Use the same total area you calculated for exterior walls, and add the area of any interior walls

Formula: (length) x (width)

Additional Wall Area:
Additional Wall Area:
Additional Wall Area:

Formula: Total Area + Additional Wall Area
Calculations:

Lesson Plan: Nature Lodge Design with Google Sketchup (continued)

Nature Lodge Rubric

Name

	3	2	1	0	
Size - 30' x 30'	Size is Correct		1 Side is Correct	No Side is Correct	Total
Seating for 25	Adequate Seating	Seating for 11-20 Students	Seating for 1-10 Students	No Seating	
Lesson Equipment	Digital Equipment		Analog Equipment	No Equipment	
Nature Displays	3 Displays	2 Displays	1 Display	No Displays	

Name

	3	2	1	0	
Size - 30' x 30'	Size is Correct		1 Side is Correct	No Side is Correct	Total
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Unit: Technology Education Olympics (TSA Events)

SUBMITTED BY ROMAN BULL, VTEEA NORTHERN REGION MEMBER

A little about the teacher: Roman Bull is a Technology and Engineering Educator at A.G. Wright Middle School in Stafford County.

Grade: 7th *Class: Inventions & Innovations*

Big Idea: The Technology Student Association (TSA) is a national organization of students engaged in science, technology, engineering and mathematics (STEM). Open to students enrolled in or who have completed technology education courses.

TSW Know/Understand:
- Identify the purpose of TSA
- Explain the benefits and responsibilities of TSA and as an adult
- Identify Internet safety issues and procedures for complying with acceptable use standards.

TSWBAT: Demonstrate leadership skills through participation in TSA activities, projects, and meetings.

Essential Questions:
- Who is eligible to join TSA?
- What are the expectations for students who are TSA members

Materials:
- MS Competitive Events
- National TSA website: www.tsaweb.org
- Virginia TSA website: www.virginiatsa.org
- TSA introduction membership brochure/flyer

DAY 1
- Given: Modified TSA onsite events and a country to represent
- Students will work: collectively in groups and individually
- To: Create a country flag and review all events
- Measured by: Modified TSA onsite events grading rubrics.

Before: (Focusing attention, laying ground work, creating interest – activate prior knowledge)
TW – Have students form teams of three or four.
SW – Determine which country they would like to represent.

During: (Strategy(ies) for active engagement with new content that's coming - what are students doing while reading, viewing, or listening)
- TW – Clarify any questions on events.
- SW - Work individually and in groups to make a team flag to represent their country.
- SW - Complete the Google Slide presentation showing:

1. The country's flag
2. The country's biggest industry
3. The country's biggest economic challenge to overcome.

Unit: Technology Education Olympics (TSA Events) (continued)

After: (How will students apply new knowledge in a new way, how will they check to see if what they understand is correct, how will they be prompted to reflect)
- SW – Present their country to the class in a short two-minute presentation emphasizing their country's biggest industry and economic challenge they have to overcome.

DAYS 2 - 5
- Given: Modified TSA event design briefs and grading rubrics.
- Students will work: collectively in groups and individually
- To: Complete all 8 TSA events in the Tech Ed Olympics
- Measured by: Modified TSA onsite events grading rubrics.

DAY 2
Onsite Events: Construction Challenge, Flight
Submitted Events: Digital Photography, Promotional Marketing (photos first 20 min.)

DAY 3
Onsite Events: Brain Teaser, Technical Design
Submitted Events: Digital Photography, Promotional Marketing, Leadership Strategies

DAY 4
Onsite Events: Brain Teaser
Submitted Events: Digital Photography, Promotional Marketing, Leadership Strategies

DAY 5
Onsite Events: Problem Solving, Brain Teaser
Submitted Events: Digital Photography, Promotional Marketing, Leadership Strategies

Before: (Focusing attention, laying ground work, creating interest – activate prior knowledge)
- TW – Have students review the daily event objectives and event rubrics
- SW – Determine who will compete in which competitions.

During: (Strategy(ies) for active engagement with new content that's coming - what are students doing while reading, viewing, or listening)
- TW – Clarify any questions on events.
- SW - Work individually and in groups to compete on various events.
- TW - Be the competition judge on various events that need onsite grading.

After: (How will students apply new knowledge in a new way, how will they check to see if what they understand is correct, how will they be prompted to reflect)
- SW – Complete all onsite competitions.
- SW - Submit all turn-in competitions.
- TW - Grade all onsite competitions and all submitted competitions using the grading rubrics for each event.
- TW/SW - Have an awards ceremony for each competition. Winning teams will receive a certificate and the first place team will also have their country's national anthem play.

Unit: Technology Education Olympics (TSA Events) (continued)

Differentiation:

- Anchor Activities
- Bloom's Taxonomy
- Curriculum Contacting
- **Flexible Grouping**
- Independent Study
- Learning Modifies
- Scaffolding
- Product Choice
- Scaffolding
- Tiered Instruction
- **Varied Pacing**
- Other _____

Assessment:

- Formative: Observation Questioning/ Exit Ticket

CTE's Covered: 8480:

22. Identify the purposes and goals of the student organization.
23. Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
24. Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.
25. Identify Internet safety issues and procedures for complying with acceptable use standards.

SOLS: http://www.cteresource.org/verso/courses/8464/inventions-and-innovations-tasklist

Summary & Closure/Evaluation:

Reflection: What worked? What didn't work? What could I do differently next time?

What really works is adding an on-site event and a submitted event daily. All submitted events are due at the end of the Olympics. They are more in depth and teams can work on them at home. The daily on-site challenges are very simple and only last 10-15 minutes. I run it this way to have teams work at problem-solving. They have to split up to get everything finished by the end of the games. It forces them to think about what team members have the best skills for the different events.

Rationale: Why teach this lesson this way? Why given, these objectives, are these the best strategies?

I've always found it hard to incorporate TSA content into the curriculum. It's very in-depth, and I have a short amount of time during the semester. Also, I always found it odd to talk about TSA in the spring semester after chapters have already been affiliated for the year. So in doing a condensed version, and running it like the Olympics, I found that students really enjoy that. This activity works best at the end of the semester during the last week. Students are burned out from final exams in core classes, and it adds just a fun, easy activity for them to enjoy. Also, being at the end of the semester, students can apply knowledge learned throughout the course to create events.

For more information
please contact Roman Bull at bullrm@staffordschools.net

Lesson Plan: Design the best conditions for seed growth in a vertical plant farm

Note: This lab is a modification of Vernier's "Cellular Respiration" lab.

SUBMITTED BY CHRISTINE SCOTT

A little about the teacher: Christine Scott is the iSTEM Teacher and Sigma Lab Liaison at Charlottesville High School in Charlottesville City.

Topics Incorporated: photosynthesis, cellular respiration, lab design, data analysis, engineering design
Grades: 6-12

Lesson Overview: Students will take data to show evidence of plant growth based on a variable of their choosing. After sharing out their findings, students can design a plan for how to maximize plant growth. An extension can include building a 3 story vertical farm from recyclable materials, or doing another test on elements of soil.

When to use this lesson: It is helpful if students have a BASIC understanding of the photosynthesis / cellular respiration equation. They do not need to know that cellular respiration is the reverse of photosynthesis. The power of this lab comes through students addressing their own misconceptions of photosynthesis and cellular respiration through which variables they choose to test (Both IV and DV). Thus, an earlier deployment in the unit is suggested.

Time

90 min	+ 45 min	Other extensions
Present Scenario	Results sharing as a class	Use class data, design optimal conditions, test
Plan experiment	demo of peas (Co2 and Oxy probe)	Build a vertical farm and test over long period of time using data
Take data	Debrief science of Photo and Cell Resp	
(Can fit if pushed hard) Results sharing		

SOL Standards:

BIO.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) observations of living organisms are recorded in the lab and in the field;
b) hypotheses are formulated based on direct observations and information from scientific literature;
c) variables are defined and investigations are designed to test hypotheses;
d) graphing and arithmetic calculations are used as tools in data analysis;
e) conclusions are formed based on recorded quantitative and qualitative data;
f) sources of error inherent in experimental design are identified and discussed;
g) validity of data is determined;
h) chemicals and equipment are used in a safe manner;
i) appropriate technology including computers, graphing calculators, and probeware, is used for gathering and analyzing data, communicating results, modeling concepts, and simulating experimental conditions;
l) alternative scientific explanations and models are recognized and analyzed; and
m) current applications of biological concepts are used.

Lesson Plan: Design the best conditions for seed growth in a vertical plant farm (continued)

BIO.2 The student will investigate and understand the chemical and biochemical principles essential for life. Key concepts include

a) water chemistry and its impact on life processes;

d) the capture, storage, transformation, and flow of energy through the processes of photosynthesis and respiration

Learning Target:
I can design a method for maximizing seed growth.
I can communicate the differences between photosynthesis and cellular respiration.

Lesson Progression

Pre-Lesson
:Lay out materials

Tools Table:
Vernier Probes:
- Soil moisture probe
- Co2 probe & bottles
- Oxygen probe & bottles
- Thermometer
- Light intensity meter

- Rulers
- Syringes or beakers (water volume) or pipetes
- Heat Lamps
- Other lamps (for light only)
- Scissors

Materials Table:

- Germinated peas or beans (or both!)
- Potting soil
- Water
- Plastic bags (Ziploc)
- Newspaper

Google slides: bit.ly/growaseedslides

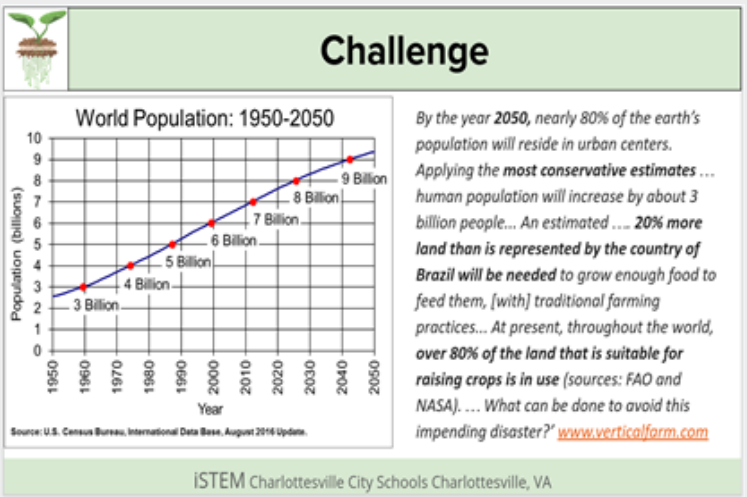
Warm up/Pre-assessment link on board (see Warm Up in Resources section) - written as a google form

Lesson
After students have taken the pre-assessment... Google slides: bit.ly/growaseedslides

1) Present scenario: Read story on slide, and discuss to students that this is THEIR problem.
2) Ask class question, list answers on board:

a) What are things that make a plant grow? Expected answers: Sun, water, fertilizer, soil, warmth...

b) What are things we see or sense to know a plant is growing? Expected answers: height change, quality of leaves, number of leaves, fruiting, oxygen output, carbon dioxide output, color...
NOTE: IT IS VERY IMPORTANT to get at least OXYGEN OR C02 Output on the board. Having the probes in the back may trigger an idea for the other if only one is listed.



Lesson Plan: Design the best conditions for seed growth in a vertical plant farm (continued)

Output on the board. Having the probes in the back may trigger an idea for the other if only one is listed.

3) Ask: Which of these is actually a quantitative measurement? If we were to create an experiment, which would be our IV and which our DV? (circle, and label (a) as IV and answers from (b) as DV).

4) Say: Your task is to design the optimal conditions for seed growth. To do this, we need each group to test one of these variables, so we can understand which are most valuable. You get to select your IV and DV and report back.

5) Students should use the class period to design, run, and analyze their experiment and data. The "report" can be informal (ex: group whiteboards with graph of results, interpretation of graph, issues that arose, etc).

6) After students share out, you can:

a) Discuss the photosynthesis equation, and how does our evidence relate to this equation? Use this as a bridge to cellular respiration, and discuss animal and plant cells.

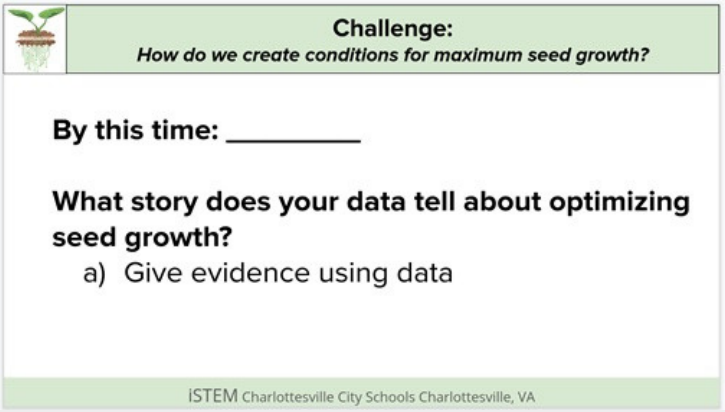
b) Show a demo of germinating peas (approx. 10) with a C02 and Oxy probe - the gases make obvious changes over even 2 minutes time.

c) Allow students to do another test on their IV against a better DV (aka: C02), or switch up their IV.

d) Have students build actual vertical farms out of recyclable materials, and try and design conditions for their germinated peas to thrive (based on data they just took).

Post-Lesson

At the end of the first day, or unit, have students take the pre-assessment again. Address any continuing misconceptions.



Warm up/ Exit Ticket

Question 1: Organisms, including plants need food to survive. Select anything you think plants use as food.

- Sunlight
- Fertilizer
- Sugar
- Carbon Dioxide
- Soil
- Water
- Oxygen
- Chlorophyll

For more information
please contact Christine Scott at
scottc1@charlottesvilleschools.org

Lesson Plan: Design the best conditions for seed growth in a vertical plant farm (continued)

Questions 2: Read the prompt below. Who do you think is right?

Five friends were talking about when plants carry out the processes of photosynthesis and respiration. This is what they said:

Janet: "Photosynthesis and respiration occur both when it is light and when it is dark."

Calvin: "Photosynthesis occurs when it is light; respiration occurs when it is dark."

Mika: "Photosynthesis occurs when it is light; respiration occurs both when it is light and when it is dark."

Turner: "Photosynthesis occurs both when it is light and when it is dark; respiration happens at night."

Sophie: "Photosynthesis occurs in the light; plants don't carry out the process of respiration."

Give a short explanation for your selection

Exit ticket also includes:

Question 4: Organisms, including plants need food to survive. Select anything you think plans use as food.

- Carbon Dioxide
- Sunlight
- Oxygen
- Chlorophyll
- Water
- Sugar

Question 3: Which of these is required for photosynthesis?

- Carbon Dioxide
- Sunlight
- Oxygen
- Chlorophyll
- Water
- Sugar

Technologize lesson materials can also be found online at the vteea.org within the Members Only Portal and the Shared Lessons Folder.

Do you have a lesson you'd like to share?

Be part of the team and share your amazing plans with others! Email your lesson plan along with any supporting files to vteea1958@gmail.com with the subject Technologize Lesson Plan.

Any questions can be emailed to Beth Gugino, the Publications Editor at guginob@gmail.com

Lesson Plan: Outdoor Watershed Classroom Project

SUBMITTED BY JENNIFER C LABOMBARD-DANIELS, PHD, VTEEA VALLEY REGION MEMBER

A little about the teacher: Jennifer C LaBombard-Daniels is a STEAM Lab Educator at John Kerr Elementary School in Winchester Public Schools.

Lesson Plans (Weeks 4-6)
NGSS K-2-ETS 1-1 Engineering Design: Ask questions, Make observations, and gather information about a situation people want to change.

VA SOL:
Resources 2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include a) important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper); b) the availability of plant products affects the development of a geographic area; and c) plants provide homes and food for many animals and prevent soil from washing away.

Resources 4.8 The student will investigate and understand important Virginia natural resources. Key concepts include a) watershed and water resources; b) animals and plants; c) minerals, rocks, ores, and energy sources; and d) forests, soil, and land.

Focus: Be able to define a simple problem that can be solved through the development of a new or improved object or tool through the concepts: Set STEAM Lab rules and Identify the 6 steps in the Engineering Design Process.

Success: Students will be able to move through the class identifying rules and how to move through all six engineer design processes by September 21st. This will be identified in our initial PearDeck review with a goal of 70%.

Week 4/Day 7 & 8 This will be used in place of week 3/Day 5 & 6 and that lesson will be used for Week 4.

Literature Connections: Build It! Chapter 7 Pg 77 STEM Picture Perfect

Focus: How do we Plan/Design in STEAM LAB

Success: Be able to come into the STEAM Lab and follow the clicker sound movement during class. Be able to Plan/Design a building with mystery material with a group. 70% understanding on PearDeck test.

5E Format	Engineering Design Process	Notes
Engage	Ask a Question Students will sit on the color circle of their choice for the welcome and introduction to the class • Explain the objective of today's class • Share what safety rules and parts of our STEAM Lab ✓ Practice coming in and out of class and that the expectation is to sit on the rug without touching the tables/equipment ✓ Practice working with the group and returning to the rug with the clicker. ✓ Using the PearDeck Slides have students view the buildings that they will build with mystery material.	<table><tr><th></th><th>1 M</th><th>2 T</th><th>3 W</th><th>T</th><th>F</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td></tr></table>

Lesson Plan: Outdoor Watershed Classroom Project (continued)

Explore	**Imagine/Brainstorm** **What building would we like to replicate or build?** ➢ When directed, go to the group table assigned and wait until you hear one click to start. ➢ Look through your bag of material. ➢ Brainstorm (talk it out) what you can do with this material to make the structure of your choice. **Plan/Design** • **Using the whiteboard, each person draws how they can build the building using the material given**	

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Explain	**Create/Build** **Teacher Note: Bags should be filled after each class with the following** • Group 1: Plastic cups and Masking Tape • Group 2: Cards and Masking Tape • Group 3: Toothpicks and Packing Peanuts • Group 4: Brown paper bags, Scissors, Masking Tape • Group 5: Craft Sticks, index cards, Masking Tape Groups have 10 Min to: • Build It!	

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Evaluate	**Improve/Modify** Trading Spy ➢ One person in each group can take the extra items and "trade" with items from another group ➢ You have 5 min to Improve your design.	

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Elaborate	**Present/Share** **Gallery Walk:** • **Students place their hands behind their back and quietly walk from table to table to "look" at the "Designs" from each group** • **At the sound of the 2 clicks students clean up their items and place recyclable/unused items in their bag. Trash goes in the trash and whiteboards are clean.** • **At the sound of the 3 clicks they return to the rug.**	

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Lesson Plan: Outdoor Watershed Classroom Project (continued)

Week 5/Day 9 & 10

Literature Connections: More Picture Perfect Lessons K-2, Wiggling Worms/Chickens
Focus: We can work through the 6 Engineer Steps; Ask a question, Brainstorm, planning, building a storyboard and presenting

Success: 1) Be able to come into the STEAM Lab and follow the clicker sound movement during class. 2) We will build and explain our Storyboard by defining the simple problem that was solved through the development of our new or improved habitat.

5E Format	Engineering Design Process	Notes
Engage	Ask a Question Students will sit on the color circle of their choice for the welcome and introduction to the class • Explain the objective of today's class • View the SciShow Kids video Worms are Wonderful https://youtu.be/l-zc_1vjLnI (Grades 1 & 2 only) • View the Slide video and pics of last year's Rhode Island Red Chickens and how they have grown. (All Grades) ✓ Discuss habitats (Water, food, shelter ✓ Show the Compost Bin and Water/Feeder apperataces. ✓ How could we build a better home/feeder by asking questions, making observations, and gathering information about what we have seen/learned.	
Explore	Imagine/Brainstorm How could we build a better home/feeder? ➢ When directed, go to the group table assigned and wait until you hear one click to start. ➢ Look through your worm/chicken habitat and brainstorm the Worm Wondering questions. ➢ Brainstorm (talk it out) what are your own Worm Wonderings?. Plan/Design • Using the whiteboard, each person draws how they can build the storyboard/feeder and deciding on using what material?	
Explain	Create/Build Storyboard Build • Have each group design 3-5 storeboard parts to explain: ○ A day in the life of their worm ○ A better way to manage food and water consumption. Groups have 10 Min to: • Build It!	

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Lesson Plan: Outdoor Watershed Classroom Project (continued)

Evaluate	Improve/Modify Sneaky Spy ➢ One person in each group can take a stroll around to see what other groups have created. ➢ You have 5 min to Improve your design.	

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Elaborate	Present/Share Presentation Station: • Students will clean their tables and return to the carpet with their storyboard. • As they present they will erase their board for the next group and listen to each storyboard.	

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Week 6, 7 & 8/Day 11-16

NGSS K-2-ETS 1-1 Engineering Design: Ask questions, Make observations, and gather information about a situation people want to change.

VA SOL: Resources 2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include a) important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper); b) the availability of plant products affects the development of a geographic area; and c) plants provide homes and food for many animals and prevent soil from washing away.

Resources 4.8 The student will investigate and understand important Virginia natural resources. Key concepts include a) watershed and water resources; b) animals and plants; c) minerals, rocks, ores, and energy sources; and d) forests, soil, and land.

Literature Connection: Outdoor Classrooms and the Watershed Picture Perfect Science Lessons: Hurtle Turtle Chapter 12.

Focus: We can work through the 6 Engineer Steps; Ask a question, Brainstorm, Plan a Design, Create an outdoor classroom that will incorporate both the chickens and the Chesapeake Watershed.

Success: 1) Be able to come into the STEAM Lab and follow the clicker sound movement during class. 2) Be able to plan a design for our outdoor classroom that incorporates both the chickens and the watershed.

Lesson Plan: Outdoor Watershed Classroom Project (continued)

5E Format	Engineering Design Process	Notes
Engage	**Ask a Question (Day 1)** Students will sit on the color circle of their choice for the welcome and introduction to the class • Explain the objective of today's class • Share the watershed video: a. Outdoor Classroom & Watershed Project Slides b. https://youtu.be/SfBZ6a6E_i4 c. Play the game Hurdle Turtle to get students thinking about the Hurdles animals go through to get to the bay. Picture Perfect Lessons Chapter 12. d. Go for a walk (Explore) (Day 2)	

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Explore	**Imagine/Brainstorm (Day 2)** How can we build an outdoor classroom that will incorporate the watershed ideas as well as space for our chickens? (Watershed Walk) ➢ When directed, go to the group table assigned and wait until you hear one click to start. ➢ Draw a picture of what you might put in the Courtyard. ➢ Brainstorm (talk it out) what you can do with this space and what material would we need to make the structure of your choice. **Plan/Design** • Using the trundle wheel measure the space in the courtyard. • Using your graph paper, mark of the space and draw a topographic map of your design. • List considerations for the watershed • List insects, plants and animals affected by the watershed

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Explain	**Create/Build (Day 3)** In order to create their models what would they need: • What materials would we need? • How would we have space for each grade level? • Where would students sit? • What would we need for the chickens to survive? • What plants would be best for the watershed? a. Plan your design on the whiteboard b. Build your landscaped designs with the Keva Makers

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For more information
please contact Jennifer C LaBombard-Daniels at
labombardj@wps.k12.va.us

Lesson Plan: Outdoor Watershed Classroom Project (continued)

Evaluate	Improve/Modify Trading Spy ➢ We will conduct a Gallery Walk to view what others have created and to capture a picture of our Plan and Model ➢ 3rd and 4th grade will discuss their understanding of watersheds and why they picked the model they did using FlipGrid ➢ 2nd & 1st will use the write-up handouts to discuss their understanding	

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Elaborate	Present/Share Gallery Walk: • Students place their hands behind their back and quietly walk from table to table to "look" at the "Designs" from each group • At the sound of the 2 clicks students clean up their items and place recyclable/unused items in their bag. Trash goes in the trash and whiteboards are clean. • At the sound of the 3 clicks they return to the rug. • The designs will be showcased at our STEM Night Oct 30th	

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Aftershock! Earthquake Lab from SmartLab

Join our board!

Immediate Openings:

- Southwestern Regional President
- Tidewater Regional President
- Elections Chair
- Resolutions
- Special Projects

Please visit www.vteea.org/board for more information on the board positions and responsibilities. Please note which positions will be expiring as of July 2019 and consider joining our team! Information can also be found about openings for the 2019-2020 Board of Directors.

"We have an energetic team of dedicated professionals who have grown beyond colleagues and developed into awesome, unexpected friendships filled with laughter and good times."

VTEEA President,
Danielle Meyer

Professional Development Opportunity

Mason Game & Technology Academy Presents

Game Design with Unity
For Middle and High School Teachers

In this course, middle and high school teachers will work with George Mason University Computer Game Design Instructors to learn the latest game design software, and how this software is effectively introduced to students. This course is a comprehensive introduction to Unity 2D and 3D game development that teaches the foundational principles of the software, from basic workflow to C# scripting. Through hands-on tutorials, teachers will learn Unity in the same scaffolded manner that they will be taking back to their classrooms.

Teachers will be able to earn Continuing Education units during this course.

General Course Info:

Tuition: $585
Date: June 24-28
Time: 9AM – 4PM Daily
Both On-site and Virtual Options

On-site location:
Virginia Serious Games Institute
10900 University Blvd., Bull Run Hall Suite 147
Manassas, VA, 20110

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GO TO MGTA.GMU.EDU/TEACHER-TRAINING

For questions please contact Technology Education Specialist,
Dr. Lynn Basham at lynn.basham@doe.virginia.gov

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AN ASM MATERIALS EXPERIENCE

OLD DOMINION UNIVERSITY
NORFOLK, VA | JULY 15-19, 2019

AN ENGINEERING WORKSOP FOR TEACHERS

Engage with science and engineering practices of NGSS through real-world applications of engineering and hands-on activities you can incorporate in your classroom.

Excellent opportunity to meet volunteers from industry and build connections to benefit your students.

WHO SHOULD ATTEND?

- Middle school and high school teachers with an interest in science, engineering, and industrial/career and technical education.
- Pre-service science teachers.

WHY ATTEND?

- Engage in hands-on, low-cost activities that you can integrate into your classroom immediately.
- Help your students discover career opportunities in science and engineering, and meet practicing engineers.
- Strong connection to NGSS.

WHAT'S INCLUDED?

- 4 CEUs (40 hours), demonstration materials, and meals.

GRADUATE CREDITS AVAILABLE!

- Two (2) graduate credits available (at participant's expense) through the University of Missouri-Kansas City at $250. (This is optional.)

REGISTER NOW! SURVEYMONKEY.COM/R/JMM9GKH

"Gave me the background information to better understand how materials are beneficial and why they are important. I'm also more confident in teaching about materials in the middle school setting."

"I felt so excited about what I was learning I started planning lessons for next year! I went to the $1 store and purchased the items for determining growth and mass."

QUESTIONS?

Jeane Deatherage, Administrator of Foundation Programs
jeane.deatherage@asminternational.org | 800 336 5152, ext. 5433.

MATERIALS CAMP®
ASM MATERIALS EDUCATION FOUNDATION

Reservations must be made by

For questions please contact Retired Technology Education Teacher / ASM Master Teacher Roger Crider at crider.roger@gmail.com

61st VTEEA Conference- Register Today!

KEYNOTE SPEAKER
Chuck English, Virginia STEM Coordinator

Chuck English has designed, developed, and supported new and innovative programs in schools, school districts and informal education centers in several states. He has worked in museums as an education director and taught science and science education from elementary school through college. In his role as Virginia STEM Coordinator, Chuck is working to pull together the great wealth of opportunities and experiences across the Commonwealth associated with STEM. Many stakeholders are working hard to create enriching STEM experiences; however, they are often working in isolation. In his role, Chuck is working to ensure sure STEM efforts work collaboratively, sharing experiences, resources and effort.

Venue Information

Conference Hotel
The Hotel Roanoke & Conference Center
110 Shenandoah Avenue Roanoke, VA 24016

Reservations must be made by June 21st!

Conference Registration

Late registration takes places after May 20th

VTEEA Members save on registration fee!

61st VTEEA Conference- Pre-Conference Workshops

Mason Game & Technology Academy Presents

VTEEA Game Design Workshop

In this workshop, George Mason game design instructors will provide a general overview of the game design process. This session will introduce basic game design terminology and the software required for turning game design ideas into a tangible prototype. Through discussion of game design principles and an instructor-led demonstration of Unity3D, teachers will not just learn about the process, but actively participate in prototyping a game. Optional but preferred: please bring a laptop with Unity 2018 (download at unity3d.com) pre-installed.

General Course Info:
Date: July 22
Time: 9AM – 4PM
Location: Hotel Roanoke
110 Shenandoah Ave NW,
Roanoke, VA 24016

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For questions about pre-conference workshops please contact VTEEA President-Elect, Dr. Ray Wu-Rorrer at wurorrerr@fccps.org

61st VTEEA Conference- Tours

Tour With Us

10:30 AM - 12:30 PM
July 25, 2019

FREE ADMISSION

Virginia Technology And Engineering Education Association

Wabtec Graham-White

Focus of Tour: CNC Manufacturing and Transportation (Train)

Notes:

- Use the main plant front lobby entrance.
- Bring safety glasses with side shields.
- Closed toed shoes are a must.

Integer™

Focus of Tour: Design and Development of medical and power devices.

Notes:

- Closed toed shoes are a must.

Trinity Packaging Corporation

A Division of ProAmpac

Focus of Tour: Distribution and Transportation

Notes:

- Closed toed shoes are a must.
- No offensive language or clothing that is disparaging to any groups of people.
- Hearing protection and safety glasses will be issued upon arrival.

Mersen

Focus of Tour: Graphite Specialties, high Temperatures, corrosion and mechanical wear.

Notes:

- Closed toed shoes are a must.
- Floors may be slippery with graphite-non-slip shoes (tennis shoes) are helpful.

Bus Transportation Must Be Taken From Conference

For questions about tours please contact
VTEEA 2019 Conference Chair, Tim Axley at taxley@rcps.us