Barbara Adcock Receives Presidential Award

By Michele Wilson

President Obama named 213 mathematics and science teachers as recipients of the Presidential Award for Excellence in Mathematics and Science Teaching on August 22, 2016. Selected among these exceptional teachers was Pocahontas Elementary School teacher Barbara Adcock, presently serving as Powhatan County Public Schools’ STEM Coach.

The Presidential Award for Excellence in Mathematics and Science Teaching is awarded to outstanding K-12 science and mathematics teachers across the country. The winners are selected by a panel of distinguished scientists, mathematicians, and educators following an initial selection process at the state level. Winners of the presidential honor receive a $10,000 award from the National Science Foundation to be used at their discretion and are invited to Washington, D.C., for an awards ceremony, as well as educational and celebratory events, and visits from the administration.

Dr. Eric Jones, Powhatan County school superintendent, stated, “Barbara Adcock is a deserving recipient of the Presidential Award for Excellence in Mathematics and Science Teaching. She has spent her entire career developing innovative programs and providing high quality science instruction for her students. In addition, Mrs. Adcock has shared her knowledge and expertise with countless teachers in Powhatan and across Virginia. As an early adopter of STEM education, Mrs. Adcock has embraced her new role as a STEM Coach, installing a STEM state of mind in all K-8 Powhatan County classrooms. I could not be more thrilled and proud that Barbara Adcock has received this esteemed honor.”

Her principal, Mr. Thomas Sulzer stated, “The staff at Pocahontas Elementary is so proud of Barbara and can’t think of a more deserving teacher to win the Presidential Award for Excellence in Mathematics and Science Teaching. She is passionate about her students, the curriculum, and her instructional practices. She is a role model for the students and her colleagues alike. She is a leader in science education. While this is a very public award for Barbara, what many don’t see are the countless hours that Barbara works to make it all happen. We are happy to have her as a STEM Coach sharing her passion and working with our teachers and students.”

Barbara Adcock has been an educator for 29 years, 28 years at Powhatan County Public Schools. For the last six years, Barbara has taught second grade through fourth grade as a mathematics and science STEM Academy teacher, and starting in 2015 she became a STEM Coach for the school division. Mrs. Adcock stated, “I am humbled and honored to be among the amazing educators who have received the Presidential Award. It authenticates the inquiry-based teaching methods I have worked to utilize in my classes. This award is also a testament to my fellow teachers, administrators and students who have challenged me to keep learning. Finally it gives me the opportunity to work with distinguished educators and policymakers to learn more, and to effect positive change.”
A Message from the President

One of my favorite quotes about education by Jean Piaget is, “The principle goal of education is to create men and women who are capable of doing new things, not simply repeating what other generations have done.” As educators we have the responsibility of preparing our students for the future. They will need the skills and knowledge to build economies, maintain infrastructures, protect natural resources, and solve problems through innovation.

The Virginia Children's Engineering Council (VCEC) is here to provide resources and services that will lead to our students being prepared for any of the challenges the future may hold. Our bylaws contain four main purposes for our organization:

1. Promote design, problem solving, technology and engineering in elementary school programs.
2. Provide in-service programs and workshops for elementary school teachers and administrators.
3. Promote greater recognition for programs at the elementary school level.
4. Foster leadership in the promotion of children's engineering, secondary, and university programs.

As the president for the 2016-2017 term, I want to extend an invitation for you to become a member of the VCEC. As a member you can:

- utilize our standards aligned design briefs
- enjoy the Children's Engineering Journal
- get involved in regional events
- nominate teachers and programs for awards
- attend our high energy annual convention
- showcase your projects on our website

Our annual convention is open to any one interested in expanding their knowledge of best practices of STEM. We hope to see you this year February 9 – 10 in Roanoke, Virginia.

Joan Harper-Neely
VCEC President
they have what it takes to be great thinkers?

Cognitive scientists have devoted significant time and attention to this question, uncovering some interesting findings that have implications for our classrooms and the nature of the tasks we ask of our students. An earlier study found that creativity could be taught (Goldenberg, Mazursky, & Solomon, 1999a; 1999b). When individuals with no background knowledge were provided instruction on templates for creative thinking, they produced products that were scored as more creative than other individuals in the study that did not have the same instruction. Chan and Schunn (2014) found that great thinking was the result of a cognitive progression and not cognitive leaps. This study ruled out the existence of aha moments suggesting that great thinking was the result of a gradual progression, often not visible to outsiders. The takeaway from these studies, along with others in the field, is that great thinking is the result of a gradual progression and can be taught; making it attainable for our students.

Problem-solving teaching or the use of design briefs is a logical option for creating an educational environment that fosters and nurtures great thinkers. However, simply finding a task for your future innovative thinkers and placing it into the school day does not automatically set your learners up to be the next Art Fry, Wilson Greatbatch, or George de Mestral. After all, standing in my garage does not make me a Cadillac. So how do we do this in our own classrooms so that we achieve our desired outcome: innovative thinking?

Art Markman (2012), a cognitive scientist from the University of Texas at Austin, identified three common characteristics of smart or great thinkers: (1) smart thinkers develop and use smart habits, (2) smart thinkers acquire high-quality information and a lot of it, and (3) smart thinkers practice applying what they know to new situations. Specific to the classroom, what Markman (2012) and others have uncovered in their research is that smart or great thinkers make use of habits...
or strategies that are both efficient and effective for learning. These thinkers acquire a high volume of high-quality information. And finally, these thinkers are engaged in learning experiences that require them to apply what they know to new situations.

Translating this body of research into classroom practice yields three big ideas that should guide our instructional decisions, particularly in the STEM classroom.

1. Whether engaging students in a problem-solving task or design brief, we should select and implement evidence-based strategies with consistency and precision (i.e., smart habits).

2. As students engage in problem-solving tasks or design briefs, we should create a learning environment that promotes the acquisition of background knowledge and a robust body of knowledge around each topic (i.e., acquisition of high quality information).

3. Each problem solving task or design brief should be set up to take students’ background knowledge and the newly acquired robust body of knowledge and use it in different contexts and on several occasions (i.e., applying knowledge to new situations).

Creating and implementing educational experiences that aim to develop our students into great thinkers should be purposeful, intentional, and incorporate these three big ideas. When we fall victim to activities that are simply fun, do not require the acquisition of high quality information, and/or do not provide different and authentic contexts in which to apply the information, our goal of developing great thinkers is like fishing without bait; the chances of success are slim to none.

— References —


Virginia at the ITEEA Conference
Washington, DC

The 78th ITEEA annual conference was held March 2-4 at the Gaylord Hotel in Washington D.C. The conference, as usual, was a huge success. This year’s conference was focused on the theme “Collaborate to Build a Diverse STEM-Literate Society.” The pre-conference workshops and all other events were fully attended. From Virginia, 110 teachers and professors attended the conference. On March 2 at 7:00 a.m., the presidential round table was the kickoff for the conference. During that meeting, all the ITEEA representatives from Region 1 were able to meet with the Region 1 director, Dr. Phil Reed. Every representative gave a brief description about their annual conference and upcoming events. During that meeting, Mohamad Barbarji was named an outstanding ITEEA representative for increasing the Virginia membership.

At 9:00 a.m., 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: Stuarts Draft Middle School and Providence Elementary School. The program was sponsored by Paxton/Patterson. The recipients were also invited to a breakfast on March 4, which was also hosted by the same company.

On March 3, the second annual session was held at 9:00 a.m. to recognize the individuals that received the Teacher Excellence awards. The following individuals were recognized: Wendi Hobbie from Midlothian and Kim Gadson from Alexandria.
During the conference, other Virginia educators were recognized and received awards: Dr. Phil Reed received the Distinguished Technology and Engineering Educators (DTE) designation. A few other Virginians received awards for their outstanding support to the profession.

**Members of Virginia having dinner**

**Virginia members presenting their show case**

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**Elementary STEM**

**Elementary STEM Units** include cross-curricular activities and experiments that teach concepts in math, science, technology, and language arts. These STEM units were created to be easy to set up and adaptable.

**STEM in the Gym™** is an integrative way to experience and reinforce science, technology, engineering, and mathematics in physical education. Equipment and activities are available for gradual implementations or complete programs.

**Phonics: Animals in Motion** is a new way to teach and reinforce phonics through kinesthetic activities. Just like the STEM in the Gym program, students are out of their seats and on their feet!
Hummingbird Robots
Joey Crawford, Millboro Elementary School

So you’re thinking about starting a robotics club? Good, you should! Why? Your students will love you for it. Trust me. I took the plunge three years ago by converting my after-school computer club to a robotics club at Millboro Elementary School. That was my first choice. The second choice was deciding what robot or kit to go with. I had seen a robot called Hummingbird that looked intriguing. It was also conducive to my budget, so I ordered three kits and our club got down to business. In fact, our club even had the opportunity to show off their creativity and hard work at the 2016 Virginia Children’s Engineering Convention!

By now you’re probably wondering what a Hummingbird robot is exactly. First of all, it’s not a robotic bird. Hummingbird is just the brand of this particular robotics kit. The kit comes with a Hummingbird controller, which connects to a computer, and has many output terminals for things like servos, motors, LEDs, and an array of sensors. The computer is used to program the controller to make an LED light up, a servo turn, or a sensor detect motion. The list goes on and on. To program the controller, my students like to use a program called Visual Programmer. However, you can also use Scratch, the beloved elementary-level programming software.

So now what? How do you make a robot with this stuff? Maybe an example would help here. Suppose you want to create a dog that barks and wags its tail when approached by someone. Your first step is to write a program where a distance sensor is used to trigger a sound, the bark, and a servo to rotate a tail back and forth. The hardest part is already over! Now, just find some cardboard, construction paper, or other building materials and get to work. I also suggest a hot glue gun, lots of glue sticks, and paint. Once you have your design, you would then attach the tail to the servo that is activated by the distance sensor. When someone comes close, the tail will move and you will hear a bark from the computer’s speakers.

Now that you know how the Hummingbird works, what about your students? If you try to explain to students how to use this kit, you will likely see and feel frustration. To teach my students how to use the Hummingbird, I hand them a computer, a Hummingbird kit, and add a link on my webpage. That link gets them to the library of tutorials offered by Hummingbird. Within 15 minutes, I hear oohs and aahs as they connect an LED and make it light up.

The seventh-grade class that was invited to the 2016 convention did this part in sixth grade, so they had a basic understanding of how to program the Hummingbird and build a robot. This year I presented them with a specific challenge. They had to create a robot that was activated by a sensor and boy did they rise to the occasion! One group created a horse that when approached by a visitor would gallop in her pen and begin to neigh. A second group designed a velociraptor that when approached would begin opening its mouth to show its teeth, his eyes would glow red, and he made “velociraptor” sounds. My third group incorporated the sensor differently. They wanted to build a fortune teller that was activated when a coin was inserted much like the one seen in the ‘80s movie “Big.” To do this, they placed a distance sensor behind the coin slot in order to activate the fortune teller when a coin was inserted.

The creativity and determination of this group of students amazed me. When something didn’t work as planned, they found solutions. If the first solution didn’t work, they would find another. This could happen three or four times, but like any good engineer, they were steadfast and solved the problems. The amount of pride these kids took in their work was awe inspiring to say the least.

If you’re apprehensive about Hummingbirds, don’t be. I was at first, too. After all, this isn't a kit with step-by-step instructions on how to build something. It’s a kit that comes wide open to the creative mind. It takes play. It takes imagination. It takes engineering. And trust me, your students will figure it out.

Learn more at http://www.hummingbirdkit.com/
Have you ever considered having a more active role on the Virginia Children’s Engineering Council? With our continued growth and goal of reaching more teachers and students with our mission, we need your help.

One way to help is to become a committee member. The following committees are now forming:

**Children’s Engineering Journal (CEJ):** The CEJ committee publishes three journals per year. Committee members are responsible for soliciting best practice articles including instructional design briefs. The committee reviews, compiles, and publishes the journal.

**Convention Planning:** The convention planning team is responsible for designing, planning, and conducting the annual statewide staff development program for K-5 teachers attending the convention.

**Website:** This committee is responsible for creating and maintaining a state-of-the-art website.

**Business and Industry:** This committee focuses on establishing partnerships between VCEC, business, and industry that builds support to advance the goals of the Virginia Children’s Engineering Council.

In order to be a committee member, you must have an up-to-date membership with VCEC. If any of these committees interest you, please contact us at vcec@childrensengineering.org for more information.

Another way to become more involved is to become a part of the Board of Directors as positions become available. Here are the requirements to become a board member:

**Virginia Children’s Engineering Council**  
**Board of Directors Nominee Requirements**

1. Have an up-to-date membership with the Virginia Children’s Engineering Council
2. Be nominated by a current Board of Director’s Member and approved by the Executive Committee for an open position
3. Serve on a VCEC committee
4. Attend a minimum of 50% of Annual Board of Directors’ Quarterly Meetings

As positions become available, notices will be placed in the Virginia Children’s Engineering Journal and on the website.

Please consider joining us in our Children’s Engineering journey!!
EXHIBITORS
&
INSTRUCTIONAL
RESOURCES
Engineering in Art with Wendi Hobbie

Wendi Hobbie, Woolridge Elementary

At Woolridge Elementary in Chesterfield, Virginia, we have an annual STEAM Night. Every year, I include a challenge in the art room for students to complete with their parents. In the past it was a pop-up card about national March is Youth Art Month in our schools. This year, we are using repurposed materials to create sculpture. The idea is to have it on display for the rest of the month and to hopefully keep it on display until the Chesterfield Annual Fine Arts Festival is past. Here are some pictures from that night and the awesome engineering creations with the parents and students working together. By involving the parents, we have more support for our initiative of using Children’s Engineering in our school in all levels.

Wendi Hobbie • Art Teacher
2015/16 Virginia State Elementary Technology Teacher of the Year
A Design Brief for YOU to try

Chihuly Repurposed Sculpture

Background: Dale Chihuly is an American sculptor. He uses blown glass for his amazing sculpture. Not long ago, his work was featured at the Virginia Museum of Fine Arts. We are going to use water bottles to create our repurposed sculptures.

Design Challenge: With your grown-up, design and create a sculpture using used water bottles. Your part of the sculpture must:
- Use a water bottle
- Use markers to color the water bottle
- Have the top and label removed
- Have the water bottle cut to create different sculptural qualities
- Have a way to hang it on the chicken wire located in the front area on the pole near the office.

Materials:
- Water bottle with label and top removed
- Pipe cleaners

Tools:
- Scissors
- Sharpie markers
- Hole punchers

Virginia Standards of Learning Connections:
Visual Arts - 2.10

YOU MAY NOT USE ANY OTHER MATERIAL OR TOOLS TO COMPLETE THE CHALLENGE.

___________________________________________
Wendi Hobbie/Art/Elementary
Chesterfield County Public Schools
Woolridge Elementary/STEAM Night/2016
Why Engineering?
Jesse Kraft, Principal

Providence Elementary School is proud to have an engineering-themed STEM Lab program that is currently in its fourth year of operation, serving grades K-6 with multi-day projects that require teams of students to accept build/design challenges. The program occurs during the school day, and the units are built into the schedule for all classes at Providence, a Title I school in northern Virginia serving 960 students. This is the story of how the school team decided to build a program around engineering.

In the course of our journey in creating and sustaining our STEM Lab, we’ve been able to connect with several elementary school STEM educators at various points in their own processes. In these conversations, we find that most of us are very interested in the specific activities or units our colleagues are using. We enter into these discussions hoping for a takeaway in the form of projects we can bring back to our schools to do with our students.

Obviously, we need projects and lesson ideas. However, they are not the most important thing in building a program. Specific student activities give us a process and product, but without a big idea or focus for the overall program, these activities run the risk of becoming isolated learning events. Students would love to build a robotic arm or an earthquake-proof structure, but they’re nothing more than cool projects unless there’s a greater purpose.

Our entire STEM program is based on teaching the innovator skills described in Dr. Tony Wagner’s work. These include critical thinking, collaboration, communication, and creative or innovative thinking. This starting point, which is basically a commitment to certain outcomes for kids, is crucial in making decisions regarding activities. Once we established this, we were ready to talk about the projects and units that would become the day-to-day experience of our students.

We found an abundance of pre-made activities for free or purchase with “STEM” stamped on them. Some seemed to be of high quality and some were not. We explored science kits with great experimental design components, mathematics challenges that promoted higher level thinking, and tech-based challenges that would have truly excited our students. Ultimately, we embraced engineering projects. Here’s why:

1. Building and design projects are the perfect vehicle to teach the innovator skills we defined. The science, mathematics and technology projects we were considering would have been good ways to teach higher-level thinking, collaboration, and communication, but engineering projects, with their open-ended possibilities, provide the best opportunity to promote innovative and creative thinking.

2. The Engineering Design Process provides students with a framework for solving problems in any context. Therefore, skills practiced in our STEM Lab would transfer to real world challenges.

3. Engineering gives students the chance to fail and to recognize that failure is an opportunity to improve. Working through failure builds resiliency in students.

Our decision to let engineering be the most prominent feature of our STEM program did not bar the integration of science, mathematics and technology learning. In fact, standards from all of those disciplines are embedded in each engineering challenge. We are simply emphasizing engineering because it holds the most powerful possibilities for helping us realize our purpose.

As our program has evolved over the years, specific units have come and gone. An activity that third-graders used last year might be replaced this year. Another may be re-imagined by the teachers to make it more challenging, engaging, team-oriented, or fun. This regular evolution can be accomplished because the core of our program – our commitment to teaching specific innovator skills through the engineering process – remains constant. In fact, one of the greatest learnings we’ve experienced in our STEM journey has been this: Instructional activities and project selection is not the top priority. The purpose is the main thing. Only after a program has purpose can you design or find activities for it.

References
A Design Brief for YOU to try

Vertical Gardening Design Brief
Emily Loving, Chesterfield County Public Schools

Background: Read The Gardener by Sarah Stewart or The Curious Gardener by Peter Brown. Analyze the story and obstacles the characters encounter. Review photosynthesis, plant adaptations, and human impacts on the earth.

Challenge: You live in a very small home with no grass or space for a garden. It’s time to brighten the place up with some fresh live plants and vegetables! Design a living vertical garden. In the garden you design, it should be easy to: provide water, remove plants, or add new ones. It must be carefully built so that soil doesn’t spill and create a mess. Build a model that will hold at least one plant and demonstrate your idea for a vertical garden. Use the planning guide at the following link (http://childrensengineering.org/technology/VerticalGardening.pdf) to brainstorm your ideas.

Example Materials:
- straws
- foam
- rocks or marbles
- popsicle sticks
- moss
- tissue or tissue paper
- recyclables
- tooth picks or cotton swabs
- plant
- potting soil

Tools & Adhesives:
- tape
- glue
- scissors
- ruler

Virginia Standards of Learning Connections:
Science - 4.4c (Photosynthesis)
4.4d (Plant Adaptations)
5.7g (Human Impact on Earth)

Supporting Resources:
Additional worksheets to support this activity- bit.ly/VCECgardening
Green Education Foundation - How to get started
www.greenevaluationfoundation.org/greenthumbchallengesub/start-up-kit/get-set-build-your-garden/1087-vertical-gardening.html
Ideas for building vertical gardens - www.pinterest.com/explore/vertical-gardens/
School Garden Support -
www.towergarden.com/content/towergarden/en-us/blog/2015/06/grow-school-garden.html
Sow & Grow - Farm Garden Curriculum Guide -
sevengenerationsahead.org/images/work/farm-to-school/SGSample.pdf
WORKSHOPS
Children’s Engineering Convention

Thursday & Friday February 9 & 10, 2017

21 Years of Professional Development Programs Focused on Design, Engineering, and Technology for Developing Technological Literacy at Grades PreK-5

Join Us
Explore teaching strategies for integrating Children’s Engineering into your existing curriculum and instructional program.

Reinforce the Virginia Standards of Learning through hands-on designing, building, and problem-solving activities.

Over 90 workshops conducted by experienced K-5 classroom teachers.

Network with teachers who share an interest in the need for children to study and use design, engineering and technology to solving problems.

Visit educational exhibits, and examine new resources from national and international companies.

Learn How Children’s Engineering Promotes
• Mastery of the Virginia Standards of Learning
• Integration of National Standards
• Critical and creative thinking
• Problem solving
• Hands-on learning
• Decision making
• Cooperative learning skills
• Differentiated instruction
• Motivated and self-confident learners
• Respect for the individual learning styles of children, including the needs of gifted and special needs children

Full Convention Registration Includes
• Lunch, afternoon break, networking reception with light hors d'oeuvres on Thursday.
• Continental breakfast, morning break, and luncheon on Friday
• Recertification points for teachers and administrators

Registration Fee: $210.00 - Postmark Deadline, January 16, 2017
(non-refundable after January 23, 2017)

Keynote Speakers

Opening Session Keynote Speaker: Since 1997, Louis Mangione has shared his highly effective strategies for engaging students with content through a series of workshops designed for teachers of all disciplines. These inspiring sessions -- focusing on instructional expertise based on developments in brain research and an up-to-date understanding of best practices -- have received high praise from teachers, administrators, and corporate training leaders across the country and abroad.

Awards Luncheon Keynote Speaker: Dr. Frederic Bertley, senior vice president for science and education, oversees a diverse portfolio of initiatives supporting innovation in STEM learning, as well as departments and programs that capture the history and legacy of The Franklin Institute. Dr. Bertley founded and directs the Color of Science™, which highlights the incredible contributions of women and persons of color to modern-day science and engineering. In addition to these STEM education programs, Dr. Bertley's purview includes the prestigious Franklin Institute Awards Program, the long-running Journal of The Franklin Institute, the Collections & Curatorial Department, and the Institute's international programs, including projects in Canada, Africa, and South America.

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Co-sponsored by: Virginia Children’s Engineering Council, and Virginia Department of Education, Office of Career and Technical Education
Website: http://www.childrensengineering.org, Convention website: http://www.cpe.vt.edu/vcec/