A Journal of the Virginia Children’s Engineering Council

The Children’s Engineering Journal

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At the Virginia Children’s Engineering Council (VCEC), we are committed to supporting educators as they infuse children’s engineering into their existing curricula. Our design briefs and professional development programs utilize engineering design to develop systematic approaches to problem solving, cultivate technological aptitude, and encourage critical thinking, within the context of creating solutions for real-world applications.

We believe engineering is for everyone! You don’t have to be a science or technology specialist to get involved with VCEC. Children’s engineering can enhance any classroom or subject area. Our design briefs are aligned with the Virginia Standards of Learning (SOL) and promote the International Technology and Engineering Educators Association (ITEEA) Standards for Technological Literacy (STL). We hope that the articles and materials you encounter in our journal and throughout our website will provide you with new tools and ideas to engage your students as they apply concepts and skills in meaningful ways.

If you are excited about children’s engineering and want to connect with like-minded educators, the VCEC invites you to join us on our journey as we continue Engineering Virginia's Future!

Here are a few great ways for you to participate:

- Become a member of our organization by visiting www.childrensengineering.org.
- Attend our VCEC summer workshop.
- Contribute an article or design brief to our publication, The Children’s Engineering Journal.
- Submit a proposal to present at future conventions.
- Follow us on Facebook and on Twitter @childengineer.

Katherine Mangum
President, VCEC


President: Katherine Mangum
Editor-in-Chief: Barbara Westlund
Assistant Editor: Shellye Wardensky
Field Editors: Patti Fazzi and Elizabeth Kirk
Journal Peer Review Committee: Dr. Lynn Basham and George R. Willcox
Layout Editor: Teresa Wilburn
Online Journal Editor: Emily Loving

Consider submitting an article for publication in upcoming issues of the journal. Submit your article or design brief and pictures (500-1000 words and up to three JPEG pictures) to VCEC@childrensengineering.org

WRITE FOR VCEC! Upcoming Journal Topics:
Winter 2018: Children’s Engineering and Technology - Submission Deadline November 30, 2018
Integrative STEM Education
by Tina Manglicmot

Educating students in the areas of science, technology, engineering, and mathematics has received considerable attention over the past decade. In response, many programs and specialized schools have emerged while what constitutes a high-quality STEM education has yet to be fully defined or explained consistently among professionals. Most programs or STEM initiatives address one or more of the STEM disciplines separately or in isolation of each other. In today’s economy, problems are not solved in isolation of a specific discipline but are solved through multiple approaches and perspectives. Engineers apply principles of both math and science to develop solutions to technical problems. Scientists, regardless of the field, utilize mathematics and mathematical models to quantify and evaluate results. While the workforce connects all STEM disciplines to make meaning and develop solutions to complex problems, our students receive an education where STEM disciplines are taught in isolation. In order to strengthen the school-to-work pipeline and increase equity and access for all students, integration of STEM content in everyday instruction needs to be explicit. The Office of Science, Technology, Engineering, and Mathematics at the Virginia Department of Education (VDOE) advocates a more integrated approach to K-12 STEM education. In September 2017, stakeholders from VDOE, institutes of higher education, state agencies, businesses, and interest groups were brought together to advise the Office of STEM on elements for STEM Education. Out of the meeting, we developed a working definition of STEM education to support integrative teaching and learning in the areas of science, technology, engineering, mathematics, and computer science. We define STEM education as a student-centered approach to teaching and learning that involves the intentional integration of rigorous content, processes, and skills of all STEM disciplines. Students use practices such as critical thinking, creativity, collaboration, and innovation to solve relevant problems in academic and real-world contexts utilizing inquiry, quantitative skills, and logical analysis.

While it took a day to bring stakeholders together and define STEM education, the challenge lies with shifting classroom practice by teaching STEM in a more connected manner, especially in the context of real-world issues making the STEM subjects more relevant to students and teachers. At the elementary level, we should begin by capitalizing on students’ early interests and providing them with experiences to engage in the practices of science and engineering. Scientific inquiry and engineering design provide opportunities for making STEM learning more concrete and relevant and at the same time promote sustained interest in the STEM fields well into high school and beyond. Integrative STEM education helps make the invisible visible to students by allowing them to explore how principles of science, mathematics, and engineering are connected. Teacher pedagogy shifts as we move from disseminators of siloed content knowledge to designers and architects of student learning by crafting projects and activities that help students build upon prior knowledge and provide them with experiential, hands-on, project-based models for learning. The teacher facilitates the learning process by assisting students to make connections between content, so they understand how the principles of the STEM disciplines build upon and support one another. The focus at the Office of STEM is to support teachers by also making the invisible visible. Currently, state standards fail to integrate STEM concepts and applications successfully, even in high school. At best, standards tend to list knowledge and skills in isolation without thought
to other disciplines. In the development of the newly revised Science Standards of Learning, connections to other disciplines are made explicit. The revised science standards connect the engineering design process and mathematical thinking to scientific investigation and inquiry. Science curriculum frameworks will be dynamic and rich with examples that seamlessly connect STEM content knowledge and skills that will go a long way in making visible the fundamental bond between STEM disciplines.

It is important to note that effective integrative STEM education needs a supportive system of assessment and accountability. The Profile of a Virginia Graduate and the revised Standards of Accreditation adopted in November of 2017 includes competencies, experiences, and attributes critical to future success. They also emphasize the elimination of verified credits for graduation and support a balanced assessment system to include performance assessment. Students demonstrate skills with performance assessments through a variety of ways including presentation, demonstrations, portfolios, debates, experiments, design challenges and projects. The new regulations support deeper learning for students and provide teachers flexibility in their instructional design.

Ultimately the Office of STEM is acronym agonistic. Whether you call it STEM, STEAM, STEM+C, STEM+H, i-STEM, or other associated acronyms, the fundamental principles and values are the same. In many respects, effective practices for STEM are closely related to effective practices for education in general. Regardless of what we call it, the crux lies in the vision to transform teaching and learning of science, technology, engineering, and mathematics to equip all learners with the skills and knowledge to become STEM literate and to inspire students to be naturally curious, creative, innovative, inventive, and always strive to contribute to the betterment of society.
Harnessing the Wind
by Alyson Toler and Erin McGuigan, Radford University

In June of 2017, eleven preservice teachers and faculty from Radford University traveled to Malawi, Africa, to work with primary school students and teachers to research math. We conducted a STEM project with the Standard (grade) 7 students. The students made a free standing, working windmill out of the materials we provided. We paired this STEM activity with the book, The Boy Who Harnessed the Wind by William Kamkwamba. This book is based on the true story of a boy, William Kamkwamba, from Malawi, who built a windmill to bring electricity and running water to his village. We chose this book because the story takes place in Malawi, and we hoped the students would be able to relate to or recognize the content in the book.

By Standard 4 in Malawian schools, students are taught each subject in English. For this reason, we conducted the STEM activity with Standard 7 students and used the young adult version of The Boy Who Harnessed the Wind. We planned to read a certain amount of the book each day for the two weeks we were working in the school. We started working with a group of five to eight students. On the first day, we realized our plan for the STEM project was going to need to change. The students we were working with did not understand the language of the young adult version of the book, and we had difficulties explaining the directions to the students due to the significant language barriers.

After realizing we needed to adjust our plan, we came up with a new plan to help our students succeed with the activity. We decided we needed to read the picture book version of the story and figure out what words students had the most difficulty with. We used index cards and asked the students to point out what words in the book they did not understand; we wrote the word on one side of the index card and put a picture representing the word on the other side to help the students better understand the words’ meanings.

After finishing the book, their teachers translated our directions for the STEM project so they would understand what the activity required. We provided the students with a variety of materials, but we did not assist them in building the windmill, aside from instructing them about the activity. However, they chose to use resources found outside as well as inside their classrooms to complete the activity. Students mixed dirt and water to make clay, used pieces of broken desks, and utilized rocks as hammers. On the last day, we tested each windmill using a handheld, battery-operated fan, and the group who had a freestanding, working windmill that spun the fastest received pencils as their prize.

The STEM activity with the students taught us many valuable lessons. STEM places students in the engineer role, no matter where they are in the world. Our students taught us we do not need a variety of resources and materials to succeed, and we can utilize different kinds of materials in creative ways to complete activities. We were able to understand the difficulties students may have when entering a classroom where instruction is not in their native language. Most importantly, our students in Malawi taught us that STEM breaks barriers.
Background: We read the book *The Boy Who Harnessed The Wind* by William Kamkwamba and Bryan Mealer. In the story, a boy from Malawi, William, does not have electricity or running water. William builds a windmill out of things he found in the trash. The windmill created energy for electricity and running water for his village.

**Design Challenge:** Design and build a free-standing, working windmill with a group.

**Criteria**
Your windmill must
- be free-standing
- have blades that spin when tested with a fan for at least 30 seconds.

**Materials**
- Corks – limit 5
- Needles – limit 1
- Wooden skewers – limit 5
- Pipe cleaners – limit 5
- Binder clips – limit 5
- Straws – limit 10
- Index cards – limit 10
- Popsicle sticks – limit 10
- Recycled plastic bottles
- Tape – limit 12 inches

**Tools**
- Push pin paper drill
- Fan
- Scissors
- Timer

**Teacher Notes**
- Discuss safety with your students and how to appropriately use needles before beginning the challenge.
- Students worked in groups of five to eight.
- The students were not given any directions on how to build the windmill but could use any of the materials provided.
- Once the windmill was built, a teacher used a battery-powered fan to test the efficiency of each windmill.
- The windmills were then presented in front of all the groups.

**Virginia Standards of Learning**
4th Grade Science 4.2
During my second year of teaching, I was lucky enough to attend a conference hosted by Ron Nash, author of The Active Classroom. During his conference, he used music, triggered by a small remote and broadcast by an iPod on a portable speaker, to signal changes or wrap up conversations. I left this conference immeasurably changed by the many things he taught teachers that day, but I was especially obsessed with the use of music in the classroom. Inspired, I immediately priced my own iPod with speaker and remote, but found it slightly out of my young-teacher means. For the reminder of that year, I used the only resource I had available at the time: YouTube on my work computer.

Although YouTube was effective, it came with some drawbacks. I had to walk to my computer every time I wished to play a song, uncensored commercials, and related video content flooded the browser, and videos were occasionally removed without warning. These issues were manageable, but when I inherited a new piece of technology, everything changed for the better.

According to a January 2018 article on TechCrunch, about 39 million people in America own a smart speaker like Amazon's Alexa controlled Echo smart speaker or Google Home – and now, so does our fourth-grade classroom.

The most common and frequent use in our classroom is as an actual speaker. In place of verbal transitions, I still use my Nash-inspired musical transitions. With Alexa, they are more convenient, and I save valuable instructional minutes. I can play songs with a single touch using the Alexa app on my phone or with a voice command from anywhere in the room. The students quickly learn that certain songs require certain actions. For example, if I play “Here Comes the Sun” by the Beatles, students immediately grab their lunch boxes and line up for recess/lunch. When a transition includes leaving the room, the last student in line is eager to perform the assigned job of saying, “Alexa, music off.”

After being placed in the room, Alexa was able to assist with other things, like timers. Most classrooms use timers in one form or another. Imagine how easy it is to say, from anywhere in your room, “Alexa, set a 10-minute timer.” This year, our class experimented using the Pomodoro Technique during long stretches of independent work on year-end projects. We modified this technique slightly, so students worked for 15- or 20-minute stretches with a 2 or 3-minute chat break between each one.

Other jobs Alexa found in our classroom were spell-checker and general question-answerer. During writing, students were permitted to use Alexa to correct spelling errors, after exhausting traditional methods first. We found that many words we wanted to use weren't in our outdated student dictionaries. A recent class discussion of Hatchet by Gary Paulson had students curious about how big a moose, really was. We asked Alexa for the average weight of a moose then calculated approximately how many fourth-grade students that was worth. I don't have all the answers, and neither does Alexa, but the students learn that there is value in their questions, and that we have plenty of resources to find answers.

As a teacher, I understand that incorporating new technology often comes with some hesitation about what could go wrong. Luckily, Alexa has a few features to ease teacher concerns about misuse. Though Alexa is connected to my personal Amazon account, there is a setting to turn off purchases through Echo so I don't have to worry about mysterious packages showing up at my house. Additionally, every request made to Alexa creates a short audio clip, which can be accessed through the History in the Alexa App. I had only two incidents where a student attempted to use Alexa for a non-approved task. One tried to order a pizza and the other wanted Alexa to spell something inappropriate for school. Replaying the audio clip, in which students can clearly identify their own voice makes it difficult to deny the misdeed and meant I saw no repeat offenders.

Today's classrooms don't look like the classroom environments many of us experienced as children.
and students. Technology has become a huge part of students’ daily lives. Teachers are regularly encouraged to incorporate technology in their classrooms, but many aren’t sure how to do this successfully. While Alexa saw somewhat limited use in my room, I am confident that with more time, I will discover other time-saving, life-assisting uses for it. With a reasonable price point ($40 for a refurbished unit through Amazon.com) and a long list of available features and skills, there are plenty of possibilities.


Building an All-Inclusive School Playground
Melody Locher, Hopkins Road Elementary School
Chesterfield County Public Schools

Background
Since we have been studying about simple machines, our school board has asked us to lead a project using simple machines to design improvements to our playground. These improvements should make our playground more accessible for students of all abilities. How can we use simple machines to do this?

Challenge
Design and build a model of a piece of playground equipment that is more accessible for students of all abilities.

Criteria
Your model should include
• at least one simple machine
• at least one moving part
• a modification that makes it more accessible for all students.

Materials
• Variety of felt/fabric
• Tissue paper
• Craft sticks – limit 10
• Cardboard
• Pipe cleaners - limit 5
• Straws – limit 5
• Masking tape – limit 12 inches
• Variety of paper
• String/yarn
• Recycled plastics
• Plastic bottle caps – limit 10
• Toothpicks – limit 10
• Aluminum foil
• Cardboard tubes

Tools
• Scissors
• Markers/crayons/colored pencils
• Computer for research
• Hot glue gun – limit 5 spots
• Ruler
• Push pin paper drill

Teacher Notes:
Review what students have been learning in the classroom about simple machines. Discuss the design challenge and show the video New Inclusive Playground Opens for Kids of All Abilities. Have the school counselor come in and present a lesson on inclusivity.
**Virginia Standards of Learning**
Science - 3.2 (simple machines)

**Supporting Resources**
Simple Machines text sets for students to research types of simple machines.
More Flipbooks I made as a Kid - https://www.youtube.com/watch?v=6T_dQniyXIU
*Playground Opens for Kids of All Abilities* - https://www.youtube.com/watch?v=PMIgSN968Z4
Field trip to the Greater Richmond ARC Park to research inclusive playgrounds https://www.richmondarc.org
**Background:** Pete the cat wanted to play catch with his friends but they were all too busy. So instead of getting upset, he came up with a brilliant idea...he would make his own friend! Pete built his own robot that looked just like him and enjoyed all the things he enjoyed. He named him Robo Pete.

**Challenge:** Your challenge is to design and create your own 3-dimensional (3D) robot friend to play with. You will build your robot out of cardboard shapes. Your robot must be free-standing. You can use the pre-cut shapes, or you can cut out your own. Once you finish putting your robot together, don’t forget to add details to your robot to make it look like a new friend or like you!

**Criteria: When you build your 3D robot, you must**
- use cardboard pieces
- use pre-cut squares and rectangles or cut your own shapes out of cardboard
- include at least one square piece and two rectangle pieces
- draw, color, and add details to make your project look like a robot
- be neat, and decorative
- make Robo Pete attractive and fun in appearance.

**Materials**
- Cardboard pieces
- Glue
- Tape
- Tissue paper rolls

**Tools**
- Scissors
- Crayons and pencils

**Standards of Technological Literacy**
- Standard 2
- Standard 5
- Standard 6

**Virginia Standards of Learning**
- English K.10, 1.10
- Math K.11 / 1.13 / 2.16 / 3.14
- Science K.6
Robot-ME!
Kelley Davis, Page County Public Schools

1. **What is the problem?** State the problem in your own words.


2. **Brainstorm solutions** - Sketch two possible solutions.


3. **Create the solution you think is best.**

4. **Test your solution**

<table>
<thead>
<tr>
<th>Use cardboard pieces to make a 3D robot.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Includes one square and two rectangle pieces.</td>
</tr>
<tr>
<td>Draw, color, and add details to make your project look like a robot.</td>
</tr>
<tr>
<td>Make the robot neat, decorative, attractive and fun in appearance.</td>
</tr>
</tbody>
</table>
5. **Keep notes of your progress.**
What problems did you encounter? How did you solve them?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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6. **Evaluate your solution.**
Was it the best solution? **YES** **NO**
Would your other idea work better? **YES** **NO**
Tell me why.

What is one thing you could do to improve your robot?

7. **Share a picture of your final product on a separate page.** (sketch or photo)
Children’s Engineering
2018
Awards and Recognition

Elizabeth Kirk
Curriculum and Instructional Leadership Award
Powhatan County Public Schools

Joan Harper-Neely
Presidential Leadership
National Institute of Aerospace Center for Integrative STEM Education

Dr. Charlotte P. Holter
Emeritus Scholar Citation
Rockingham County Public Schools

Bobbie Arbogast
Program of the Year
Rockingham County Public Schools

Emily Loving
Meritorious Service Citation
Chesterfield County Public Schools

Teresa Wilburn
Meritorious Service Citation
CTE Resource Center

Kelley Davis, Secretary
Prince William County Public Schools
Katherine Mangum, President
St. Catherine’s School
Kimberly Dempsey, President-elect
Loudoun County Public Schools

George R. Willcox
Emeritus Scholar Citation
Virginia Department of Education
From H2NO to H2O
Water Crisis in Flint, Michigan
Vivian Hackney, Ettrick Elementary School
Chesterfield County Public Schools

Background:
In 2014, Flint, Michigan announced that fecal coliform bacteria was in the water supply, prompting a boil water advisory for a specific neighborhood. As officials tried to get this contamination under control, more bacteria continued to show up in the water, causing a clean water shortage for citizens.

Challenge:
Research, design, and create a water filter that accurately filters contaminated water to help the people of Flint, Michigan, have clean water to drink.

Criteria:
Your water filter must
• filter contaminated materials out of the water
• hold at least 5 mL of clean water
• be at least one simple machine
• have at least one moving part
• use a modification that makes it more accessible for all students.

Filter Materials:
• Plastic bottles
• Glass jars with/without tops
• Coffee filters
• Milk jugs
• Cardboard tubes
• Duct tape – limit 12 inches
• Rubber bands

Testing Materials:
• Sand
• Potting soil
• Outside debris
• Water
• Rocks

Tools:
• Scissors
• Hot glue gun – limit 5 spots
• Graduated cylinder
Teacher Notes:
Show the YouTube video: Water Crisis in Flint, Michigan. https://www.youtube.com/watch?v=872Xz63b-9VU. Discuss the living conditions of Flint citizens and what it would be like if we had no clean water to drink. What would life look like on a daily basis? How would that affect our lives?

Discuss the importance of safety when using glass jars before beginning the design challenge.

Technology:
Each group of students will conduct research to find more information on the water contamination, as well as information on what makes a good water filter. Students will record their information.

Virginia Standards of Learning
Science - 4.1
Science - 4.9
Math - 4.8

“It was extremely fulfilling to see my students connect on an emotional level to a place they have never visited. Watching them feel compassion for strangers was the big takeaway from this lesson. I was also blown away with how they applied their engineering skills and research knowledge to this project in several different ways. I am so proud of how hard they worked to make the world a better place each and every day.”

-Miss Vivian Hackney
The Virginia Children's Engineering Council (VCEC) is dedicated to developing design, engineering, and technology instructional material, and providing local, regional and statewide inservice opportunities for educators at grades K-5. The inservice programs help teachers ensure that children develop an understanding of how to use, create, control, and assess technology. These instructional experiences are provided in a design, critical thinking, and problem solving context. They undergird attainment of selected Standards of Learning in English, mathematics, science, and history and social science.

As an organization of volunteers the Council seeks individuals that are interested in participating in the work of the council. Please review the committees below and check the ones that you are interested in serving as a member:

- **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.

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

- **Convention Planning.** The convention planning team is responsible for design, planning, and conducting the annual statewide staff develop program for K-5 teachers annual.

- **Photographer.** The photographer will be responsible for taking an array of pictures during annual convention.

- **Staff Development.** This committee plans and conducts local, regional and statewide workshops for teachers. Committee members should have experience in the engineering design process including design and technology.

- **Web site.** This committee is responsibility for creating and maintaining a state-of-art Web site.

Please provide your contact information below.

First Name: ___________________________  Last Name: ___________________________

School Division or Organization: _______________________________________________

School: _______________________________________________________________________

Address: _____________________________________________________________________

City: ___________________________  State: _____  Zip: _________________________

Phone: ___________________________  Fax: ___________________________

Email: ________________________________

Please email your area(s) of interest to vcec@childrensengineering.org or mail a copy of this form to the address below:

Virginia Children’s Engineering Council • P. O. Box 29307 • Henrico • Virginia 23243
Nominations for 2019–20 Elected Offices

The Virginia Children's Engineering Council (VCEC) is pleased to announce the Call for 2019-2020 President-elect and Secretary nominees. Below are the core responsibilities for nomination and roles of the two positions. Please consider these positions and those who may be interested in being nominated. Nominations are open until midnight Sunday, September 30, 2018. The election voting will be held in December 2018. The election winners will be installed during the Virginia Children's Engineering Council annual convention, February 7-8, 2019.

Eligibility for Elected Office

- Current member of the Virginia Children's Engineering Council
- Served on the VCEC Board of Directors or one of the Board's committees
- Committed to attend at least 75% of the Board of Director's meetings and all responsibilities of the position
- Able to attend the annual convention
- Direct experiences at the elementary level as a teacher, specialist, coordinator, principal, etc.
- Demonstrated understanding of design, engineering, and technology at the elementary school level

Responsibilities of Elected Officers

President-Elect: (3-year commitment: president-elect, president, immediate past president)
- Serves as a member of the VCEC executive committee
- Notifies, collects, and organizes committee reports by due dates
- Serves on the annual convention program committee, assist with the approval of presenters, and convention schedule
- Manages meetings if the president is unable to attend
- Serves at the discretion of the President

Secretary: (1-year commitment)
- Records the minutes of all meetings of the Board of Directors
- Notifies the Board of Directors of quarterly meetings, special meetings, and proposed changes to the bylaws
- Maintains an on-going calendar of events and important dates pertaining to the operation of the Council
- Coordinates with the Chief Executive Officer to ensure that all legal documents are properly maintained
- Serves at the discretion of the President.

For election questions contact Elections Chair, Elizabeth Kirk, vcec@childrensengineering.org.
Challenge your students to see the technology and engineering that go into everyday objects – flowerpots, ladders, trains, escalators. *Children's Engineering* highlights the T and E in STEM!

In each guide, teachers are provided with a Design Brief, Guided Portfolio, Grading Rubric, Teacher Tips, and Standards Connections for selected children's books.

Students complete the **Engineering Design Process** - defining the problem, brainstorming a solution, creating a design, testing the solution, and evaluating the solution.

### K-2 Linking Literature to Structures

Children should begin learning about the role of structures in technology and engineering at an early age, and **K-2 Linking Literature to Structures** is a perfect book for doing that. It highlights the T and E in STEM with five in-depth activities that guide students through the whole design process in projects such as mini golf and building a tree house. Each design brief hits multiple standards and goals in one project. Items for these activities are cost conscious with many of them found readily around the house or classroom. In today’s classroom, flexibility is key, and the design challenges created here are easy to set up and can be adapted to your needs.

| 41205-16.95 |

### 3-5 Linking Literature to Structures

Teach Grades 3-5 about structures with activities focused on using readily available items found in classrooms and houses. The five design projects included in **3-5 Linking Literature to Structures** will have students creating structures such as ancient Egyptian burial structures and medieval siege machines. Each of the design briefs in this book will take students through the whole design process and teach them multiple standards.

| 41204-16.95 |

With a more than 57 years of combined teaching experience, authors Charlotte Holter and Krista Miller bring engineering and technology to light in these *Linking Literature to Structures* teacher’s guides. Both Charlotte and Krista are members of the Children’s Engineering/STEM Training Team, training elementary teachers to integrate children’s engineering into standard classroom curriculum.
Join Us
Explore teaching strategies for integrating Children’s Engineering into your curriculum and instructional strategies.

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

Attend workshops conducted by experienced PreK-5 classroom teachers.

Network with teachers who share your interest in the need for every child to develop skills in critical thinking, creative thinking, communication, collaboration, and citizenship.

Visit educational exhibits and examine available materials from technology vendors.

Full Conference Registration Includes
- Morning and afternoon breaks and lunch on Thursday
- Breakfast, morning break, and lunch on Friday
- Ten recertification points for Virginia teachers

Registration Fee: $230.00
Postmark Deadline, January 21, 2019

For More Information Contact
Katherine Mangum, VCEC President
(804) 335-4879, kmangum@st.catherines.org

Kim Dempsey, President-elect
(540) 578-3745, Kimberly.dempsey@lcps.org

Barbara Adcock, Chair, Convention Presenter Workshops/Sessions
VCECPresenters@gmail.com

Keynote Speakers
Dr. James F. Lane was appointed Virginia’s 25th superintendent of public instruction by Governor Ralph S. Northam, effective June 1, 2018. As state superintendent, Dr. Lane serves as the executive officer of the Virginia Department of Education, which is the administrative agency for the commonwealth’s public schools. He also serves as secretary of the state Board of Education. In 2014, Dr. Lane was recognized by the White House as one of the top 100 superintendents as a leader in the use of instructional technology in schools.

Dr. Yvonne Spicer, DTE, is the President of the International Technology and Engineering Educators Association (ITEEA). She was the vice president for Advocacy and Educational Partnerships at the Boston Museum of Science before being elected mayor of the City of Framingham, Massachusetts. She was appointed to the Massachusetts Governor’s STEM Advisory Council in 2010 as the co-chair of the council’s teacher development committee. Mayor Spicer was instrumental in establishing the 2001 Massachusetts Technology/Engineering Curriculum framework and the first ever kindergarten through 12th grade assessment for technology and engineering.

Cas Holman has spent the last 16 years immersed in play, early education, and designing for children’s imagination. Through her company Heroes Will Rise, she designs and manufactures tools that allow children to transcend existing models of identity and the performance of play. She is also an Associate Professor of Industrial Design at Rhode Island School of Design (RISD) and prototypes her educational tools on her five acre summer camp known as Camp Fun. Her inspiring collaborators and clients include Cheng Xueqin, founder of Anji Play (Anji, China), several community-based organizations and schools in New York City, and Lego Education (DK).

Sponsored by: Virginia Children’s Engineering Council, Inc (VCEC)
Website: (http://www.childrensengineering.org)