



2022 MINNDEPENDENT STEM Education Conference Breakout Sessions

Recommended grades listed in the left column. Additional grades for which sessions may be relevant are indicated in parentheses.

Welcome and Keynote: 8:30-9:15 am



Jazmine Darden
Educator | Entrepreneur | Creator
Aspire to Create, Create to Inspire

Jazmine is a non-stop problem solver and question asker, who embodies what it means to have a STEM mindset — and is always striving to inspire the next generation of doers, creators, and thinkers to imagine the possibilities of a life in STEM. Jaz applies this mindset to everything she does, whether as an educator at Dunwoody College of Technology, working with K-12 students, serving as director of the Young Inventor Challenge, using engineering and design to solve all kinds of problems, or picking up a new hobby. With bachelor's degrees in physics and math from Augsburg College and an associate's degree in Engineering Drafting and Design from Dunwoody, Jaz knows firsthand the benefits of the different educational pathways available to young people interested in STEM. Regardless of where Jazmine works and volunteers her time, she arrives with a "yes" attitude that embraces her motto of "Aspire to Create, Create to Inspire."

Morning Double Sessions: 9:30-11:50 am (break from 10:30-10:50am)

K-5	<p>NOTE: THIS SESSION IS FULL</p> <p>Integrated STEM Brings it All Together: Activity, Project, Problem Based Learning (APB)</p> <p>Vic Dreier — Project Lead the Way</p> <p>Project Lead the Way Launch classroom experiences engage students — sparking their natural curiosity while supporting collaboration, persistence, motivation, inquiry, and connecting them early to career interests. Come learn how APB instruction works and take-home examples ready for your classroom even if you aren't a PLTW teacher or school. PLTW Launch is truly designed for all learners and with the flexibility for schools to implement in ways that work for them. Each module supports teachers and students with real-world problem solving, social-emotional development, and three-dimensional learning through activity, project, and problem-based instruction. Bring your best problem-solving mindset to participate in this hands-on session. We will share grant opportunities for charter, private, and independent schools that can help you grow your STEM program.</p>
K-12	<p>Math Talks: Promoting Discussion for All Students</p> <p>Debbie Monson, PhD — University of St. Thomas</p> <p>Math Talks can promote a more inclusive, student-centered classroom where students are thinking and communicating about mathematics. Math Talks can focus on number sense or other mathematics content. This session will give you an opportunity to explore what Math Talks are, participate in Math Talks, and discuss how to implement them in your classroom daily.</p>

One-Hour Breakout Sessions: 9:30-10:30 am		
K-12	Managing Stress from the Inside Out Paul Bernabei — Top 20 Training Although stress is necessary for a healthy life, chronic stress can be a destroyer. This session focuses on (1) the importance of stress, (2) how stressors come from outside and inside ourselves, (3) how our thinking impacts our experience of stress, and (4) simple practical ways to minimize unhealthy stress.	
3-8 (K-12)	Batteries, Bulbs, and Wires: Low-cost, Low-tech Learning through Making Eileen King & André Phillips — The Bakken Museum Circuits are the building blocks of computers, and being comfortable with building and manipulating them opens up a world of physical computing possibilities! In this session, participants will work through the progressive circuit-building challenges we've found work best for late elementary and middle school students, review key concepts and vocabulary, and explore examples for including circuit-building activities in STEAM and coding projects.	
4-12	CoderZ: Using Virtual Robotics to Teach Programming in the Classroom or Afterschool Cheryl Moeller & Jeannie Badger — High Tech Kids Participants will receive an overview of the CoderZ curriculum and CoderZ Leagues. Those attending will be able to experience CoderZ software as a student and see the educator's view of the software as well. CoderZ is a cloud-based learning platform that can be used on Chromebooks and laptops (not available for iPads at this time). Software is geared for students in 4th grade through 12th grade. Devices will be available for your use if needed.	
6-8	Student-designed Research and Peer Review in the Middle School STEM Classroom Ben Gapinski & Aran Glancy — Hill-Murray School Learn about Hill-Murray's process for engaging students in presentations and peer review — and how you can use it as a launching point for similar projects. We'll share the successes, failures, and impactful learning that took place when we utilized this process using the example of challenging students to design experiments in order to determine what factors would impact a 3D printed sled's speed down a ramp.	
Session 2: 10:50-11:50 am		
K-12	The Motivational Power of Purpose Paul Bernabei — Top 20 Training Educators have been dealing with challenging experiences that have impacted their students, colleagues, and selves. Throughout history people with a clear sense of purpose have better managed such challenging times. During this session, we will (1) connect with our professional motivational purpose, (2) become aware of outside 'hits' and inside 'saboteurs' that can knock us off purpose, and (3) identify practical strategies that help us stay focused on our purpose and better manage difficult times.	
K-12	Curriculum Choices and the Minnesota Science Standards Erin Clarke — Hiawatha Collegiate High School Moving to the new science standards and embracing three-dimensional pedagogy is a challenge faced by all schools and can be supported by a strong curriculum baseline. This session will cover: <ul style="list-style-type: none"> ● Rationale for providing a strong curriculum foundation ● Review the key pedagogy shifts of the new standards ● Ways that the 2019 MN Science Standards are different from NGSS ● Overview of curriculum adoption options (open source, revision, updated curriculum, or new vendor) ● Resources for planning curriculum adoption and evaluating curriculum 	

3-12	Connecting Students to Nature in the Classroom to Save Wildlife with the Minnesota Zoo Kristi Berg & Gina Goralski — Minnesota Zoo Connecting students with nature is more important than ever, but finding accessible and meaningful ways that support STEM and student learning goals can be challenging. Join the Minnesota Zoo to learn how students can contribute solutions to real Zoo and wildlife challenges in Minnesota and explore how environmental education-focused activities can help build empathy, support social-emotional learning, and provide students with a sense of impact in their community. As part of this session, participants will also learn about two of the Minnesota Zoo's free program opportunities for schools: Show us Your Mussels Digital Campaign (Grades 6-12) and ZOOMS STEM Enrichment and Exhibit Design Challenges (Grades 3-12).	
3-12	3D Printing in the Classroom Jazmine Darden — Dunwoody College of Technology 3D Printing is a technology that is disrupting the future of manufacturing and fabrication. As 3D printing is becoming more accessible, it can be exciting but also nerve-racking to take the leap of introducing printers into the classroom. Attendees will learn about the process of how 3D printing works, how it is used in industry, and ideas for projects they can do in the classroom geared towards different age groups. We will take a look at options of user-friendly Computer-Aided Design (CAD) software, glance at slicing software to convert the 3D models into a language the printers can understand, and observe 3D printers in action!	
Afternoon Double Session: 12:50-3:15 pm (break from 1:50-2:10 pm, last 5 minutes for survey)		
K-12	Keeping Students Engaged in Learning Paul Bernabei — Top 20 Training A growing number of students are having experiences in school that are resulting in disengagement from learning. This session will present a major cause of student disengagement that has gone undetected in American schools. We will then consider how to address this problem by identifying four ways to create a culture of learning: (1) learning from mistakes and failure, (2) knowing the secret about confusion, (3) assuring that all students know that they have intelligence, and (4) developing relationships that foster connection and belonging.	
Session 3: 12:50 - 1:50 pm		
K-5 (6-8)	Top 10 Strategies for Teaching STEM in a Virtual or Hybrid Environment Sandy Marshall — Project Scientist Project Scientist is a non-profit that has served 20,000 girls ages 4-12 in STEM over the last ten years. Through the recent pandemic we have transitioned our in-person programming to a virtual at-home solution and now a hybrid program, partnering with schools and nonprofits across the country. During this transition, we expanded our programming to include bilingual STEM curricula in English and Spanish as well as serving girls in Mexico all via a hybrid model. Come learn the latest technology, tools, and techniques to provide hands-on STEM activities in any environment and create a pandemic-resilient STEM program.	
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3-12	<p>Free and Low-cost Engineering Curriculum and Experiential Learning Resources Jason Bruns & Melissa Huppert — Minnesota State Engineering Center of Excellence</p> <p>The Engineering Center will share the Explore Engineering Curriculum, Siemens STEM Curriculum, as well as the Engineering Machine Design and Reverse Engineering Contests. These programs are designed to inspire interest in engineering-related careers, support critical life skill development (teamwork, communication, critical thinking, etc.) and increase educators' self-efficacy to teach basic engineering principles to their students. Material shared supports educators in teaching STEM principles through hands-on lesson plans, tools, and resources and is suitable for both during school and afterschool settings.</p>
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6-12 (K-5)	<p>Media in the Classroom Leah Defenbaugh & Caylee Haus — Twin Cities PBS</p> <p>Youth today have more demands than ever for their attention. Meet them where they are with targeted, standards-based media like videos, games, and interactive lesson plans. In this session, participants will learn about free media resources from Twin Cities PBS and PBS Learning Media. We will discuss ways to implement these resources and create individualized plans for adding media resources into the existing curriculum. Educators will leave with a set of resources and strategies to immediately implement in their classrooms.</p>
Session 4: 2:10-3:15 pm (last 5 minutes for survey)	
K-12	<p>MINNDEPENDENT's STEM Program: How to Write a Winning STEM Grant Proposal & Intro to Community Partnerships Beth Murphy — MINNDEPENDENT</p> <p>In this session, new and experienced grant writers will gain tips for writing stronger MINNDEPENDENT STEM Grant applications and learn about what our STEM Advisory Committee looks for when they review grant proposals and make funding recommendations. In addition, information about MINNDEPENDENT's community partnerships with Science from Scientists, We Share Solar, and other organizations will be shared.</p>
3-8	<p>Developing Student Confidence with Science and Engineering Practices Renee Nesnidal, Jo Hopp & Haleigh Ziebol — Science from Scientists</p> <p>Science from Scientists is a nonprofit focused on scientist-led STEM programming. A MINNDEPENDENT school partner for the past 4 years, we send real, role-model STEM professionals into schools to teach hands-on STEM, improving students' STEM skills, confidence, knowledge, and ability. In addition to our classroom visits, we offer teacher professional development with in-person, live-virtual, and asynchronous-online options. In this workshop, we will explore the Science and Engineering Practice (SEP) of <i>Planning and Carrying Out Investigations</i>. We will use the example of DNA extraction to look at different ways to allow students to gain confidence with planning and conducting their own experiments and work through the process for themselves – while still ensuring successful outcomes. We will also work in small groups to develop ideas for using this SEP with other hands-on STEM activities.</p>

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6-8 (9-12)	<p>Sulfide Mining in the Boundary Waters: An Interdisciplinary, Socio-Scientific Project Aran Glancy, Hill-Murray School</p> <p>In this session we'll share the development, implementation, and results of an interdisciplinary, "socio-scientific" student project. Socio-scientific issues are complex and need to be considered from multiple perspectives. Our project centered around sulfide mining, a different process than traditional iron mining, near the Boundary Waters. Sulfide mining produces precious metals like copper and nickel, both important in many electronics and modern batteries, and these new mines promise to create jobs in the area. But the processes necessary to extract these metals pose many risks to the wetlands and waterways of northern Minnesota. After being introduced to the issue, students investigated the topic in math, science, social studies, and engineering classes, applying discipline-specific knowledge and practices to make sense of the complex issue. The project culminates with students combining what they've learned in all their classes to make a recommendation for the future of sulfide mining in Minnesota.</p>
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