Chat

Amy Stephens: Good morning everyone! It is great to see you online! The chat is open so feel free to introduce yourselves. Remember to have it set to "Everyone"

Neil Lundgren: Thank you. I'm Neil Lundgren, an Elementary Science Specialist, tuning in from Garden City, Kansas.

Darcy McMahon: Good morning from Michigan!

Marti Hendrichs: Thank you. I am Marti Hendrichs joining from Vienna, Austria (Vienna International School)

Hope Brown: Good morning from Fort Dodge, Iowa ☺

Ann Miller: Good morning Ann from Rockville, MD

Vidalina Trevino: Good morning. I am Vida Trevino, an AEF Fellow at NSF in NSBO.

Erica Baker-KY: Good morning! Erica Baker from KY. I am the Elementary Science Consultant for the Kentucky Department of Education.

Manuel Silva (ISEP): Hi, I am Manuel Silva connecting from Porto, Portugal.

Shari Templeton: Beautiful autumn-feel day in Maine!

Stephanie Klixbull: Good morning! Stephanie Klixbull, Elementary STEM Specialist for Penn State Univeristy

Robert Ceglie: Rob Ceglie- Science educator is Charlotte at Queens University of Charlotte

Ginger Teague: Good morning! Ginger Teague with Project Lead The Way and from Alcoa, Tennessee.

Melissa Rogers, Smithsonian (she/her): Hello. Melissa Rogers from Smithsonian Science Education Center. Working from Canaan Valley, WV

Kathleen Bergin: Good morning...I'm Kathleen Bergin, a Program Officer at the National Science Foundation...Lead of the Robert Noyce Teacher Scholarship program and a former classroom teacher

Eileen Coughlin: Eileen Coughlin, Falk Laboratory School, University of PIttsburgh

Margaret A Eisenhart: Good morning from Boulder, CO

Cathy Holmes: Good Morning! Cathy Holmes Ohio Department of Education Science Consultant

Kate Cook (she/her): Kate Cook - Maine Mathematics and Science Alliance

Jim Bader: @Melissa Rogers - Hello from Cleveland!!!

Jen Love (she/her/hers): Jennifer Love, Northeastern University Center for STEM Education

Leslie Silbernagel (she/her): Good morning! Leslie Silbernagel, STEM Outreach Director @ Northern Kentucky University

Margaret A Eisenhart: Good morning from Boulder, CO!

Jessie Enlow: Hi all! Jessie Enlow, Cabarrus County Schools - K-12 Instructional Specialist

Bridget Murray: Good Morning! Bridget Murray from American Museum of Natural History.

John Galisky: Hi everyone. John Galisky, PhD student at UCSB. (HI Vida! I'm an AEF fellow from 2017-18)

Jim Bader: JIm Bader - Leonard Gelfand STEM at Case Western Reserve University, Cleveland OH

Jill Latchana she/her: Good morning, I'm Jill Latchana, the project manager for the Albert Einstein Distinguished Educator Fellowship Program. Thrilled to see many AEF Fellows and Alumni both in person and virtually.

Stacey van der Veen: Good morning all, Stacey van der Veen, Leadership in Science, from Sunny NJ

John Galisky: Hi Jill!

Amanda Buice: Amanda Buice, Georgia Youth Science & Technology Centers

Claudia Ovalle: Hello from Colombia, South America

Adrienne Hanson (She/Her): Good morning everyone! Adrienne Hanson from the Maine Mathematics and Science Alliance.

Joan Harper-Neely: Good morning! Joan Harper-Neely, National Institute of Aerospace/ NASA eClips - STEM Education Specialist

Nancy Kober: Hello, Nancy Kober from Charlottesville, VA,

Stanley Harrell: Hello all , Stanley Harrell - Warren County,North Carolina - STEM Specialist

Chanda Jefferson: Good morning! Chanda Jefferson, University of Pennsylvania Director of Community Engagement and Outreach (K-12 STEM)

Valery Gonzalez: Hello! Valery Gonzalez, science educator for the American Museum of Natural History.

Celia de la Loza: Good morning everyone! Celia de la Loza, Digital Learning Instructional Coach from El Rancho Unified School District in Pico Rivera CA (Los Ángeles)

Maranda Chung (she/her): Hello, everyone! Maranda Chung, STEM Education Specialist at the Maine Mathematics and Science Alliance.

Bonnie Wylo: Good morning! Bonnie Wylo, Eastern Michigan University, Physics & Astronomy

Jennifer Wayne: Good morning all! Jennifer Wayne from College of Engineering at Virginia Tech.

Robin Deems: Good Morning! Robin Deems - Ohio Department of Education - Science Consultant

billwood: Hello everyone from Bill Wood in Boulder!

Jae Williams: Good morning, Jae Williams Equity practitioner and science consultant, dialing in from Atlantic Canada

John Galisky: Hi everyone! John Galisky, PhD student at UCSB. (Hi Vida! I'm an AEF fellow, too—2017-18. Hi Jill!)

Bonnie Wylo: Preservice elementary teachers are such an important intervention point.

Kevin Anderson, WI DPI: "design challenges" to me can mean spaghetti and marshmallow towers - not real engineering. Anyone else have issues with that terminology?

Jae Williams: Good morning Folks! Jae Williams, Equity Practictioner and Science Consultant, tuning in from Atlantic Canada

Bonnie Wylo: @Kevin a little bit, but that is 'real' engineering e.g. modeling with something other than steel, etc. I hear you, though. It does bolster the student's perspective on it, though.

Barb Kohut: Good Morning everyone! Barb Kohut, Worcester County Public Schools K-5 Science and Social Studies Instructional Coach.

Cathy Holmes: @Kevin and Bonnie - it is a starting point and we need to develop meaningful next steps.

Jae Williams: @Kevin Anderson: I have issues with using "food materials" for investigations, when some students and their families are experiencing food insecurity.

jessica.enlow: Hi there! Where can we gain access to these slides during/after the event?

Kevin Anderson, WI DPI: Good point @Jae, thanks. I do as well.

Kate Cook (she/her): @Bonnie @Kevin - I would argue that it depends on the context of the towers. If we are building towers for the sake of building towers, we lose much of the vision of the framework. If it is in a larger context of figuring out science ideas around phenomena (perhaps as a smaller investigation in the process that helps build a piece of the science idea) or if it is a part of the designing solutions (engineering), I could see how that particular set of materials could be powerful as a sensemaking tool (with the appropriate surround).

Bonnie Wylo: @Jae Right! I forbid it, but it's the idea that you use everyday materials.

Amy Stephens: For those who are less familiar with the report, you can find it here: https://nap.nationalacademies.org/catalog/26215/science-and-engineering-in-preschool-through-elementary-grades-the-brilliance

Bonnie Wylo: @Kate Yes!

Joan Harper-Neely: @Jae - I agree. If the activity doesn't allow students to consume the food, then I don't use that activity or I find an alternate non-food material.

Valery Gonzalez: Thank you @Amy!

Amy Stephens: The recording and slides will be available on the project page shortly after the event: https://www.nationalacademies.org/our-work/enhancing-science-in-prekindergarten-through-fifth-grade

Lydia Hunter ODE: Hi, Lydia Hunter, Ohio Department of Education. I forgot to say hi when I jumped on. Good to see everyone

Kevin Anderson, WI DPI: Are there good computational thinking resources out there for elementary students?

Jim Bader: Awesome to see Ohio Department of Education so well represented. O-H-I-O

Amy Stephens: The evidence for computational thinking is still being developed for these early spaces

Joan Harper-Neely: @Kate- There are other structures students can build other than towers. Cantilevers are fun and students can find them everywhere in their school, homes, community...

Jim Bader: Jim Bader from the Leonard Gelfand STEM Center at Case Western Reserve University. Hello @Melissa Rogers!

Adam Scribner: Good morning! Adam Scribner, Director of STEM Education Initiatives, Indiana University School of Education

Jim Bader: Great to see Ohio Department of Education so well represented.

Melissa Rogers, Smithsonian (she/her): @kevin, going back to an earlier comments you made. yes, I am constantly reminding colleagues to rephrase situations to that students are addressing a problem rather than being handed a design challenge

Candyce Curry: Good morning! Candyce Curry, Albert Einstein Distinguished Educator Fellow, USGS - Washington, DC

Ruth Ray: Ruth E Ray, Warrensville Heights City School District

Mariah Sinclair: Hello! Mariah Sinclair, NRAO Charlottesville VA

Kevin Anderson, WI DPI: I love the possibilities of social studies and science integration. Here are a couple docs with ideas along these lines: https://docs.google.com/document/d/11rIJFZUmcNg9lluCOcgOlyC8vdZl8mSyTRs4pnc2dDs/edit?usp=sharing and https://docs.google.com/document/d/16vBNRrjend1C5NDG44gN-_SJkG41dDY_v2spj-p5D-E/edit?usp=sharing

Ruth Ray: R. Ray WHCSD, STEAM Integration Coordinator K-12

Jessica Short, Dayton Regional STEM Center: Hello, Jessica Short, Director, Dayton Regional STEM Center

Kate Cook (she/her): Hi @jessica! I used to work at the Dayton Regional STEM School!

Missy Holzer: @Melissa - agreed!!

Jim Bader: O-H-I-O is in the house!

Melissa Rogers, Smithsonian (she/her): Hello back at you, @Jim Bader

Amy Reese, HCPSS, Coordinator of Elementary Science: I am so excited for you all to hear from my colleagues! Enjoy this discussion - you will learn so much

Cathy Holmes: +1 Jim Bader

Kathy: Agree, Kevin Anderson. To me, design challenges are fun, but usually do not involve any science.

Jill Latchana she/her: Hi Amy. Can we get that twitter hashtag again?

Neil Lundgren: #BrillianceandStrengths

Melissa Rogers, Smithsonian (she/her): @Kevin Anderson, Smithsonian Science Education Center is about to release two freely available upper elementary units that integrate computational thinking into three-dimensional, phenom/problem-driven units. I'd love to share info with you if you are interested.

Vidalina Trevino: yes, please share! @Kevin Anderson

Jim Bader: @ Melissa Rogers - share the wealth, sister!!!

Stephanie Klixbull: I would love to see that as well!

Kevin Anderson, WI DPI: Yes, @Melissa, please share!

Neil Lundgren: @Melissa, I wanted to say something about your computational thinking units! I'm glad you're here to share about them! (They're great, check them out once they're released)

Melissa Rogers, Smithsonian (she/her): rogersmj@si.edu Let me know if you are interested in the CT units. They will ultimately be posted at ssec.si.edu later this fall

Kevin Anderson, WI DPI: Or, Melissa, you could ask Carol O'Donnell to share them with CSSS - then, I'd get them, and so would most state science leaders (thanks)

Melissa Rogers, Smithsonian (she/her): Thanks @Neil. And thank you for reviewing the fifth grade unit!

Melissa Rogers, Smithsonian (she/her): @Kevin, I'm sure Carol will be sharing them

Ann Miller: I am struck about the comment about parents not preparing kids in science. Science and scientists are hidden to most children. A five year-old can describe what a teacher or doctor does, but most probably can't say what a scientist does.

Kevin Anderson, WI DPI: Yes! I am frustrated that most curriculum materials don't do a good job at getting kids asking questions.

Bonnie Wylo: @Kevin Check out OpenSciEd and/or the Instructional Modeling approach.

Amy Stephens: Moderator: Jenn Brown-Whale; Panelists: Jennifer Atkins, Connie Haymon, Linda Wilson

Amy Reese, HCPSS, Coordinator of Elementary Science: all from the Howard County Public School System, in Maryland ☺

Kate Cook (she/her): Some great options from Next Generation Science Storylines as well.

Amy Stephens: Link to report: https://www.nationalacademies.org/our-work/enhancing-science-in-prekindergarten-through-fifth-grade

Kevin: Agree. There is a difference between learning science and learning the history of science. I see emphasis on the latter rather than the former.

Amy Stephens: The presentation (and the archived recording) will be available on the project page: https://www.nationalacademies.org/our-work/enhancing-science-in-prekindergarten-through-fifth-grade

Neil Lundgren: @Kevin Check out the STEM Teaching Tools for conversation and talk strategies too. 6 and 48 are focused on conversation and talk.

Jeanne Norris- UW: https://stemteachingtools.org/brief/6
https://stemteachingtools.org/brief/48
Also since we're talking K-5, here are grade-banded table tents I developed:
https://drive.google.com/drive/folders/1fBaYG_C1ElIuOVY5S-ijp9ug0NBrRifC?usp=sharing

Celia de la Loza: I teach students about indigenous ways of doing science, so that they can see that science is happening in our under resourced community. In our classes, very few children come from homes with adults that work as engineers. This is one reason it's important to balance it with indigenous ways of doing science.

Kevin: Thank you!

billwood: Have you found ways to transfer their excitement about science to other topics and help them see that a similar approach -- of investigating and questioning to discover new insights, can be applied in other areas?

Robin Deems: Thanks Jeanne! These are great!

Kevin Anderson, WI DPI: Thanks for sharing @Jeanne

Jeanne Norris- UW: 🙌

Ruth Ray: thank you amazing resources

Patti Bills: Thank you so much for sharing these resources. My undergraduate teacher education candidates will learn so much from these!

Celia de la Loza: Yea, Jeanne, thanks for sharing the resources!

David Schnepp: Hi! Will the information posted in the chat thread be included on the project page when you post the recording (maybe the chat is included with the recording?) thanks!

Jeanne Norris- UW: Patti, feel free to reach out to me for any resources for pre-service teachers. Our stemteachingtools.org website has PD modules and climate education resources for pre-service teachers, including webinars and accompanying PD lessons.

Patti Bills: wonderful. thank you. Side note: I'm at Oakland University outside of Detroit in Michigan. We just redesigned our entire elementary program which has been in place for a year. It's exciting work. And, we now offer 2 elementary science methods courses which I'm thrilled to teach!

Jeanne Norris- UW: How fantastic!

Celia de la Loza: Love it Patti!!! Way to go Oakland University!

Kevin Anderson, WI DPI: I'm loving this interactive panel of educators!

Amy Stephens: I will make sure that the chat will also be available on the project page.

Nancy Kober: Thanks, Amy. So many good suggestions in the chat!

Kevin: Thanks Amy. I was just about to ask that.

Kevin: I think it is also important to have leadership at the administration level that either has a science/math background or trusts the science/math teachers to figure things out and support them while they try new things

Alexis: How do you evaluate learning?

Amy Stephens: We will have some time to ask questions of our educators. Please place those in the Q&A. Otherwise I will assume that they are open for "all" discussion

billwood: From Bill Wood. It's exciting to experience your excitement about student-centered teaching of science and engineering to these kids!

Stacey van der Veen: Agreed Kevin. We spend a lot of our time working with administrators to help them support their teachers because so many of them are not comfortable learning from what they see when they go into a science classroom.

Kathy: Although someone may have come into my elementary science classroom and think there is chaos, actually, students were all working very purposefully.

Jeanne Norris- UW: My recommendations to administrators- read these:
https://stemteachingtools.org/brief/21
https://stemteachingtools.org/brief/24
https://stemteachingtools.org/brief/85

Kate Cook (she/her): @Kathy - Such a good point! We are thinking about how we can engage in messaging and communication with EVERYONE (admin, parents, school boards) to start to shift the image of what science looks like in the classroom.

Stacey van der Veen: These have been a great resource, Jeanne!

Candyce Curry: Background knowledge provided is imperative. I like that it is provided and they don't have to search for the information.

billwood: Regarding questions -- a colleague has summed up good teaching at the college level with three words: "Ask, don't tell." — Bill Wood

Amy Reese, HCPSS, Coordinator of Elementary Science: Kids become empowered and that stays with them throughout their education

Kathy: For me, always comes back to having students experience the joy of learning.

Bonnie Wylo: Does anyone know how much the OpenSciEd materials are actually being adopted? Anyone here using them or their approach?

Jill Latchana she/her: I want to take the opportunity, Amy, to thank yourself and Heidi, for always bringing the voices of the teachers to the table, always. I'm loving this panel and their input.

Robin Deems: YES @Jill. Thanks to the NASEM Team. This is so good to hear. Our administrators need to hear this as well.

Amy Stephens: Thank you @Jill and @Robin!

Neil Lundgren: @Jill. I agree! I'm a classroom teacher and I've always felt welcomed, included and listened to at NASEM events.

Jeanne Norris- UW: Teachers know.

Adrienne Hanson (She/Her): Hi @Bonnie, I am a recent classroom teacher and I love OpenSciEd. It was such an important tool for me in making the pedagogical shifts envisioned by The Framework and NGSS.

Jill Latchana she/her: Let me encourage you to advocate with administration, but also past. Go to board meetings and talk about engineering education. Have your voice heard on the state level. Step outside your comfort zone and have your voice heard on the federal level (like the panelists are right now).

Kate Cook (she/her): Yes, @Jill - and even through some more "regular" communication outlets - I think that involving parents in some of this thinking is really important for many reasons.

Jill Latchana she/her: Absolutely build that community and network from solid structure.

Amy Reese, HCPSS, Coordinator of Elementary Science: These QUR sessions are good for brand new teachers, but also teachers that have changed grade levels - we find that learning about the content, the lessons/unit, and long range plan helps them feel more comfortable jumping in and becoming facilitators sooner!

Kathy Renfrew: @Jill that's what I am thinking about doing in the community I live . Going to board meetings, joinginthe PTO

Jill Latchana she/her: I'm pretty sure that starting with your community stakeholders @stephanieklixbull and @johngalinsky would agree that is just great engineering practice? But just don't stop there.

Jeanne Norris- UW: This is exactly how we designed mySci (local STL science curriculum). We included teachers from Day 1 and observed the lessons in action. We also held lots of focus groups in person and took survey data seriously when making edits.

Chad Janowski - Einstein Project: This is a great place for nonprofits to connect curriculum developers to practitioners and provide the additional support that may not available through most developers.

Ruth Ray: Parental involvement is so critical and is everything, yet we continue to struggle in consistently engaging our most impactful partners...

Kathy Renfrew: @that's what I am thinking about doing in the community I live. I am going to begin attending board members and joining the the PTO

Ann Miller: @Chad, I am starting a nonprofit, Science is Elemental, to help support science education. I know from personal experience that many of the people I have met over the years did not engage in science education or get the necessary background in science during their school years. Grateful for these open NASEM meetings--I've gotten more ideas for how I can help. scienceiselemental.blog

Kathy Renfrew: @chad yes organizations like the one I work with

Stephanie Klixbull: Yes @Jilllatchana! So glad you commented on that! But oh my I don't know if I have enough chat space to express my feelings or participation on that, haha. If anyone wants to start the convo, let me know!

Kathy Renfrew: @ chad https://www.wadeinstitutema.org/

Ann Miller: Thanks for the link, Chad https://www.scienceiselemental.blog

Peter: This is a really great panel, it sounds like the work Jenn (the moderator) in particular does is amazing

Kathy Renfrew: I recently supervised a preservice teacher where the principal met me at the door and said “we do not teach science in our school”

Kevin: :(

Ann Miller: So sorry to hear that Kathy.

Jae Williams: The lag inherent to systems change will keep lesser practices in progressive future0oriented science education in play.

Kevin: Does anyone here integrate systems dynamics into their curriculum?

Jill Latchana she/her: I know that @vidatrevino is especially interested in turning that message of 'no science' around for preservice teachers @kathyrenfrew.

Jae Williams: This is why continuous un/learning and levelling up for high level instructional practices is necessary.

Kate Cook (she/her): And also a reminder to ourselves that systemic change takes time! On the order of 15-25 years! We are getting ready to dive in to widespread implementation - what an exciting time for all of us.

Jae Williams: @Kate: spot on!

Chad Janowski - Einstein Project: In working with a team of teachers this summer that complained of the lack of science, I had one team decide to be “Contagious Science Teachers” as well as “Ambitious Science Teachers.” They wanted others to see their success and want that for their own students.

Jeanne Norris- UW: Kate that is what hurts me the most, especially knowing that my own child's K-5 science schooling has completely been lost because of the slowness of change.

Katz, Jacqueline: @Chad: I love the idea of being a "Contagious Science Teacher"--the excitement that science generates is hard to deny!

Kate Cook (she/her): I also empathize with that @Jeanne - good point.

Erica Baker-KY: Have any state science consultant/specialist people that are here completed any work around the idea of getting the message out that science is important for all students, including primary and intermediate? Is so, what have you done and what are your take-aways from that work? I would love to hear from you! Erica.baker@education.ky.gov

Ann Miller: @Erica, I am just starting, so no results. I will email you with what I am planning.

K. Renae Pullen: Canvas can be great for on-demand learning.

Erica Baker-KY: @Ann, Thank you for your willingness to share!

Kathy Renfrew: @Erica join the CSSS committee . Info coming soon

Scott Spector: Since this group is ver passionate for the elementary science, is there a way to start a community of practice with this group so we can affect this in more than just one state, county or district!

Erica Baker-KY: @Kathy I am a new CSSS member and excited about getting to join in this collaboration!

Kathy Renfrew: @Scott I am in

Erica Baker-KY: @Scott I am in!!

Scott Spector: If anybody that is interested can put their email into the chat I can try and get that started if anybody is interested. [emails taken out – left in Google doc]

Ted Willard: @scott Rather than starting a new group, I would encourage the idea of tying into existing groups forcused on elementary Science. I believe that there are such groups affiliated with NSTA and there is even an elementary science organization

Ann Miller: I'm in, even though I'm not a teacher. But I am a scientist that worries about how many people don't have a good grounding in science.

Scott Spector: Agree completely.

Amy Stephens: @Scott--I shared this with some folks in the audience that will also be ruminating on this

Jeanne Norris- UW: Erica, have you been linked up with the ACESSE Project work? We are in the process of forming regional groups to do this type of collaborative work.

Kathy Renfrew: New exciting opportunity coming .Collaboration between NSTA and NSELA new science column in Science and Children

Vidalina Trevino: Yes, I am wondering how to leverage this work with preservice teachers and programs

Channon Jackson: Also the heart of instruction should not come from reading, but doing and talking. In experiencing the doing and talking first you'll be amazed at how students will start to access reading materials.

Stephanie Klixbull: @ericabaker if you would like to connect let me know. I was a AEF fellow last year 2021-2022 and my action plan as a fellow was to be a voice in elementary STEM. I was with the Department of defense, Navy STEM. During my time, I created hands-on science elementary lessons that were NGGS aligned and cross-interdisciplinary with ELA/Math to allocate more science time for elementary teachers. This lessons are public domain and free to all educators! I'm now with Penn State University, creating pd and curriculum development involving elementary science/STEM.

Erica Baker-KY: Thank you @Jeanne! I have used many of the resources but have not been a part of the project work. Meg at CSSS was going to try to get me lined up with the elementary group, but I have not heard from that. I email you directly!

billwood: One way college science instructors can help prepare future elementary educators is to teach college courses the same way these amazing panelists teach their kids -- adopt evidence-based teaching approaches. Too many college instructors (~70%?) still teach by lecturing — not a good model. — Bill Wood, U. of Colorado, Boulder

Jeanne Norris- UW: Great to hear you're linked up with Meg. Yes, let's definitely connect!

Bonnie Wylo: I've been teaching physics to preservice elementary teachers in Michigan for 37 years. Unfortunately, the state has just cut any science certification for elementary grades, thus cutting requirements and discouraging its importance.

Neil Lundgren: @Bonnie, I'm sorry to hear that. I came out of an elementary science program at GVSU in Michigan.

Darcy McMahon: @Vidalina I work with teacher prep programs in Michigan, too. Maybe we can collaborate?

Vidalina Trevino: @stephanieklixbull I would love to connect with you as well. l am a current AEF Fellow working in the NSF office and I am very interested in STEM Ed in elementary spaces.

Erica Baker-KY: That would be great @stephanie!

Vidalina Trevino: @Darcy Yes! Would love to collaborate.

Darcy McMahon: @Bonnie I would love to connect with you and hear your perspective about our new teacher prep standards in MI!

Chad Janowski - Einstein Project: Einstein Project is happy to collaborate with others

Stephanie Klixbull: https://www.navsea.navy.mil/Home/Warfare-Centers/NSWC-Carderock/STEM/

Channon Jackson: Science gives students the desire to want to read and gives them something engaging to write about. I've seen student's scores increase in reading when I increased science and integrated reading strategies.

Katherine Dwyer: and something to talk about! So important for LA skills, including for our ELL students

Ann Miller: @stephanie I would also like to connect. Prior to my new work with science education, I spent 28 years as a naval analyst, looking at training and education issues for naval forces.

Kathy Renfrew: @katherine yes!

Marti Hendrichs: Thank you Stephanie!

Bonnie Wylo: @Neil They have a good program!

Kathy Renfrew: thanks to the amazing panel!

Tatyana S.: Hi Stephanie! Thank you for sharing great info. Would also love to connect with you to learn more. Would it be possible to share your email with the group?

Khedidja Allia: Thank you

Channon Jackson: Yes @katherine Dwyer

K. Renae Pullen: Channon, I've seen that too. I believe that is because the science and engineering practices are so language and literacy rich: ask questions, argue from evidence, construct explanations, make observations, the entire 8th practice 😀

Channon Jackson: I agree K. Renae. I think that is what we need to get others to see. The collection of data around this is important.

Jill Latchana she/her: Some of the best resources Stephanie is linking to are free K-3 engineering resources that she's created as an Einstein Fellow with the Department of Defense.

Stephanie Klixbull: Yes! Would love to be part of a network of Science Elementary educators!

Kathy Renfrew: @katherinedwyer fancy meeting you here

Robin Deems: @Scott - and others - So you don't have to go scouring through the chat for email addresses after the session - here is a google sheet that folks can add their contact info to so we can follow up with each other.
https://docs.google.com/spreadsheets/d/1y165BhkqP0t5exi1aCYdRzpXlo4oRfNvydV6INKyRYw/edit?usp=sharing

Stephanie Klixbull: Thanks @robindeems!

Robin Deems: My pleasure :)

Steve Jacobs: The numerous remarks against lecturing gave me pause. Presented by well trained, well prepared, entertaining and inspirational presenters, a lecture can garner remarkable results with students. I cite Abraham Lincoln, JFK, MLK, and my first physics teacher. Alas, it appears education has done to lectures what McDonald's has done to a cheeseburger. I hate to toss out good lecturers with the bath water. Perhaps we might consider tossing out.....bad lectures, or inadequate ones. I've been inspired by good lecturers for decades. and, likewise have been bored to tears by others.

Katz, Jacqueline: @Steve: I do agree that there is space for a balance in all classrooms. Science communication is vital and modeling this in a classroom can help students understand this importance.

Channon Jackson: I think there is no problem with lecturing, but with the shift to facilitating there is a time and place for lectures with should come after students have learned the majority of the content through the exploration and discourse with others. Lectures should be based off formative assessment to solely cover misconceptions

Jennifer Williams: @Gwendolyn. Please consider membership in NSTA. We have an active and vibrate elementary teacher group, along with conferences, web seminars, and committees.

Tatyana S.: @Steve - also agree. It comes down to whether a lecture can be an engaging journey and exploration that provokes curiosity, thinking and makes impact

Kevin: @Steve great counterpoint. We should not judge something based on how it has been misused or abused. Could we say the same thing about textbooks?

Bonnie Wylo: @Kevin I think we could say the same thing about any method of teaching. Anything can be overused or misused, even something like modeling or OpenSciEd approach. Mixing it up helps to engage all learners as well. Introverts, for instance, like lectures much better than group work. There's room for both/all.

Jill Latchana she/her: If you aren't familiar with Christine's early work, it was way before it's time. Her Engineering is Elementary books were amazing resources

Neil Lundgren: @Jill. No way! I love those books.

Jill Latchana she/her: https://eiestore.com/engineering-grades-prek-8/engineering-is-elementary-grades-k-5/engineering-is-elementary-storybooks-grades-1-5.html?__hstc=97864128.7716b5a56c4516fda4d0a97257cf013a.1663254983582.1663254983582.1663254983582.1&__hssc=97864128.1.1663254983582&__hsfp=3874435361 This is Christine

Jill Latchana she/her: @Neil, me too!

Amy Reese, HCPSS, Coordinator of Elementary Science: @Steve - remember the frustration with lecturing is in ELEMENTARY - there is no place for lecture with young children. The emphasis was to highlight that children should not be “talked to" but “facilitated through" learning. Too often (especially after virtual instruction for 1.5 yrs) too many teachers came back and wanted to simply lecture with slides. That is NOT GOOD for 6 years olds…that is not how they learn. Lecture to inspire older children, with purpose, intent, and strategy is very different ☺

Gwendolyn Kinard: Thank you Jennifer. I will look into joining NSTA.

Jae Williams: ^^ Knowing is not enough, we must apply to our practice.

Stephanie Klixbull: Christine Cunningham is amazing! I am working on a grant right now with her and her team on elementary engineering. Hearing her talk is just awesome, I would look into her books! Also the YES! program

Kathy: Used Engineering is Elementary units long before NGSS. Engineering task always situated within the accompanying story and tasks integrated science.

Jae Williams: As a French language speaker, I absolutely appreciate the distinction between “Language for science” versus “Language of science”. I plan to sit with this.

Vidalina Trevino: Narrow conceptions is what continues to perpentuate that there's only one way to know. Language for science - love it.

Amy Stephens: With respect to language, some of these ideas were taken up in a report on English Learners in STEM: https://nap.nationalacademies.org/catalog/25182/english-learners-in-stem-subjects-transforming-classrooms-schools-and-lives

Ann Miller: My perception is that science education in the past has focused only on those kids that could keep up with the new jargon, leaving all others behind. I love getting away from insisting on knowing the vocabulary as a measure of understanding the phenomena

Kristen Rice: Thank you @Amy!

Celia De la Loza: Thank you Amy, I downloaded the resource.

Steve Jacobs: And, here's a hug for Ann Miller. In addition to jargon, math inserted too soon can entangle understanding.

Kathy: Engineering-Start with the science!

Chelsea Cochrane: @ steve jacobs - lectures used as the only instructional modality/pedagogy is what needs to be changed - they are rarely inclusive for all - I like to draw the parallel to a

conference we might attend - every session is not a Keynote Speaker - treat lectures like Keynotes - the more interactive the better and used sparingly at purposefully planned spots in a unit they can move student thinking forward - best when paired with opportunities to connect the keynote to previous experiences and learning experiences in the future that allow hands-on and minds-on learning for all students.

Ann Miller: @Steve Jacobs. Thanks!!

Steve Jacobs: Chelsea; I agree. Lectures must be used wisely.

Vidalina Trevino: Meeting teachers where they are means involving them in the discussion and giving them collaborative opportunities. Support is important but teachers want to be collaborators. And that's what students in our classrooms want too. They want to feel like they can contribute. And yes, that they belong!

Kathy Renfrew: The development of a safe community where all assets are valued.

Stephanie Klixbull: I agree with Ted Willard, I wish I knew more about how to support the science materials I was given when I was a elementary teacher. I will be honest I learn a lot more when I was giving the opportunity to see panel discussions and professional development on STEM education. When I was a Albert Einstein Distinguished Educator Fellow, I was able to be in the room with these experts and gain so much knowledge. I would highly look into opportunities like this for educators. So many great resources out there for educators to gain support! https://science.osti.gov/wdts/einstein

Kathy Renfrew: Thinking about what Ted had to say the lessons I write now are much different than I did when the standards were first developed. OI feel like I am continuing to learn form all each day so I think that having curriculum being"live" being flexible is so critical because the assets children bring are so many

Amy Stephens: We will be heading into audience Q&A. Please share any questions you might have for our panelists and I will make sure to get them asked.

Adrienne Hanson (She/Her): Fidelity to goal! Love, love, love.

Greses Pérez: Elementary teachers are also experts in science and engineering but the level of the demands that elementary teachers are posed with are enormous (from accommodations for languages others than English to being asked to provide special ed, etc) - they also have limited resources (time, materials, ect)

Katherine McNeill: Maria and I worked on this piece together that brought up this idea of "fidelity to goal" based on some amazing adaptations to curriculum one of the teachers we were working with made. I thought I would pass it on in case you were interested - https://www.tandfonline.com/doi/full/10.1080/09500693.2018.1482508

Greses Pérez: So my question to the panelists is how have they conceived and thought about mechanism to address the structural challenges that elementary science and engineering teachers face in engaging the brilliance and multicompetence of students in engineering and science? (particularly those who work with bilingual students, special education and other populations). I acknolwegde that this is a large scale question, but nonetheless an important one in thinking how do we support those teachers who already have the content knowledge but feel constraint by structural challenges

Katherine McNeill: @Adrienne - Maria and I worked on this piece together that brought up the idea of "fidelity to goal" based on some amazing adaptations to curriculum one of the teachers we were working with made. In case you are interested - https://www.tandfonline.com/doi/full/10.1080/09500693.2018.1482508

Kathy Renfrew: #kate thanks for the resources

Adrienne Hanson (She/Her): @Katherine McNeill I learned so much from reading that article that you and Maria wrote! I was fresh from the classroom and it felt really empowering to have language to describe what I was trying to advocate for for my colleagues and I - to have access to HQIM and PL and then to be trusted to make adaptations using our expert knowledge of our students and community.

Amy Stephens: We will be going on break soon and will return at 1:30 pm ET. Although the folks in the room will be eating lunch, we will keep the zoom and chat open if any of you would like to continue to share ideas and resources with one another.

Katherine McNeill: ♥♥♥ Thank you so much for your kind words!!

Greses Pérez: @Maria Gonzalez-Howard, thank you for expanding the idea of going beyond the vocabulary. Language is not static but learned in social interaction, especially for science and engineering.

Umar Abdullahi: Thanks for the wonderful presentations

Celia De la Loza: I teach NGSS to Preschool and Kindergarteners from a Special Day Class, and they are able to engage in the engineering design process nonverbally. One student didn't like the bowling ball rolling far away in all directions after hitting the pins, so he found an empty plastic bin and placed the pins in the bin. After moving the bin to three different spots (tested his design), he bowled for 10 minutes and the ball stayed within the bin. ☺ Other classmates used his new design. This is a testament that SDC and our littles benefit from the opportunity to do NGSS.

Ann Miller: @Celia, that's a great story. I wish more kids, in any classroom, recognized when they were solving design problems. Doing so feels so good, and is the basis for any type of engineering.

Kathy Renfrew: I had to take an SEI course to keep my certification and the way I was taught was exactly what Maria was talking about. My instructor didn't appreciate me because I kept starting with science and the instructor was all about teaching the voacab and more or tha same thing

Kathy Renfrew: @celia ☺

Celia De la Loza: @Ann Miller, thank you. I feel honored to be in a position to teach NGSS to SDC and our littles. Yes, I agree! it's important for students to recognize when they are solving design problems.

Celia De la Loza: Co-teaching combined with coaching helps teachers make shifts and gain confidence.

Robin Deems: We shared this link in the last session, but if you would like to follow up on this work and connect with others who are in the on-line session - please feel free to add your contact information.
https://docs.google.com/spreadsheets/d/1y165BhkqP0t5exi1aCYdRzpXlo4oRfNvydV6INKyRYw/edit?usp=sharing

Vidalina Trevino: Love that question! What are the other levers to push upon? Curriculum is developed and disseminated. But how do we institute meaningful change in classrooms? What should/could be happening in K-5 Preservice Ed and also what professional learning for current practicing teachers need to take place?

Celia De la Loza: Thank you Amy and panelists! WONDERFUL!!!

Amy Stephens: Welcome back everyone!

Patricia Arnold: I work in teacher education in the preparation of K-6 teachers. I am so excited to be part of this movement! ☺

Amy Stephens: @Patricia -- we are too!

Patricia Arnold: I started in the medical field at UW Madison, and then got my 6-12 licensure, and with my doctorate in science education, am taking my passion for science for all to higher education! So glad I signed up for this session!

Joan Harper-Neely: Several school divisions near me do not offer science to 4th graders. This is a terrible idea.

Joan Harper-Neely: Several school divisions near me do not offer science to 4th graders. This is a terrible idea.

Mari Willis Carr: We actually announced UPK in the state of CA last October - 2021 as well. Exciting times.

Katherine McNeill: I appreciate that phrase "science like experiences"

Kathy: the distinction between busy, happy, good and a meaningful learning experiences is a huge challenge!

Katherine McNeill: Elementary policy, requirements and assessments can be a barrier for science.

Celia De la Loza: YES, fantastic to hear they are also partnering with their universities!!!

Joan Harper-Neely: Old Dominion University has a great program that pairs preservice teachers with engineering professors.

Patti.Curtis (she/her) US ED: Can you share the DC EC standards Sara just mentioned?

Celia De la Loza: @Joan - thank you for sharing about Old Dominion University!

Katherine McNeill: SOLID Start science curriculum - https://education.msu.edu/research/projects/solid-start/curriculum/

Katherine Dwyer: Thanks for sharing, are there other OER you recommend?

Celia De la Loza: Thank you for sharing Kate! I LOVE everything you shared. I begin with a shared experience as well. Really liked your activity!!!

Katherine McNeill: The Lucas Foundation has great grade 3-5 science curriculum - https://sprocket.lucasedresearch.org/home/curriculum OpenSciEd has great middle school curriculum. And they are going to be developing elementary as well - https://www.openscied.org/about-instructional-materials-2/ All OER.

Amy Stephens: From Jennifer Williams: Here are some resources that NSTA has for elementary and early childhood teachers. Some of this is for members only and we would always love to have more teachers join us at NSTA.

- Position Statement: Elementary School Science - https://www.nsta.org/nstas-official-positions/elementary-school-science
- Position statement: The Nature of Science - https://www.nsta.org/about/positions/natureofscience.aspx
- Archive Webinar: Transforming Science Learning: Who Is the "Knower" in the Classroom? Learning as Sensemaking in a Globally Connected World - https://my.nsta.org/resource/122135
- Sensemaking resource portal - https://www.nsta.org/sensemaking
- NSTA's Daily Do: Sensemaking tasks teachers and families can use to engage students - https://www.nsta.org/resources/daily-do
- Science & Children: The Elementary Journal - https://www.nsta.org/science-and-children
- Early Childhood resource portal - https://www.nsta.org/levels/early-childhood

Lydia Hunter ODE: The elementary math and ELA should look noisy and active too.

Kate Cook (she/her): Wow, Tiffany! That is an amazing story - thanks for sharing!

Vidalina Trevino: A lot of wonderful resources are being shared. I was wondering how can teachers, leaders, policy learn about everything that's available if they're not here or at the table?

Patti.Curtis (she/her) US ED: Bravo Sara!

Maranda Chung (she/her): Amazing insights into early childhood challenges and opportunities. Thank you, Sara 👏👏👏

Katherine McNeill: Instructional Leadership for Science Practices - https://www.sciencepracticesleadership.com/

Kathy Renfrew: https://www.amazon.com/Instructional-Leaders-Implementing-Science-Practices/dp/1416630546

Joan Harper-Neely: ODU Ed+gineering - https://www.oduedgineering.com/

Meg Richard: Such a wonderful text @Kathy!

Marti Hendrichs: Thank you Amy and Kate!

Kathy: Thanks for these resources @Kathy @Kate

Katherine McNeill: Thanks Kathy! ♥

Patti.Curtis (she/her) US ED: DC Early Learning Standards https://osse.dc.gov/publication/district-columbia-early-learning-standards-dc-els

Amy Stephens: As a reminder, we will strive to make the chat, slides, and videos available on the project page: https://www.nationalacademies.org/our-work/enhancing-science-in-prekindergarten-through-fifth-grade

Vanessa Lujan: We had Ben Lowell and Kevin Cherbow come and present (back in 2018) to our Lawrence Hall of Science (Berkeley, CA) district science education capacity building network that includes superintendents, assoc./assist. superintendents, principals, science coordinators, etc. and it was really transformative.

Kathy Renfrew: Another thoughts that i am reminded of when Tifffany mentioned crosscutting concepts https://www.heinemann.com/products/e08774.aspx?utm_source=googleads&utm_medium=&utm_campaign=&utm_term=&utm_content=&hsa_acc=4700717789&hsa_cam=17535846471&hsa_grp=&hsa_ad=&hsa_src=x&hsa_tgt=&hsa_kw=&hsa_mt=&hsa_net=adwords&hsa_ver=3&g

clid=Cj0KCQjwmouZBhDSARIsALYcouqPH0birp99OrnCQPBGn8G3OlJCNAIzZdVgB1R31whjbGqVm2e_Z64aAoHXEALw_wcB sorry for the awful UrL

Amy Stephens: You can access the report here: https://nap.nationalacademies.org/catalog/26215/science-and-engineering-in-preschool-through-elementary-grades-the-brilliance

Katherine McNeill: Vanessa - I love that! ☺

Amy Stephens: And a nice little interactive page here: https://nap.nationalacademies.org/resource/26215/interactive/

Robin Deems: It looks like we have some folks with us now that were not on earlier today. If you are interested in following up in this work and would like to access colleagues present today on-line, please feel free to add your contact information on this Google Sheet - https://docs.google.com/spreadsheets/d/1y165BhkqP0t5exi1aCYdRzpXlo4oRfNvydV6INKyRYw/edit?usp=sharing

Meg Richard: Thank you Robin!

Marti Hendrichs: Thank you for all the great links you are sharing!

Patti.Curtis (she/her) US ED: Sharing ED funded EC & STEM center https://stemie.fpg.unc.edu/

Kathy Renfrew: What can 4th graders learn from swinging? IBig kids love blocks. My 5th and 6th graders loved building with many different materials!

Kate Cook (she/her): I'm so excited that Kate just mentioned play! We are really interested in (and exploring) how children naturally engage in SEPs through play and how teachers can deepen and extend these engagements! (And I'm sure we ALL echo the need to pay preschool teachers more. Thank you all for making a point to call that out.

Robin Deems: @ Patti - they will share on the site for the event after the event

Neil Lundgren: @Kathy I take my 3rd grade students out to the swings when we learn about patterns in motion!

Steve Jacobs: What % of our challenges would disappear if we tripled teacher salaries?

Kathy Renfrew: @neil yes!

Kathy Gill: Play was important part of my 4th and 5th grade classes! So many great investigation questions came from those play sessions.

Bonnie Wylo: After almost 40 years of teaching science to preservice elementary teachers and having strived to help implement several different (not really different) iterations of science standards documents at both the state and national level, I have to say that the current state of elementary science education in this country is excruciatingly depressing. Kudos to all you young, excited folks. I still like doing what I do, but the constant battle against prevailing beliefs/practices in our society is really wearing. Really. Wearing.

Kathy Renfrew: I love that some of colleagues are excited to engage students in science learning through play

Steve Jacobs: Bonnie. A hug for you, too.

Kathy Renfrew: Yes! There are many bright spots. Schools closed during the pandemic but the learning did not stop!

Katherine Dwyer: some think the main "loss" was collaboration and group work, which Science practices specifically address

Bonnie Wylo: @Steve *sigh* thanks

Steve Jacobs: Stay the course. I started my teaching career in 1964. I've sat through meetings such as today's many, many times. The song has not changed much. New faces. Same song. New verses. However, there are moments of sublime joy when the music inspires a young mind.

Neil Lundgren: Some teachers are here!

Katrina Madok: Agree!

Meg Richard: Yes Neil!!! And I am so exceptionally thankful for how you spread this good work!

Marti Hendrichs: Exactly!

Adrienne Hanson (She/Her): Gratitude to folks here who share through Twitter. I learned soooo much through that platform when I was in the classroom and couldn't attend most events.

Joan Harper-Neely: Well said.

Gwendolyn Kinard: I agree!! This is a very relevant conversation!

Kathy Renfrew: Yes! YES! YES! People think I talk too much

Joan Harper-Neely: We need to find co-workers who view teaching as a profession or career and not as a job.

Jen Love (she/her/hers): @Katherine Dwyer - my dissertation research in Massachusetts absolutely identified the loss of collaboration and group work during COVID as teachers' #1 challenge they've faced for science/engineering instruction, even last academic year 2021-2022. With social distancing requirements now relaxed, at least in Massachusetts, teachers are relieved to somewhat get back to "normal". Some of the teachers in my study reflected that teaching engineering practices has been the catalyst to launching their students' science learning.

Gwendolyn Kinard: Yes Doug!

Joan Harper-Neely: Science Fridays Educate does a great job with storylines - https://www.sciencefriday.com/educate/

Steve Jacobs: Good gathering today ! It's wonderful to see such dedicated people focusing on our work. I was inspired. And, amazingly, this meeting arose from the National Academy's LECTURE room. Go figure.

Meg Richard: I always like to call the scientists "content experts" I think it's an important distinction as teachers are experts in their own critical right

Bonnie Wylo: @Steve Yowza. I've been at it since 1985; at least you make me feel young-ish. ;-) I've got 50 preservice elementary teachers in my physics class this term and yes, some of will inspire me with their dedication and excitement in the course. I can only hope they take that with them and translate it into their future classrooms.

Kathy: I am collaborating with a prof from NYU about doing a lesson on light and crystals with my first grade students. I appreciate that she is open to working with me to plan what is appropriate and grows curiosity. This helps improve what I can do on many levels.

Steve Jacobs: 50?? Wow !

Ann Miller: I have a Ph.D in Chemistry, but I ended up doing something other than chemistry with my degree. I would encourage you to be open-minded by whom you consider a scientist or engineer. There are many people out there who studied science and apply those concepts to other work.

Kathy Renfrew: Tiffany listening to you gives me goosebumps!

Erica Baker-KY: Say it loud for those in the back!!!!

Mari Willis Carr: I was just going to say the same thing - thank you for those inspiring words to wrap up!

Kathy Renfrew: Thank you all SO MUCH!!

Kate Cook (she/her): Thank you to this really incredible panel! It was a powerful discussion.

Steve Jacobs: Phenomenon based instruction. Give her abundant hugs.

Robin Deems: Don't make me cry Tiffany

Anne Gatling: So beautiful and insightful! Thank you!!

Ann Miller: Thank you. Great discussions in panels and in the chat!

Kathy: Thank you all so much! Inspiring discussion.

Adrienne Hanson (She/Her): Thank you everyone! It has been an incredible day.

Gwendolyn Kinard: Thank you so so much for such an enlightening day and the engaging panelists!!

Kevin: All panels were excellent. Thank you

Bonnie Wylo: @Steve Enrollments are way way down from the '90s when I had 300…

Katherine Dwyer: So great, just what I needed!

Mónica Sulecio de Álvarez: Thank you for those amazing panel insights to trigger that shift that we have all been longing for in education, not only for STEM but for education in general!! Thank you, thank you.

Vanessa Lujan: @Katherine Dwyer and @Jen Love — This is interesting. In California, we (the Lawrence Hall of Science with WestEd) conducted a 1.5 year study with 25 school districts in August 2020 to October 2021. We heard from district leaders that the virtual space allowed more frequent and regular collaboration among teachers and instructional leaders. And that the return to a full year of in-person learning (Fall 2021) caused a reflex in district plans to much more limited staff development days, collaboration opportunities, etc. (as it was before COVID shutdown).

Marti Hendrichs: Great learning today! Thank you to all in the chat, and to the panelists for the inspiration they had provided by sharing with us their knowledge and experiences.

Lydia Hunter ODE: Thanks to everyone for a wonderful session!

Cathy Holmes: Thank you for lots of things to ponder as we move our work forward!

Jen Love (she/her/hers): @Vanessa Lujan - I may have interpreted Katherine's post. I was referring to collaboration among students in the classroom as students' learning loss as a result of COVID. misinterpreted

Marti Hendrichs: thank you

Patricia Arnold: Thank you!!

Barb Kohut: Thank you so much!

Robin Deems: So many great resources shared and connections made with our colleagues across the country. Thank you NASEM and all of the fabulous panelists and on-line cohort.

Maranda Chung (she/her): Thank you all! Grateful to all of the panelists who shared their time and expertise today.

Stacey van der Veen: Thank you to Amy and Heidi, and the amazing panelists for a thought-provoking day!!