

WEBVTT

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Jessica Juliuson: Hello, everyone so nice to see everybody, and I see some familiar faces joining our Round table today.

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Jessica Juliuson: We're so happy to have all of you with us. we want to thank you all for coming to our May installment of the engine biotech experience teacher, roundtable series. I'm Jessica Julius, and I'm the director of community and strategy for the Ae Program office, and it's always a pleasure for me to host this roundtable series

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Jessica Juliuson: for those of you who are new. These roundtables are designed for our incredible Abe, teacher community from around the world. And it's a chance really, for teachers to hear and to learn from both experts and from each other about topics of specific interest to science and biotechnology teachers. So we hope you find this series valuable. Please feel free to tag us in social media. If you want to share your thoughts, we use the tag at a be pro office which Sarah will drop into the chat for everybody.

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Jessica Juliuson: And today's roundtable focuses on hearing from fellow Abe educators about their successful strategies for integrating career skills into their Abe curriculum, with examples of approaches, resources, and tools that they've used, that can help you bring career readiness into your own classroom, and if you have great ideas of your own. We really would love for you to share those in the chat. As the roundtable progresses.

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Jessica Juliuson: This roundtable will be recorded and posted on our website and registered participants will also receive a transcript of the discussion in a copy of any materials shared today. We'll have hopefully some time for audience questions at the end of the roundtable. So please, we encourage you to put your questions in the chat at any time during the discussion at the bottom of your screen.

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00:01:45.370 --> 00:02:02.559

Jessica Juliuson: and we will be sure to watch for those and to ask your questions at the end. So I'm gonna jump right in by introducing our panelists today. Dr. Lori Jackson Grosby teaches biotechnology at Brockton High School at A. Be Massachusetts. Since changing careers from academic biomedical research

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Jessica Juliuson: she serves as the academic lead for the Massachusetts Life Sciences Center, Sponsored Apprenticeship program and the Massachusetts Department of Elementary and Secondary Education. Sponsored Innovation Pathway in Health Care at Brockton High School.

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Jessica Juliuson: Dr. Jackson Grosby strives to incorporate student choice and agency as they approach scientific phenomena, and Lori was a member of the second cohort of Abe, master teacher, fellows in 2,02122, and will be serving as an advisor and contributor to the upcoming ae career connections toolkit, which is coming next fall.

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Jessica Juliuson: Dr. David, who, Peggy, or just you, Peggy, as he is known to his students, joins us from Abe Rhode Island. David completed his doctoral degree in education at the University of Rhode Island. He is a Latino immigrant who found his way out of poverty through science. He serves as a science teacher at Central Falls High school and is an adjunct professor of education.

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Jessica Juliuson: His inclusive approach to science education enables students to become problem solvers and innovative thinkers. He receives the U.S. National Association of Biology, teachers outstanding biology teacher award in 2,021. After previously receiving the evolution education award in 2,014, and the Presidential award for excellence in mathematics and science teaching in 2,019. Since that time he's contributed to several publications on science, education, and appropriate pedagogy.

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Jessica Juliuson: David was one of the very first Abe, Master Teacher Fellows and his 2,020 Fellowship Project was on race as a social construct. He has continued his work through an Ae mini-grant which he has used to engage his citizens, his students in citizen science through the International Bar Code of Life Project. It's always a pleasure to have David join us. He's kind of a celebrity on our circuit. Dr. Wendy Wooten is also a celebrity. She's an Abe teacher from Abe, greater Los Angeles, and you can see her likeness if you walk into Am. 10,000 hopes.

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Jessica Juliuson: She is a science teacher who teaches biology, chemistry and physics as well as career, technical education or cte

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Jessica Juliuson: teacher focusing on biotech and engineering, Wendy has over 40 years of teaching experience, and is passionate about providing current authentic experiences for students to help them become future leaders in stem. Wendy was an Ava master teacher, fellow in 2,02122, and developed a fellowship project that consisted of both student curriculum and teacher. Professional development on synthetic biology and its connection to solving real world problems.

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Jessica Juliuson: So it's no surprise that Wendy is joining us today from a field trip for her students as she seeks every opportunity to get her kids out in the world and seeing science. It is such a pleasure to have

Wendy with us today to share her expertise with all of us. So it's it's not my fault. They have so much so many distinguished experiences, and that's why it takes so long to introduce them. But we're going to jump right into some questions now.

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Jessica Juliuson: And so we'll begin by getting to know just a bit more about our panelists and their journeys as educators. So, Lori, for those participants who don't know you, can you please tell us a little bit about your pathway into science, teaching your current school and students and the leadership role you play now with Abe Massachusetts.

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Laurie Jackson-Grusby: Happy to thank you. Thank you, everybody for coming. So I started. I I made a career pivot between 2,015 and 2,017 And so I was. An academic researcher. Had a lab at Boston Children's Hospital. My Phd. Is in genetics.

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Laurie Jackson-Grusby: post stock at Mit, you know, lab experience. And all through that whole time I was very into the teaching aspect of my job

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Laurie Jackson-Grusby: as like an important part of my

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Laurie Jackson-Grusby: my job description and my sense of purpose. And so when grant funding became difficult to come by. I just decided for myself, like, I want to figure out how I can make education the center of what I do. And so the way that I did. That was I.

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Laurie Jackson-Grusby: went to a Teacher Residency program at a local high school and then transitioned into becoming a teacher at Brockton High school. So Brockton High is a title one school. It's one of the largest schools in the Us. It was the largest school east of the Mississippi for the longest time. enrollment of north of 4,000 students. At 1 point it was 4,500 students, and

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Laurie Jackson-Grusby: mit

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Laurie Jackson-Grusby: any any kind of demographic you can think of. We've got a high diversity of that. And and so

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Laurie Jackson-Grusby: biology is our testing subject in our school, and

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Laurie Jackson-Grusby: sometime, maybe, like 1012 years ago, was decided to try and create a pathway in biotechnology where students would get more of a hands on experience. And instead of teaching biology in one year and having those kids test, they get 2 years. And it's framed as biotechnology.

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Laurie Jackson-Grusby: And it's much more project-driven hands on learning than in the traditional classroom. So our students still test for biology. but it created this avenue for these career connections that we're here to talk about today.

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Jessica Julison: Thank you so much, Laurie, and I've put a brief explanation of title one in the chat. But for those of you, not from the US. Title in the school serve high percentages of students. up low socioeconomic status. so thank you so much for that. Lori, David, how about you? What was your path to science teaching and your role with Abe Rhode Island.

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David Upegui: Yes, thank you. And I'd like to just second what Laurie just said welcome. And I hope that this is somewhat useful for you to think about. how to engage kids in not only thinking about their own personal development, but how they, those talents that they possess once they're developed, can serve their greater humanity. So I was

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David Upegui: a researcher in public health. And my oldest son was born in 2,004, and he was born with down syndrome. It literally

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David Upegui: shook the very core of what I believe was important in life, and it allowed me to reconsider, or, as Thomas Coon would say, that the paradigm shift, how is it that the new data is going to fit into my reality. So I went back to school and got a teaching certificate, and I now teach at my Alamata Central Post High School, which is the most economically disadvantageous city in the State of Rhode Island. So I get a chance to teach kids

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David Upegui: that, like my own personal background are dealing with the the, the ugliness of poverty, and I'm empowering them, I hope, through the use of science.

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Jessica Julison: Thank you so much, David, and it's been an inspiration to to me personally to hear you speak about this, and for those of you who haven't seen it. We have a blog about David and his students on our website. So encourage you to check that out if you can. And, Wendy, I'll continue with you. you're just kind of a rock star among our 88 community. Can you tell us a little bit about how and why you became a science teacher and about your school and students in greater Los Angeles.

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Wooten, Wendy: yes, and and it sounds like The 3 of us have similar backgrounds in that. we were in research. high, you know, higher education. And again, like David, I had a situation related to family. My younger daughter was put into afternoon kindergarten

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Wooten, Wendy: when Ellie, the Los Angeles Unified School district, initiated it because they didn't plan on having enough schools for the baby boomers.

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Wooten, Wendy: So there was no daycare available for taking care of afternoon kindergarten. So I did a year of kindergarten daycare. So I went from teaching post secondary to teaching kindergarten students the only differences. They're a little shorter. but basically, the kindergarten teacher's husband was the

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Wooten, Wendy: Department Science Department chair in L. A. Usd. High school, and he said, oh, you know. Why, don't you, you know, start teaching high school? And he invited me to teach at his school. So I think a little bit of difference in my background is that

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Wooten, Wendy: I started college as an engineering major. So I graduated with a double major in biology and physics. So I started out teaching the Ap. Chemistry and honors chemistry at this high school, I, after 4 years another high school which was closer to home. They needed a physics teacher because the physics teacher there that they just hired only lasted 2 weeks. So then I went to teaching physics

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Wooten, Wendy: and I got sucked into first robotics. And so anybody from the Boston area or Mit we were building robots. And and we created a team that ended up. We need winning the National Chairman's award at first robotics. So on.

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Wooten, Wendy: But then I was asked to help start a Charter School high tech high with an engineering department and robotics program. But then, after teaching there for a while, the principal

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Wooten, Wendy: wanted to make it an independent charter. So they left L. A. Unified, and if I stayed longer than 5 years I was going to end up without lifetime, health, benefits. So then I went to receive a Charter high school. It was well, basically. Then it was received a high school. Everybody's a charter high school now, so they can track parents to get bring their kids

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Wooten, Wendy: But I then got to go to my

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Wooten, Wendy: true love, which is is biological molecular life science basically. And I started a a biomedical science pathway with, I have to say, with the help and support of Abe, because it was the curriculum that really propelled me into all of the industry connections that I'll I'll talk about a little later. But our school is

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Wooten, Wendy: title one. We're considered a hundred percent free and reduced lunch, because we have over 85% socio economically disadvantaged students. it's mostly Hispanic students. but still with a lot of diversity, with other ethnicities. and

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Wooten, Wendy: just, you know, just again trying to give them as many opportunities to be successful in the future and develop a love of science.

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Jessica Juliuson: Thank you so much, Wendy. And it's actually kind of a perfect segue as you talk about sort of these opportunities through Abe. you know, some folks may be thinking, why, you know, we're talking about career connections. What does that have to do with science teaching or the science classroom? And so I'd like to dive into that a little more and say, maybe beginning with David, what first grabbed your interest in making career connections within your science classroom. And why do you think that's important for your students?

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David Upegui: A school is really a sort of I I I call it a playground for students to figure out who they are and what the world is like, and so in many ways.

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David Upegui: opportunities for students to see themselves as part of the greater world are significant in allowing them to connect what we're learning to, what the future can be. And it's really important that that I highlight the fact that science, in my eyes, is the most democratic of all endeavors that we do in school. Right? We don't care who said it. How many times we repeated it, how loudly they said it, because science ultimately depends on

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David Upegui: publicly verifiable evidence, and in that sense is democratic. And I want my students to understand and value the fact that science is not dead.

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David Upegui: that it's a continuously growing body of knowledge, and that they can be full participants in that quest of understanding our natural world. So in that way, I think the connection is for students to recognize that there's a greater world out there. Sometimes it's easy for my students to think that. Well, of course you Peg. He wants me to do well, because he looks like my uncle cardinals, and that may be true, but that's not all right. The whole world needs these kids to develop these talents because we're in need of real solutions for real problems that we're facing as a humanity.

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Jessica Juliuson: And it's especially important now, as we begin to realize the gaps that have existed, you know, between some of our populations in within the United States outside the United States, and the discoveries and the research and the trials that have gone before then, that there there are gaps there, and there is

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Jessica Juliuson: there's an equity there. And so, having a democratically participatory bench of scientists for lack of a better term, become so important. And so I want to ask you the same question, Wendy. when did you first kind of start thinking? If you can think back

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that career connections were important for your students. And how did you first begin helping students?

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Wooten, Wendy: Okay? So I I started teaching, you know, with that stand and deliver methodology. And it wasn't until I started doing robotics. Where in first robotics you're given a game for which you have to design and build a robot to participate or compete in.

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Wooten, Wendy: And so basically, it was the discovery that

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Wooten, Wendy: if you give students a a real world, authentic challenge and you give them the resources and opportunities, and then just get out of their way. They learn and achieve so much more than you could have ever given them, you know, by lecturing and and that kind of thing. And so

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Wooten, Wendy: you know, I've always tried to

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Wooten, Wendy: get kids into real world situations. and that's happened through, you know, different industry connections that have been developed. and get them to experience that excitement and engagement in them, solving the problems, and then they'll move on to be the people that solve the problems in the future.

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Jessica Julison: I love that. And I always think you know, as new teachers. Sometimes you don't realize that it's actually easier to teach with engaging authentic content than trying to deliver the perfect lecture every time. And that's kind of learning that you get along the way as you go. But the kids love to know the answer to why are we doing this? And and having that be clear? Lori, how about for you? What

was kind of your first experience with realizing that career connections matter for your students? And how did you go about it?

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Laurie Jackson-Grusby: So, to be honest, that realization happened when I was running my own research lab. So I was always signing up for

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Laurie Jackson-Grusby: opportunities when we would have middle schools visit high school students in the summer. So I had obviously undergrads and and more advanced students and researchers. But

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Laurie Jackson-Grusby: anytime I could allow a high school student to spend a few months in my lab, working side by side with me and with somebody in my lab who had, you know, a good set of hands and a and was very good at explaining things. I wanted to get kids right from the jump.

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Laurie Jackson-Grusby: and and just seeing like eighth graders putting on a lab code and safety glasses and it just like seeing them light up in those moments. You, it's just pretty obvious that

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Laurie Jackson-Grusby: that, you know it's a way to connect with them, and once they're once you have them in those moments, now they're open up to everything else that you want to have them have conversations with them about.

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Jessica Juliuson: I love that you can also share that experience kind of coming from both as a an industry practitioner, and seeing how you could engage with students, and then as a teacher, how you could kind of work from the other direction and engage your students with industry practitioners. And that's kind of a, you know. Sometimes an eye opener for people is to realize it really can be that 2 way street with that participatory education. for students, a more holistic education for students.

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Jessica Juliuson: and so I want to move into kind of advice or insights. I know you're going to be all sharing some examples of what you do in just a couple of minutes.

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Jessica Juliuson: But before we do that I wanted to ask if, as you have engaged your students with real world projects, with industry, practitioners with the concept of careers and career pathways. what kinds of advice have you? Would you give to teachers who may be just trying it out? Or what lessons might you have learned along the way, whether the hard way or the easy way. So I'll start with you, Wendy. Any advice or insights you have for teachers just trying this out.

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Wooten, Wendy: Yeah, I think the advice I would give is that when you give students the opportunity to you know, make these connections to like, see themselves in a situation where they observe how

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Wooten, Wendy: an industry professional carries out their career, and that their people just, you know, just normal people it. It's really empowering to the students, and it gives them confidence that hey? I could probably do this too.

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Wooten, Wendy: as opposed to the you know, like the super hero image of, you know a a scientist, it's like, Oh, I don't know if I could ever do something like that. But when you, when you put them in a situation where they're shoulder to shoulder with researchers and and industry professionals and they're doing a project or something, and they're, you know, being successful in achieving something.

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Wooten, Wendy: then that gives them the motivation and confidence to you know. Say I, I want to pursue this. I enjoy it, and I think I can do it.

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Jessica Juliuson: I love what you're saying about kind of humanizing the image of what it means to be in science, quote unquote, and to put people's faces on that and help students see themselves in science.

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Jessica Juliuson: Lori, how about for you any advice or insights that you've gained along the way as you've attempted to make these connections with and four-year students.

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Laurie Jackson-Grusby: Yeah, I I really want to echo what Wendy said, so that I think that is really the crux of it is that a kid needs to identify with that role, to take ownership of it. And so I I think David even said this earlier of his himself and his students.

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Laurie Jackson-Grusby: so

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Laurie Jackson-Grusby: that has really been our agenda is really trying, because we've got a diverse student body is really trying to make connections with a variety of different avenues. making sure that the scientists that our students are interacting with reflect that diversity, so that every kid has an opportunity of seeing somebody that they can see.

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Laurie Jackson-Grusby: you know, reflects who they might become.

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Jessica Juliuson: And, David, I'll wrap up this portion of the roundtable by asking you the same questions. learnings, challenges, advice that you have for new teachers.

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David Upegui: Yeah, I'll make it quick, because I want to build on both what Wendy and Lori said, which is. there is a disposition. There is a particular way of thinking when you are considering

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David Upegui: the fact that education is no longer about content. Delivery

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David Upegui: right? I mean, we can't just go up and and compete with with Tik Tok and Youtube. They have so much better graphics than what we do right. So what we need to do is engage them in a way that is real and it's applicable. And I think that it begins with our minds, and it begins with us recognizing as educators that

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David Upegui: what we're doing is we're preparing the next.

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David Upegui: Dr. Lynn Margulis, Dr. Rosalind Franklin, Dr. Jennifer Dubner, Dr. Emmanuel Chopin Tier.
We are truly

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David Upegui: preparing these future stewards of the world to solve the issues. And so in that way, I think it's where we position ourselves. It's not just about assessments or fulfilling some state requirements. It's really about preparing these young minds to address the problems that they're going to inherit sadly.

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Jessica Juliuson: And I can only imagine that that will

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Jessica Juliuson: serve a dual purpose, not only to help teachers make these connections with students, but also to help sort of re inspire teachers. the why of why teachers go into the profession. and and sort of remember your why as well as an educator.

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Jessica Juliuson: so I I I want to not take any more time. using up your presentation time, because I know all 3 of you have some great examples to share and some resources that you've used and approaches that you've used in the past. so we always like to have practical examples and resources for our participants. So I will say, for those who are in our audience

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Jessica Juliuson: we are hoping to have some time for Q. A. At the end. So if you do have questions as you hear our presenters share. please put them in the chat. We'll be collecting them, and we will ask them at the end of the roundtable. So I'll begin by inviting Lori to share her screen and to walk us through her examples that she brought with her today. Laurie, over to you.

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Laurie Jackson-Grusby: Here we go.

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Laurie Jackson-Grusby: Can everybody see the screen? Awesome? Thank you. so

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Laurie Jackson-Grusby: I am going to. This is just my title slide. Let me

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Laurie Jackson-Grusby: move on to the next one. Here we go.

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Laurie Jackson-Grusby: Sorry I need to. I've got 2 screens, and when I

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Laurie Jackson-Grusby: move this it changed my orientation of everything. So I'm going to just move things a little bit for myself here. all right. So

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Laurie Jackson-Grusby: I'm going to talk about 3 strategies that we utilize at Brockton High School. So they include curriculum connections with just your standard course. developing a course that's aimed at

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Laurie Jackson-Grusby: embedding career connections within it. We've got a capstone course for our seniors that serve as our example for that and then developing an after-school enrichment course which we also have. And I'll tell you a little bit more about each of those.

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Laurie Jackson-Grusby: All right.

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Laurie Jackson-Grusby: All right. So career connections, obviously A is our first one. We're all here because of Abe and the value that it brings in terms of turning the molecular biology and the central dogma and

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Laurie Jackson-Grusby: essentially showing kids how the central dogma is used to create genetic medicines. and we have been really fortunate that we've been able to

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Laurie Jackson-Grusby: not just carry out the laboratories, but get volunteers from am Gen. Labs to come in and

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Laurie Jackson-Grusby: give guest presentations or panel discussions where they talk about their career path kind of job they do. What is their day to day look like and and so meshing both the learning with the real people that do this on a day to day. is very impactful for students. and and student comments afterwards always reflect that. You know, we've asked kids to reflect on why it's important.

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Laurie Jackson-Grusby: You know, the kinds of things we mentioned earlier always come up is like, you know I had. it's exciting to see somebody that looks like me, or you know I didn't. You know, I I didn't realize. This person, you know, could

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00:26:15.240 --> 00:26:26.040

Laurie Jackson-Grusby: do something completely different, and then come back and do by a technology later in life so like it gives them the whole gamut of possibilities. So that's very, very empowering.

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Laurie Jackson-Grusby: also, we have some project-based learning things. So one project that we have is an anatomy and Physiology project that is modeled after building Frankenstein.

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Laurie Jackson-Grusby: And so this is really a bioengineering challenge. That is the the project for them

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Laurie Jackson-Grusby: as they learn, and that me physiology. So we're fortunate that we have an engineering bioengineering company not too far from us, and they visited us this year. So

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Laurie Jackson-Grusby: during remote school, we actually had a remote scientist

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00:26:59.410 --> 00:27:05.449

Laurie Jackson-Grusby: come in and you know, talk about what his path was. And that was great. And kids really enjoyed it.

108

00:27:05.520 --> 00:27:22.230

Laurie Jackson-Grusby: But we thought once we were in back in person. We would like to have them, you know, bring some examples of artificial, this or that. They, the kids, could actually, you know, put their hands on, and they could describe well what is the evolution of of their design?

109

00:27:22.310 --> 00:27:32.209

Laurie Jackson-Grusby: And then they also gave feedback to students as they were developing their models of how they would put their body system into the Frankenstein model.

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00:27:33.190 --> 00:27:35.759

Laurie Jackson-Grusby: so if you have.

111

00:27:36.100 --> 00:27:39.409

Laurie Jackson-Grusby: If you have something that kids are doing that

112

00:27:39.420 --> 00:28:04.270

Laurie Jackson-Grusby: mimics, even if it's in a very simple way things that scientists do in real life. just making a cold email to people in the company. you know, going Linkedin, figure out who's in your area and reach out to them because a lot of people are. Really, they enjoy getting a day off. A lot of companies will give time to their employees to make these kinds of connections.

113

00:28:04.640 --> 00:28:24.310

Laurie Jackson-Grusby: again field trips. I think I don't want to see too much about this, because I know Wendy's gonna probably say that. And then and scientists visitors. So I just touched upon just any any time you can have practicing scientists, whether it be academic scientists or scientists. from an industry setting.

114

00:28:24.420 --> 00:28:28.409

Laurie Jackson-Grusby: It's it's just exciting for kids to have those conversations.

115

00:28:29.130 --> 00:28:31.739

Laurie Jackson-Grusby: All right. So I want to

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00:28:32.160 --> 00:29:00.559

Laurie Jackson-Grusby: segue into talking about our Senior Capstone course. So this is a year long project that we have where kids are trying to discover new antibiotics. So they're doing citizen science. They're learning about different microbes and soil. Learning about the soil is a living thing, a living entity that can be studied and conducting this original research to learn about all the skills as well as the you know how to study and why we're studying

117

00:29:00.560 --> 00:29:12.339

Laurie Jackson-Grusby: microorganisms from the environment and how they might be employed to develop new antibiotics, therapeutics. So it's both content and lab skills learning.

118

00:29:12.910 --> 00:29:30.110

Laurie Jackson-Grusby: students have a lab notebook. They can do electronic lab notebooks. And and it's fantastic because you can, just you can see their progress evolve over the year. we're really fortunate that we've got a connection with scientists, a tough, infectious disease

119

00:29:30.320 --> 00:29:48.120

Laurie Jackson-Grusby: prior to the pandemic our students presented their their capstone project to scientists there and then through the pandemic. That wasn't an option. This year we were excited to go back. We had scientists from tufts coming in, and they talked about the research in December

120

00:29:48.390 --> 00:29:53.939

Laurie Jackson-Grusby: develop those kind of interpersonal connections with students right off the bat. And then we

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00:29:53.980 --> 00:29:55.820

Laurie Jackson-Grusby: we were able to say, you know.

122

00:29:56.030 --> 00:30:13.830

Laurie Jackson-Grusby: you heard the kinds of work these folks are doing, we set that bar for them, that expectation of achievement for them so that they realize the scientists we're going to be now evaluating the work that they did come, May. And it was super exciting. And kids were

123

00:30:14.090 --> 00:30:25.669

Laurie Jackson-Grusby: kids are blown away because they realized they had learned so much that they never expected to learn. That's one. And then the second is their skills. Some of them had pretty good hands.

124

00:30:25.710 --> 00:30:34.140

Laurie Jackson-Grusby: and you know I would always say you take pictures of everything, so that when when it comes time to build your poster. You have that information there.

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00:30:34.350 --> 00:30:57.629

Laurie Jackson-Grusby: And so a number of kids had really nice examples of streak plates. So this is where you take bacteria. All 8 teachers know what a streak plate is, presumably trying to get isolated colonies, and some of them had fantastic examples, and they all got really positive feedback for the scientists saying, You know, there's practicing microbiologists still aren't as good as what your streak plate is. So

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00:30:57.740 --> 00:31:07.599

Laurie Jackson-Grusby: anytime you can pull those kids into an environment where they're seeing people who have dough devoted their lives. Now, right? So students are.

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00:31:07.750 --> 00:31:10.100

Laurie Jackson-Grusby: you know, in grad school they're

128

00:31:10.980 --> 00:31:24.940

Laurie Jackson-Grusby: 6, 8, 12 years post high school, and they've devoted their their lives to this line of research, and they can see where the year that they spent is meaningful to people

129

00:31:26.040 --> 00:31:35.240

Laurie Jackson-Grusby: all right. And I just want to just wrap up with our after school program. So after school program, we're funded by the Massachusetts Life Sciences Fund.

130

00:31:36.120 --> 00:31:52.420

Laurie Jackson-Grusby: and we've been fortunate to do this for the past 6 years. It's a 9 week program where students, 3 days a week, they're spending about 9 to 10 h a week after school with us, and we're essentially taking a and blowing it up.

131

00:31:52.430 --> 00:32:18.439

Laurie Jackson-Grusby: So instead of the red fluorescent protein, our target protein of choice in this case is Luciferase. we chose that because it's an enzyme, and we can measure its activity. So we can extend what we do with Rfp going into Looking at the purification process and the specific activity of the purified protein at the end of the day.

132

00:32:18.470 --> 00:32:44.290

Laurie Jackson-Grusby: and because this is an after-school program. We foster both collaboration of small groups of students as well as foster independence. And so, you know, we will scaffold the learning of kids, but anytime they've done something. One time. We want them to be able to write out that procedure the next time, and then Tas and teachers will come around and check and make sure that they know what they're doing. So

133

00:32:44.360 --> 00:33:09.509

Laurie Jackson-Grusby: the goal is so that when they move on to a summer internship that they have these skills. If somebody asked them to pour a gel, they know how to do that on their own And so we have a few internship connection partners that Dana Farber for Safe Institute, Reagan Institute, and a number of others that have taken our students in the summer. And and again, kids. So it's

134

00:33:09.510 --> 00:33:26.469

Laurie Jackson-Grusby: both a summer job as well as a networking opportunity. Kids come back from both from our program, but especially these summer internships. They, the what they envision for themselves is completely transformed by these experiences. So it's very cool.

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00:33:33.780 --> 00:33:35.150

Laurie Jackson-Grusby: And that was my last slide.

136

00:33:35.770 --> 00:33:59.829

Jessica Juliuson: Oh, okay, thanks, Laurie. I was waiting for the significant pause. But I'd loved hearing about these opportunities that you've these doors you've opened for your students, I know in many places those apprenticeships and internships are kind of the gold standard, and they're easier or harder to find depending on your location and how much access you have to those industry partners. But it's certainly something that if you can manage that

137

00:33:59.830 --> 00:34:24.830

Jessica Juliuson: that it's it's, as you say, transformative Lori and just being able to really do the work, and to know that you can do the work can change your whole sense of self. so, Lori, thank you so much for sharing all of that there's so much to absorb here. We had a couple of questions just about the age groups for capstones. and I wanted to also just recognize that whole kind of in school out of school parallel that you've got going so that

138

00:34:24.830 --> 00:34:39.640

Jessica Juliuson: students have exposure in these kind of different settings. and so I now want to thank you and turn to Wendy for some specific examples of how you integrate career connections into your science classroom and all of the wonderful connections that you've made. Wendy.

139

00:34:40.420 --> 00:34:46.730

Wooten, Wendy: Okay, So all I have is a graphic here. That kind of is a

140

00:34:46.750 --> 00:35:06.640

Wooten, Wendy: a growth chart or a a evolution of how I've been able to make industry connections. And I think in terms of a strategy. I learn most of this. when I've been robotic because,

141

00:35:06.700 --> 00:35:20.519

Wooten, Wendy: we needed a lot of community support for manufacturing that kind of thing. and so just being able to

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00:35:20.600 --> 00:35:38.139

Wooten, Wendy: not be intimidated to approach industry contacts or hearing connections that can be made trying, you know, just going and asking, for, you know, some type of of

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00:35:38.140 --> 00:35:51.299

Wooten, Wendy: articulation. has been extremely successful. So you know, just basically go for it, and don't be afraid to try to get anybody in the community or

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00:35:51.300 --> 00:36:12.980

Wooten, Wendy: you know, even, I mean, sometimes it's been across country to help with your your program and the the opportunities you want to bring to your students. So basically the evolution of our program. it started And actually, I have to say it start.

145

00:36:12.990 --> 00:36:25.579

Wooten, Wendy: Or I got involved with ae, because I actually went to grad school with Bruce Wallace, who started Abe at Ucla and I remember when

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00:36:25.750 --> 00:36:40.170

Wooten, Wendy: Winston Solser's lab, of which Bruce was a part. you know, left Ucla and went over to the dark side. we were all, you know, just what's going on here, because it's the first time that you know, really

147

00:36:40.200 --> 00:37:02.679

Wooten, Wendy: biotechnology. was becoming commercialized. And so it was something where it was leaving Academia. But in any event, after starting up trying to start up a biomedical science pathway. I got introduced to the Ab. Program. and

148

00:37:02.870 --> 00:37:09.259

Wooten, Wendy: I have to admit that Karen Steinhauer, who is on our is, is here at the roundtable

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00:37:09.330 --> 00:37:35.859

Wooten, Wendy: help provide a lot of of these connections. you know, always emailing us of. Oh, here's this opportunity and that opportunity, and so on. So you know, the Abe sites have been very you know, important in helping us reach out and expand. So that's greatly appreciated. the first connection that I got involved with was

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00:37:35.860 --> 00:37:47.260

After learning about Abe, I found out that they had a leadership symposium, or what they called DNA Boot Camp at Cold Spring Harbor, with the DNA learning center.

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00:37:47.260 --> 00:38:10.760

Wooten, Wendy: And so I attended that it was a, you know 2 or 3 weeks in the summer. And from there I learned about all to all kinds of different programs and trainings through Cold Spring Harbor that I went to, you know. g Gmo detection mitochondrial DNA hapla type. We actually made that a an an integral part of our

152

00:38:10.830 --> 00:38:22.089

Wooten, Wendy: tenth grade identity project where the students get their mitochondrial DNA haplo type from sequencing their mitochondrial

153

00:38:22.090 --> 00:38:43.390

Wooten, Wendy: control region. and you know seeing which out of Africa group they belong to. the genes, the cognition program, the Rna. I knock down and see elegance which then allowed me. They had an an additional training at Pasadena City College, where I met

154

00:38:43.390 --> 00:39:08.329

Wooten, Wendy: Dr. Wendy Johnston, who in Southern California is like the G Guru for biotechnology which then led to. You know, our connection with the the Pasadena bio-science collaborative. and because they're a ab this distribution center now. so there's, you know, a lot of things that came from that

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00:39:08.330 --> 00:39:26.179

Wooten, Wendy: But basically the the curriculum that I was able to bring through that connection with Cold Spring Harbor was you know. Very, very valuable another connection that Karen Stein. How connect,

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00:39:26.180 --> 00:39:52.229

Wooten, Wendy: you know, made us aware of was coastal marine bio-labs because they were initially an Abe dis distribution center and so they were. they have summer workshops for students, but they also have educational outreach, and that's where I learned DNA bar coding. And I guess, David, you also do I? You know, eyeball and the basically

157

00:39:52.430 --> 00:40:14.229

Wooten, Wendy: using DNA bar coding where we then we're able to connect with Cesaki, otherwise known as Csu Channel Islands. So now We go to the island twice a year. and collect Simons and and other things

158

00:40:14.230 --> 00:40:33.699

Wooten, Wendy: to monitor biodiversity, using DNA bar coding so that. And you know, a great opportunity for our kids, especially some kids learning that. they prefer a field work compared to you know.

159

00:40:33.700 --> 00:41:03.490

Wooten, Wendy: lab lab work. So they're they're identifying what things they have a passion for. From that experience we we're able to meet up meet with Dr. Gina Drake from Ucla. She works on coral and algal proteomics. And so now we've established a a program at our school. It's also after school, and the kids get data from

160

00:41:03.490 --> 00:41:27.000

Wooten, Wendy: Lc mass spec from the researchers of the Peptide and they basically end up sequencing the protein. You know the determining, the sequence of the protein and using bioinformatics to analyze the proteins and take it all the way to a a structure protein structure.

161

00:41:27.040 --> 00:41:49.230

Wooten, Wendy: Then from Wendy Johnston and the Pasadena Biocent bio science Collaborative they were in the same building as as the O. Crest Institute of Science. And so I was able to actually do a summer externship with them on the delivery of cancer drugs.

162

00:41:49.230 --> 00:42:03.560

Wooten, Wendy: like Abe, they provide speakers and mentors, and they were especially helpful during covid when they would do a lot of

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00:42:03.890 --> 00:42:10.749

Wooten, Wendy: curricular activities and and have speakers and panels. that we could attend with zoom

164

00:42:10.890 --> 00:42:35.680

Wooten, Wendy: from them. One of their one of the Scientists then went to Usc. And we were able to then connect with Dr. More suit who does synthetic biology. And he comes to our school and gives lectures. And then he gives the kids challenges.

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00:42:35.860 --> 00:42:43.320

Wooten, Wendy: that his lab is working on to design genetic circuits that

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00:42:43.350 --> 00:42:51.320

Wooten, Wendy: get cells to to form into tissues and different structures. And just last week our our students went

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00:42:51.320 --> 00:43:21.160

Wooten, Wendy: and presented their solutions to these challenges to his at his lab meeting. So the they were the students were presenting to post docs and graduate graduate students on the research, the ideas that they had And and again, that's what led to. the synthetic biology curriculum that I did as an M. 10, master teacher.

168

00:43:21.160 --> 00:43:33.260

Wooten, Wendy: Another contact that we got through Abe, was the Biocom Institute, and they connected us with the alumina

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00:43:33.410 --> 00:43:56.130

Wooten, Wendy: alumin, a genetic discovery program. And so our kids this past year have been doing whole genome sequencing. And we were actually able to get an IC 100. So our kids are, you know, have have that skill. And they they can, you know, consider those types of careers in in bioinformatics and things like that.

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00:43:56.130 --> 00:44:11.350

Wooten, Wendy: That's what then, connected us with Ellison Institute of Transformative Medicine. where? we're. I'm at right now with the group of 40 students. we have a program where they come to our

171

00:44:11.350 --> 00:44:27.449

Wooten, Wendy: medical interventions class and present lessons on cancer and you know, the hallmarks of cancer model organisms, toxicology, measurements of drugs, and so on.

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00:44:27.450 --> 00:44:45.090

Wooten, Wendy: And they actually donated an ion torrent next generation, sequencing machine to us. So that connection was amazing. In the meantime, after we

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00:44:45.090 --> 00:44:58.890

Wooten, Wendy: first started doing, Abe, we were connected with the community colleges, La Valley College and Peers College with La Valley College. The students did

174

00:44:58.890 --> 00:45:15.199

Wooten, Wendy: their certificate pathway, and that's where we were connected with Dr. Aurora Calendar, who is now an a leads the Ae distribution center at la Valley call L. A mission colleague. She she moved over.

175

00:45:15.200 --> 00:45:25.050

Wooten, Wendy: and that was the segue into our kids doing dual enrollment for biotechnology class.

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00:45:25.190 --> 00:45:39.850

Wooten, Wendy: We also, then connected with Peers college with Dr. Kamagaya. we wrote a a Nsf. Grant to develop a a biotech pathway

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00:45:39.850 --> 00:45:56.910

Wooten, Wendy: that had a very cool twist to it. The biotech 3. The third class is actually an internship. And I'm sure with high school students, we're all aware that at least in biotechnology, it's very difficult to get students into an internship

178

00:45:56.910 --> 00:46:10.999

Wooten, Wendy: because you have to be 18 and over which most of the students are not, and then they always worry about the liability. Well, by making this class a part of a community college course.

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00:46:11.000 --> 00:46:25.180

Wooten, Wendy: the kids are able to actually get an internship, and this course runs as if it were a bio Manufacturing Company, and our kids piloted the program where they, for you know.

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00:46:25.180 --> 00:46:48.959

Wooten, Wendy: basically develop the way to prepare to bio manufacture tech polymerase to do all of the Qc. And Testing to make sure they could deliver it. And so now they provide it to other high schools and community colleges. so you know, they're getting a real a real

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00:46:48.990 --> 00:47:08.449

Wooten, Wendy: accurate it, you know. Look at what it's like to work in bio manufacturing and the biotech industry. so just basically with a number of these different opportunities. you know, we've been able to give our kids

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00:47:08.450 --> 00:47:30.900

Wooten, Wendy: real world experiences allow them to develop skills. Give them the confidence to know that they can be successful in the field of biotechnology. And it all basically started with, I guess we can say, Bruce Wallace wanting to get biotechnology and what goes on in the, you know, in

183

00:47:30.900 --> 00:47:50.629

Wooten, Wendy: the real world getting it into the classroom and so these are just, you know, some some examples of how we've been able to network through our association with, and Jen and Ade to provide all of these opportunities for students.

184

00:47:51.240 --> 00:48:14.340

Jessica Juliuson: Wendy, this is just been glorious to see how this web kind of grew, and I so appreciate you walking us through that, and we do have a question in the chat for you about how do you? How? How do you go about making those connections? So I'm going to encourage you to go ahead and respond to that in the chat if you're able to, because in the meantime I want to make sure we have time for David to share some of the approaches he's taken with his students. So

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00:48:14.340 --> 00:48:24.229

Jessica Juliuson: if David are you able to, maybe when you can stop sharing your screen, and we can invite David to share his. And we can hear how he's approached career connections. David.

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00:48:28.310 --> 00:48:30.280

David Upegui: Okay, thank you so much.

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00:48:30.340 --> 00:48:50.060

David Upegui: So I do have a lot of redundancy between what both Lori and Wendy have shared already. There's some things that are very much the same, such as the idea of citizen science. I also participate in the Bar Coding project. And so, instead of just talking, and you know, if if my wife

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00:48:50.060 --> 00:49:05.530

David Upegui: what we're here. She would tell you that if you tell me that I have to speak for 10 min, you have to say 5, because I'm gonna always run long. So I I'm really gonna try my best. I I apologize, is gonna feel rush. But I wanna also be aware of your time and conscience is aware of the fact that

189

00:49:05.530 --> 00:49:31.069

David Upegui: we only have a few minutes, and so they are obviously some purposes and some reasonings, for you know, some explanations as to why this is important, and I can go over these. But I I'd like to really focus on on the last one more than anything else. So of course, it's going to increase motivation and engagement. And it's going to help students with their future employability. And of

course, it's going to increase the ability for students to see application to to their knowledge and to explore

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00:49:31.070 --> 00:49:41.150

David Upegui: careers and decision making to a line sort of so. But all of these are fundamentally still sort of economically driven.

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00:49:41.150 --> 00:50:05.770

David Upegui: And and there they they miss what I think is the most significant component. Which is this increase humanity. So rather than talking. Let me share with you some photos. That's what I want to do with you, and maybe give you a very short description of what what we see here. So in one of my classes, one of the things that's very important in my class is that we have people from the outside to see the greatness of my students.

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00:50:05.770 --> 00:50:12.899

David Upegui: So here, for example, in the very middle is this young man that's next to me. Now I I know he looks like he's a student, but he's not. He's a physical therapist.

193

00:50:12.900 --> 00:50:40.769

David Upegui: but he happened to be a physical therapist who is very young, and and my students connected with him right away. Ask all kinds of questions. this is the same class. So you're going to see the same students. These are all from this year. and because I so often have people from the outside coming in, they're getting really used to what it's like to engage with professionals. This helps with to develop skills such as engaging in a way that is productive here. This is a visit by the Brown Medical School

194

00:50:40.770 --> 00:51:07.420

David Upegui: and in the back there, you see that greyhired man that's a Dr. Diaz, and I can call him that because he and I went to college together, and we had to say, bent or he is a primary care physician who works with the community. So he came in, and he also brought another physician, as well as a gentleman named Luxon, who works in the medical school. So they came in and talk to my students about their career path here our students also from Brown University, I came in. You're going to see again.

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00:51:07.690 --> 00:51:27.989

David Upegui: Similar. All my students are the same and I I hope you also recognize immediately that my students are as as as Wendy would have said, you know, a a, an inclusive of a large diverse group of people. here they are again. In this case a young lady with a baby is actually a former student who is now a

196

00:51:28.150 --> 00:51:44.440

David Upegui: medical imaging expert. And so she came in and she talked to my kids and this is consistently the way it is. And I I want to finish with this one. You see the 3 gentlemen in the back. They are as you can see, significantly older than my students. They are all war veterans

197

00:51:44.440 --> 00:52:12.390

David Upegui: and the gentleman who's holding what you can't see there. it's our class, lizard. So we we have a we have several pets, but that's one of them, and he's a survivor of a cardiac arrest, and he came in to teach my students and certify him in both Cpr. As well as first aid, and one of the things that's really powerful is the 3 gentlemen they are When they left they they said

198

00:52:12.760 --> 00:52:39.460

David Upegui: that they would. That was the best class they ever had. My students were the best students they ever had, and they've been doing this for for many, many years, and so what I did that kind of is it not only did it help in immediately improve my students, skills and sense of who they are, but it also allowed people that normally don't interact with my students to see the greatness in them. And so this was a a a dual win for all of us. I have one more here, that lady with the dress there in the front.

199

00:52:39.460 --> 00:53:04.270

David Upegui: She is a public health researcher that I worked with at Brown and she came in to talk to my students. here's another one. This was a former student. I'm sorry a former teacher, and he came in to talk about his role growing up in the city and dealing with mental health and and sort of the anxiety that comes with that. And this last picture from that class the gentleman on the far left. He is a

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00:53:05.180 --> 00:53:24.830

David Upegui: I guess he would be considered a computer programmer. He's a programmer who works with neuroscience. And one of the things he does is he is one of the people that has helped develop that technology of remotely controlling robots through through the the just thinking himself through neural activity. So he came in. He talked to the kids. They absolutely love that they engage with him.

201

00:53:24.830 --> 00:53:48.719

David Upegui: Another thing I want to bring bring out again. Reiterate. What already been said is bringing experts of the the content that you're covering in the case. The gentleman in red I don't know if you know, that is, but Dad saw Dr. Ken Miller. He is a recently retired professor at Brown University who comes into my classroom every year, and one of the things that happens is that he tells my students about the new

202

00:53:48.720 --> 00:54:08.019

David Upegui: parts of biology that have to be included in this textbook. So this is Miller from the Miller and Levine textbook, and so he talks about his personal story, how he got to where to? To where he is. and then describes what's new in biology. White biology is a an exciting area of of academic sort of inquiry.

203

00:54:08.170 --> 00:54:23.059

David Upegui: Another thing that I feel is important is again this, Citizen science. And I know that in this call today we have Dr. Osgood, and I am so thankful for her support, because, even though it's not part of the sort of traditional aid program or the Bruce

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00:54:23.170 --> 00:54:39.970

David Upegui: Wallace program she has continued to help me to make sure that my students are doing real science. in the sense that for example, this is a picture I took during February vacation, so there was no one else in the school except these 47 students and I

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00:54:39.970 --> 00:54:54.549

David Upegui: and they came in specifically to take care of their B samples. So when the students realize that this is authentic, real situated sign. So this is legitimately something that is worth their time, they're going to step up their game.

206

00:54:54.550 --> 00:55:20.770

David Upegui: I also wanted to mention this here. So the gentleman in the red robes, or I'm sorry. Not red sort of orange peach robes that Swami you got manand, and I could tell you a long story about him. But this is not necessarily a scientist. This is someone who comes into the class, and I have tons of pictures on it, because he's been coming to my classroom literally for dozens of years, and what he does. He comes to describe to my students

207

00:55:20.770 --> 00:55:29.869

David Upegui: what his path was, and what we do is we also do this Pre and post, where we look at the effects of meditation on physiological

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00:55:30.090 --> 00:55:56.070

David Upegui: metrics. So we measured heart rate. we measure breathing rate, we measure sort of semi-qualitatively quantitatively, how their mood is changed. And so what this for me does is he brings also someone that looks very different, not used to, not not in the same way that my students are used to seeing. They are very few people from Asia in in the city where I work, and so this is a great way to also increase

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00:55:56.070 --> 00:56:04.880

David Upegui: who they are. And the last thing I want to finish with, because I know our time is running short. Here is this idea of how can we take students and we and turn them into transformative intellectuals?

210

00:56:04.880 --> 00:56:29.549

David Upegui: So this is something that I've done officially for the first time, thanks to a little, a many grants. And what you have here is that's my colleague named the Gray. But these are students, my students teaching younger students about biotechnology, about science, and given them the skills. And so what happens when that kind of interaction takes place is that my students are aware of their knowledge, their own power, their own

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00:56:29.590 --> 00:56:53.070

David Upegui: significant contribution to the community. And the youngest students are able to look at them and recognize that they look like them that they can do something like this. They can see themselves in this kind of a situation. So this was a win-win for both the little kids, or they they they're all told at me. But the younger students, as well as my students. And here, for example, with the the long hair

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00:56:53.070 --> 00:57:04.670

David Upegui: is Maribel, who will be going to Province College and definitely going into medical school. So I like to stop there. I know again. I I I'm sorry that I had to rush, but that was the only way to get through all of that. So thank you.

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00:57:04.950 --> 00:57:25.969

Jessica Juliuson: Thank you so much, David and I know that we are wrapping up, too, but I want to thank all of you who have been commenting and watching, and we will have this recording posted for all participants, and we'll share materials with our registered participants as well. I want to thank all of you

for these lessons that we've been hearing about from all of you, engaging the whole student, keeping things authentic,

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00:57:25.970 --> 00:57:46.060

Jessica Juliuson: thinking about things, experiences that are transformative. And so we'll continue to explore this idea of the how. how do you go about building these relationships? But I want to wrap up with something that Wendy said, which is, you know, basically not being intimidated. Be fearless. Be courageous as you go to help make these connections for your students, because it's worth it.

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00:57:46.060 --> 00:58:10.159

Jessica Juliuson: because they can have these experiences, and it transforms not only themselves, but as we just saw, I can pay it backwards, forwards, down to younger students. And then you have systemic transformation. so the power of career connections can really make the difference in how students see themselves. And I want to again thank our 3 master teacher fellows for joining us today and for sharing your experiences and your how?

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00:58:10.160 --> 00:58:19.899

Jessica Juliuson: I have a feeling we're going to be coming back and probably doing more on this topic. in future roundtable. So thank you so much, all of you, for being with us today, and have a great rest of your day.