

Room 102 Session II

Framework for K-12 Science Education and NGSS (Next Generation Science Standards):

What gives?

Lead: Tom Keller

Facilitator: Sarah Morrisseau

For us to find out who is here so to \_\_\_\_\_ start with Maryann and go around the room and say, you know who you are and what you do and what your interest is in...what the heck you were thinking to want to come to this \_\_\_\_\_.

I'm Maryanne \_\_\_\_\_ I am the director of curriculum in York for the next three months. And \_\_\_\_\_ I'm here just because we have had an abiding interest in how to create a sustainable STEM program in York and we have been unsuccessful to this point. Just we moved to Project Lead the Way and thought we could create something moving with a full program \_\_\_\_\_ so we need to think differently, so I am here to just figure out what we need for STEM and integrate.

My name is Carrie. I work at Bigelow Labs. I specifically work at the National Center for green algae and micro\_\_\_\_. We just went through a name change so we are a national collection. We have like 3,000 strains but Bigelow has an interest in education now for some really interesting program and resources but I think it was always sort of that interest and the need to identify what is going on with teachers and we did, I think this year was the first pilot, we are doing a professional development so I think there is always (background noise) more about what is going on.

I'm Mary Ellen Tracy and I am a regular ed teacher at Rancliff Community Middle School. And we have an integrated curriculum so we aren't trying to do something separate with STEM we are trying to make sure STEM is part of what we do in the regular classrooms. Maybe that is your outside of the box thinking, but it still poses certain challenges as far as making STEM concepts truly accessible to middle level kids and making them, I don't know making them accessible is the best word I can come up with right now without thegns getting too complex and making sure they get the concepts without being overwhelmed and stay excited and involved in STEM.

I'm Lisa \_\_\_\_\_. I teach physics at \_\_\_\_\_ Regional High School and I am here because we are just starting to dive into the framework in my school and talking about how to integrate STEM and bring our \_\_\_\_\_ technology education person into the science department and pull in the math department. So it is looking \_\_\_\_\_

I'm John Higgins and I am at Ocean Side High School and just formed consolidation and I am here simply exploring STEM. I don't know it is necessarily a conversation that my district is having right at this moment but at least on the faculty level.

Rich Grich with the Maine Veterans Association of Maine. We are looking at developing partnerships that link industry into the STEM programs and provide jobs for people and training. Also ran the \_\_\_\_\_ for \_\_\_\_\_ challenge for the \_\_\_\_\_ this year and sort

of wondering...we had 1 teams sign up but only two teams completed. So I am trying to figure out how we can better improve that ratio for next year.

Rich I think you once told me there were 75 businesses in Maine that are aerospace...

Rich: We are up to 81 right now.

(both talking) It amazes me.

Yea, Maine does over five hundred million dollars a year in aerospace business and some people aren't aware of it. We are also...have put together a doing business with NASA and coaching \_\_\_\_\_ who are industry members looking for NASA and NASA \_\_\_\_\_ so we have four space flight centers, NASA headquarters, and 10 prime manufacturers and suppliers in Maine to learn how to do business with us or vice versa I should say.

I'm with \_\_\_\_\_ auto body. I direct our fields \_\_\_\_\_ center which is just outside of Bangor, one of our two year round environmental centers and one of our big audiences is K-12 especially K-6 students who we work with, students and lots of classrooms and like many non formal education \_\_\_\_\_ we have gone through a big shift over the past 10 years, offering a kind of discrete set of programs that teachers can choose from to being partners with schools and the teachers really helping to support the work they are doing and especially from our interest is really helping them do real world projects that build well being in environmental quality and students commune; so really helping them find a fit to enhance their teaching by placing it in students \_\_\_\_\_.

I'm Steve Coseau, I am Associate Dean of the College of Science Technology and health a the University of Southern Maine and I am involved with a number of initiatives across the university of rethinking both pre-service and inservice degree in the course of my area of the STEM areas that I am mainly focused on (too low).

I'm Christine Anderson-Whorlhouse. Half of the time I am hired by the Mid Coast Superintendents to coordinate professional development for the region and the other half I do consulting in \_\_\_\_\_ and I have read the framework, I am familiar with the framework and I love the vision of the three strands that are woven together, so I love the idea of that with STEM as well.

I'm Susan Hunter, I am the Provost at the University of Maine in Sciences actually and so I am here really to figure out how to better, I guess, connect and interface higher ed, K-12. Both for teacher preparation which is...that's important. It is important how we teach STEM \_\_\_\_\_ on campus and it would be great if everybody got excited about STEM in middle school and high school and it would be terrible if they came to campus and they went boy this is boring. So just trying to figure out what makes this all together.

I'm Tom Connor, I'm with the...I'm a split personality as well...we all wear many hats but one of the hats I wear is with the National Academy of Sciences, a board on Science

Education and I work upon the framework project so I know it pretty well. I wear another hat now with the Maine Math and Science Alliance which is part of the \_\_\_\_\_ center where we are looking at stitching together out of school and you know non-formal kind of experiences for kids in STEM and making them long term duration and building upon the great resources we have in the state, like Bigelow, and pulling together such that kids now don't get just a scattered approach but get some kind of exploration within that area.

I'm Beth like while you are introducing yourself and take (all laughing and talking). Actually I am Tracy Harkins. I am the educational for risk manager at Kids Consortium. We are a non profit and we work around the country helping communities implement service learning and my interest in this room in particular is just cause I saw Tom's name in there (laughter). So, but really for us for service learning there has to be a high quality learning and we are not experts in all different fields, we are experts in service learning, we are generalists, and so we like to spend a lot of time understanding what kids nowadays will do when it come to doing the service projects and make sure that it is developmentally appropriate and that we are on the cutting edge of what the field is saying about quality of learning. So that is why I am here.

I'm Kathy Chase. I teach 9th grader science and our school is involved in the Ties grant with Maine (coughing) Alliance to get STEM into the building and we are also working on becoming a proficiency-based school and there is just so much stuff going on that the STEM stuff is sort of sliding under the carpet and so I was interested in the framework and the science standards and what is coming up and what we can do and do it well.

Kathy, what school are you in.

Mountain View.

(too low to understand...Laughter)

I'm from the Gulf of Maine Research Institute which is in Portland. You heard from Sara Kirns this morning from there but I am specifically on the Vital Signs Project which is a community of students and teachers and scientists and citizen scientists all looking at the question of invasive species in Maine; getting kids really...building the scaffolding that students and teachers really need to contribute to the effort in that field of research that is going on around the State.

Great while I am familiar with this format so I am going to just paddle on for a couple minutes and then you guys can engage in some debate and I will leave. But (laughter) this is probably the most concrete thing you are going to get. This is a flyer for the framework that is 25% off, so it is a good deal. It also lists on the back some really key references that were used in the development of the framework and that are good for inservice and pre-service teachers and alright, okay, so I got to get more. I got one more but I will get you one, Maryanne, sorry.

That's fine.

But the best news is these are free PDFs too so if you don't want the hard copy you can download it for free any of them and it is an incredible gift, I think, by the academy to do that for all their reports, anything you want from back in the old days rising above gathering storm or even the national science \_\_\_\_\_ standards on \_\_\_\_\_ that were done in 96 that are now free PDF. So that is one paper. The Academy was asked by a private funder, this has not been federally funded, there is no federal money in this. That is a very important statement to lots of people across the country. But this is not a federal effort, this was coming out of a private funder who asked the Academy to identify what are those core ideas that kids need to know in science because they knew that the common core math was coming down and the common core deal \_\_\_\_\_ was on its way and science made some sense that being in a similar kind of tract. So this group said to the Academy, what are those core ideas that all kids need to know and be able to do because if you remember from the 96 version it was a \_\_\_\_\_, you know and we had benchmarks and we had National Science and which do I use and that is the overlap and so it was a confusing picture. So this round we tried to come up with what are those core ideas. So this framework was put together by a committee of 18 people, 9 of whom are National Academy of Science and National Academy of Engineering members including two Nobel orates, that is important on the \_\_\_\_\_ I don't know why, but then there were 9 people who actually, and by public opinion, knew something about (laughter) and could really say well that is all well an good but what does that matter to a 12th grader kind of thing. So these two groups came together and had some very frank discussions about what are those things that Kids need to know and be able to do and it is not just the core ideas, not and I hate the fact that when we think of content we think of life science, physical science, earth and space science and in this case engineering and technology that is part of the framework as content. And if you look the framework now has three major demotions to it. And the first dimension and it is first as purpose, that was a deliberate decision, is scientific and engineering practicers and they are these eight components and it is basically an unpacking of inquiry. What use to happen, I know it wouldn't happen in your classrooms, it use to happen back in my classroom where, you know we would do some fun activity and then somebody said well what's the science here and they were like, oh yea I kind of forgot that, but it was fun. It was hands-on and that is not inquiry. So this is now looking at...the first one is asking questions and designing solutions, so it is a science and engineering kind of thing; it is actually at that level to say what should these kids be doing. So that is the first dimension. The second dimension is a thing that has appeared in the past in both benchmarks and national science education standards in a different term but this is now called cross cutting concepts. And it is seven or so things that occur across sciences and engineering, sometimes in both, sometimes in only in life and physical science but the important thing is that these have big outline value for kids. They are able to hang things on these structures and it helps them understand and make sense of this whole thing. So things like systems, things like energy. I mean big concepts across and unfortunately sometimes we use different technicians for those things but we are trying to say these are critical, critical things that kids need as the structure to understand what is it within science. And then, so that is the second one dimension, it is cross-cutting concepts. The third

dimension is disciplinary core ideas, the content. So we have physical science first because the chair of the committee was a business \_\_\_\_\_ and it is the longest chapter (all talking and laughing) by God, oh not by God, there is no God... (all laughing and talking). So we have physical science, life science, earth and space science, and engineering and technology. And I want... I did a chat on this at the math supervisors conference about a year ago and there was an engineer in the crowd and he came up to me later and said, boy I was really surprised about these content areas that you have in the science framework and I thought he was going to say engineering. He said I was very surprised that you had earth science because, you know, I never had that in school and he really wasn't given much \_\_\_\_\_ and it is an important thing. But these days, I mean, you think about all of the natural hazards, the natural disasters we have had lately with tsunamis and then human impacts on the globe and the document does talk about human induced climate change. There is a National Academy of Scientists that the evidence is clear that this is real and this is evidenced based. There is also evolution is one of the primary core ideas in biology, we are up front with that. That causes some problems in some states but those kinds of things are there but remember it is a framework so they are pre-global level. So the framework is out, you can buy a copy now or download a copy. It took us a long time to get the printed copy of it but the printed copy is out finally. That document is now being used and was being used back in July when we released the pre \_\_\_\_\_ to create next generation science standards. Twenty-six states have signed together to say we want to develop science standards. They don't use the work common but they call them the next generation science standards. We want to work with you. They are being led by this group in Washington called Achieve, it has some very strong stats putting together the science standards; Maine is one of the twenty-six states. We have a small team that gets advance notice of drafts, they have actually seen at least one draft, two drafts already and given feedback. There will be a public release of the draft in April. I don't know when in April. At the Academy we use to go by holidays. Oh we said oh, it will be out by Valentines Day without a doubt. Well we first started with seasons and that was... you never give a date because you know April 15th comes and goes. But so they are saying in April and that is going to be a public release to everyone. It will be on the web, there will be a questionnaire that directs you to provide input or there will be open response as well. So I would encourage you to go looking for that. That is now taking everything within the framework and weaving it together such that if you look at the math common core or the ELA common core, it is kind of written in the old way of here are the things that kids need to know and then we have these practices too, you need to put that in there. Well the science one is being written differently in that they are trying to create performance expectations, more of the language that we are more use to up here where it is now saying, here is what a kid will be able to demonstrate if she knows what this particular cross-cutting concept is utilizing this content to get there. So it is blending these three dimensions into performance expectations statements that, you know, are expected to drive instruction. I mean the whole point is that we can't just let everybody do what they think needs to be done across the country. We tried that for the past few years and you know kids move a lot from state to state so it makes sense to have some kind of commonality to that. We know that within the schools one 4th grade classroom is different from another 4th grade classroom and so it is not to say that everybody needs to be on this concept on October 10th but it is to say here is the kind of

things that we are expecting kids to be able to perform, like our old performance indicators. These are the things that indicate what performance kids will be able to do. The question that will be answered when the draft comes out in April is, is this going to be grade band at elementary or grade level, is it going to be 5th grade or 6th grade and as well in high school how do you deal with that in the course kind of things or it is going to be somewhere in the high school range. These things need to appear in the city's background. And I don't know, at this point I can't tell you. Anita could probably tell you but she would have to shoot you (laughter) and it is just going to be a few weeks before you can see it anyway. So you know, don't get all upset about it. But look for it, absolutely look for it, absolutely read it, give input, talk to colleagues both within your school and within your community because in order for this to take, first of all we have got to make sure common core takes; because if it doesn't we don't have a snowballs chance in July or March apparently, \_\_\_\_\_. So the whole value to this is look at common standards across the state, that is to say first of all kids move a lot. People get transferred, they can miss huge amounts of science and we know that we need to build these progressions in order for kids to understand and that they are missing chunks which is not going to work. \_\_\_\_\_ there will be some economies of scale as we begin to develop good lesson plans in Kansas that could transport to here, so rather than just depending on whether the text book company gives us, we have a better shot if we are all trying to achieve the same thing, to look at some good lessons and finding with assessment and that is the big element in the room is what is assessment going to look like. And we can only hope and the framework was quite up front to say look there aren't any great models right now but we are saying that we need to blend these three strands for instruction, we need to blend these three strands for assessment as well. So it isn't necessarily going to say it is all going to happen through the SAT or through a particular test and it will probably be some kind of blend in local state system but their needs to be some sophisticated look at assessment because we aren't doing it very well right now. So that's the speal. Any questions ask Anita.

I'll add that there are some school districts that are already kind of begun thinking about the practices and what it looks like to assess the practices or not assess them. So I created just a check list so if you were to look, everybody loves the KPNK so I will start there. So if you look at the MEA, okay so it does what it does relatively well but it doesn't do what it really needs to be doing for assessments. So if you look at that and you start to look at the practices it is just helpful to think about which ones are we not even doing at all right now. Never mind intertwining the practices across cutting concepts and the core ideas. Just if you start to think about, you know, and then you can turn the mirror on yourself, say do I do these, all of these, am I assessing all of these practices in my own teaching and learning. And then what would it look like if I were going to be pulling the pieces together, what would an assessment that did cross-cutting concepts and practices and core ideas together. I think it really helps you to kind of get a sense of, ooh that future is going to be very exciting and interesting.

With the common core of that smarter balance, will we have a similar thing for science that will be developing assessments and resources and...(all laughing and talking)

All it takes is money...

One hundred seventy-five million dollars would do us nicely to do that. I think whether or not there is that I think it is very likely that, and Tom may disagree, but I think we are very likely to see consortium states come together even without a big nest egg from them.

Well remember one of the two assessments is based at Achieve, which is the group doing science standards. So there has been some, I don't call it collusion but, some collusion between the two groups because, you know, we keep saying look we are going to need simulation, we are going to need computer level platforms that can handle simulations and large data sets and things that you might not be thinking of for math and the ELA, so begin to think about it. So that, you know, we are kind of sneaking in the door because the door is in the same room with that group. I don't know that smarter balance, I keep e-mail Dan but I can't get him to bite on that \_\_\_\_\_. You know if you govern, the governing state we should have some pull with them. Other thoughts?

You said there were 26 states that participated in this. Is there some expectation on the other side that the 26 states would continue to work together so that it gets utilized across a broader audience than just a single state or will each state use it however they wish?

There is a firm statement that each of the 26 states will strongly consider adopting this.

I would like to say that when I meet with my partners across the 26 states and that I liken our conversations to prenuptial agreement, that better we hammer out the details about that, that clearer we are not the better it will be for us to work together. So I think we ought to do our stormin normain right now and get the details into here so that we can collaborate because it is in our best interest.

You got 46 states within the common core. That is unheard of in this country. This is a culture shift that I would not have anticipated and that is just amazing. So if we can get 26 and I am sure that there are others who will, there will some who will come on board and there are some who will drop off, but we will probably never get all, especially Texas but that is a whole other topic. So, yea, I mean we can...all we can do is make the good cases for it, make the fact that some science was done by the National Academy of Sciences, you got pretty good leverage there to say we think they got that part right. Now the politics comes into play and how much do you want to say, oh, well we don't believe in global climate changes as we are slipping in, you know, so we will see what happens.

I mean Anita is right on...I was thinking about the transformational talk today and I think if I were in your seats I would say, I would try to start small, rather than saying what don't I do really well, I would say you know there are a couple of these practices that make some sense to me that I can tie in with this content to see what this feels like to begin to work out, that kind of instruction. I mean arguing for evidence is one of them but I think some really powerful \_\_\_\_\_ that really helps kids learn and then you get into all kinds of good discussions on how much evidence, whose evidence, is your evidence as good as my evidence, how do you make a case? Kids need that no matter where they are going to

go. How to you make a case to somebody on something and so I think that is a good...I would take a look at that and just start small.

That is a great \_\_\_\_\_ for me to decide on but we are getting ready to launch the Communities in Practice, it is a department online communities in practice and the one that we have identified for STEM and Michelle Mayotte and myself are working together very purposely in math and science around this on conduct talk in math and science. So yes, hopefully will bring out practices related to that, what is the research we know now and share that broadly within the state. So there will be more information coming out about that on \_\_\_\_\_ as well as the list of services as well as the commissioners update. So if you haven't heard anything and you shouldn't have heard anything yet, specifically about that but we will be launching \_\_\_\_\_ sometime.

April I think. We do seasons too.

(all talking, laughing)

On this one and that is why one reason I had in this as you heard this morning Ready Set Science is as close as we have to a picture of what it might look like at some level. You don't need to read the whole thing but I would download it and I would look at a couple chapters just to get a feeling of so what does this begin to feel like. That is not the final solution and it is not the answer but it is a start and it is free.

So at the high school...

You know, boy, high schools are such an interesting case study. Ready Set Science was built for K-8. The people who have dug into it deeply, especially in New Jersey, they say through the science institute there they have done a lot of strong professional development and their high school people have said, Holy Cow, this makes some sense for us as well. So even though it says K-8 on the cover, it seemed to make sense for K-12 and college people have said, Holy Cow, this is pretty interesting maybe we should be thinking about this. There is a lot of work coming out through the Academy and there is a report that will be emerging probably around the 4th of July or Labor Day, (laughter) Yea, yea, on discipline-based educational research which is looking at the teaching of under graduate science, what are really good ways to do that, what do we know about kids learning, older kids learning at those more advanced ages of 18-21 or the non-traditional students. So that piece I think is going to fit very nicely in the us to say so what should our pre-service program look like and how do we think about perhaps redoing under graduate science instruction to fit into this whole movement. So that is another interesting piece.

You said next fall...

Maybe 4th of July, Labor Dayish...

And yea, so just keep in touch.



Can I \_\_\_\_\_ service learning also because it is just one of those pathologies that integrate all three of these pieces. And we don't have it down perfect yet but we have been playing with a lot of middle school teachers in particular and I have a few high school groups that we are working on to integrate into this but really looking at how do you look at the core content and I have to look to get my exact words, but eliminate your practices and your cross-cutting concepts and how can a service learning project let all of those pieces happen and it can be both instruction that also assessment pieces for students. So just as you are trying to figure out how do you keep all of these pieces together, that is one of the methodologies that seems to be working and we are excited about how close that makes math and science. Other groups around the country are saying, ah, here is one way that we can look at this.

So I will jump off with that and as a colleague who was here today but nothing to do right now discussing white elephant and who is the white elephant \_\_\_\_\_ from high school teachers perspective. I will start with the framework. We as a department, a department of nine science teachers just last week got together in \_\_\_\_\_ and they are looking at cross-cutting whatever,

Concepts...

...and as we are reading through them...I don't know if they were cross-cutting or practices, but one or the other one and we are trying to \_\_\_\_\_ what we do and we got to one where you are analyzing data and there was a statement there about statistics and there were some examples of these statistical analysis that apparently all kids are supposed to be able to do and as a faculty of 9 very intelligent training people, none of us had ever even heard of this, none the less think that kids sometimes complain about taking averages or ranges or standard deviations and now you are going to try...and now we have these standards and all kids are supposed to meet the standards so we have to figure out how to teach those standards and then we come to a conference like this and project-based learning \_\_\_\_\_ the real world design and we get all excited, but when and what do we take out, how do we take...we have got these standards, we got them and how do we fit everything...because it takes longer, it is fantastic the kids love it but it takes longer. And so how so we juggle all of that stuff...

Just in kind of response...were...

Slowly, slowly, and I will say it is everything slow in education but slowly looking at how do we get more onto the plate. So when we do service learning now we always talk about data question analysis. When I am talking to my kindergarten teachers and when I am talking to my high school teachers and we talk about what we do \_\_\_\_\_ topic study around that and saying, you know, these 4th graders their grasp sucks, they should be at a much higher level and really looking at what the research is saying around that. As we are adding in we are looking at energy concepts so that we are getting the question analysis, we are getting energy concepts and then we are doing persuasive writing in terms of the scientific concepts and so slowly we are trying to create these models where

we can see where can we fit all these but they are not out there yet and so right now we have to say less is more, lets do a couple of these and really do well and then next year lets put on another piece, so I agree with you. I don't have this wonderful model that has all the layers beautiful, but I think organization, like us has to do more work but how can we get more done with this teaching methodology as opposed to just engage what else can we accomplish through STEM learning.

I think part of the piece, too, and believe me I am no expert and I hear all the time about so much on the plate but I think that the new standards can help us so much and look at them. If you think about particularly the common core being stepped back from the college level and then step down. What we found was that in particular some of our high school teachers couldn't let go of the things that really belonged in lower levels. Well the kids don't come knowing it but when we met with k-12, they say we taught that and we taught it to \_\_\_\_\_. So part of it is holding the student accountable for it too and then being able to take those things off your plate because they sort of become imbedded in the way we do things. Of course we have to review Maine Medium \_\_\_\_\_ with sophomores. Maybe we don't, maybe we need to remind them and certainly we will always have those remedial aspects but now with our every day math we have this little chant, trust the sign, trust the sign... (Laughter). Really trust our colleagues, I think that indeed they did it and there is going to be that increasing level of complexity, but also being certain that you are communicating with your colleagues and then (too low to understand). I don't know if that helps \_\_\_\_\_ anything but it is and I couldn't agree with you more.

Yea, holding kids responsible but when they come and they just don't do it you just can't go on unless you go back and reteach some of the basic concepts.

And well one of...again this is from a middle school perspective but I did teach in high school a long time ago. We usually use these standards and it really makes me happy to see the cross-cutting concepts because, again, I teach at the middle level for \_\_\_\_\_ curriculum and it is that piece of letting a piece go for another colleague to cover. So for example, if we were doing body systems and our kids had picked the theme of sports which sort of makes it a good thing but then I wanted to go somewhere completely different with it and so the kids studied their body systems but then I say okay, how do you carry your body. So we started getting into the chemistry of the human body and the ADAPT cycle and we got down and dirty with that instead of me sitting back and saying, oh, no the chemistry teacher will cover that with you. My kids wanted to know. They were like, okay, so why do I get tired when I'm sprinting, why do I when I am making my run to first base I can get there fine but if I have to turn the corner to make the double I kind of lose it half way. So you know, I think a piece of it is really rethinking how we look at teaching science and saying we don't knee to each, like biology and physics and chemistry in isolation of one another. These can be concepts that we look a the cross-cutting pieces to allow us to address these things and the kids are much more based and they get it because they see it in the context of something real in their world. But I know that is really hard too because I think if we had this conversation in the last session when we were talking with just middle level educators, some people feel like well I was trained

as a biology teacher. I can't teach chemistry. And I say, yea you can. I mean I was trained as a French teacher...you know we are not stupid people. I think we can go out, we can educate ourselves, we can take courses, we can do what we need to do to really take those concepts and look at how we teach science differently. And that whole, the inquiry based learning and STEM and bringing all these disciplines together. STEM doesn't have to be separate. Why should it be separate from the science curriculum? It should be a part, it should be what we do. You know I just did a while unit on energy and my final project was the kids designing, building, and then self-reflecting on toys that they made powered by renewal energy. It is all STEM but it was also MG, it was...there was fossil fuels, we did social studies, we did a great energy debate and they got to have a big...it was all integrated together and kids get it. It sticks with them and they understand it. And now I have a whole class of 60 kids, three separate classes, who can go home and then come in to me the next day and say well Mrs. Tracy I heard this whole thing about the wind farm that they are talking about and they were having this debate and I heard this on the radio. Oh, so what did you think? So they are engaged in their world. They hear it outside and it makes sense to them. Instead of, you know, I leaned this piece in this classroom but it is never going to apply to anything I do outside of the classroom. So really it is a shift but I think we are going in that direction. I think we are capable of doing it, but again it is like that piece of how do we put more on the plate. My answer to that is don't cut up those plates and hand the pieces to other people. Redistribute how you look at you plate and how you load your plate and I think we can do it and make it really...

To redistribute don't you have to take something out somewhere, if you are giving something to somebody else, something has to go out.

Well an example, I work with a night routine and I won't name names but I was listening to them work on the unit and I learned that the students at least once a week have to bring in an \_\_\_\_\_ for social studies, formal practice and then I was talking to the science teacher and the kids at least twice a week have to bring in a current even for science. And so that actually wouldn't be adding to the plate, it is as we discussed well can we bring in one current event but the current event has to be around energy during this time of year, it has to be around sustainability and so we took from the plate as opposed to adding to the plate, so I think there are places where you can split up that plate a little bit different but the barriers to doing that are so many in terms of communication and schedules so it is so not easy. I am not saying...you are bringing up all the right questions to the table but I have seen some situations where when that communication is available, they have stuff they have taken off the plate.

We only have a couple more minutes, because I don't want you to miss door prizes that I was told to start at 3:15.

Do we have to be there to get them?

Yea, yea.

Out of here. (all laughing).

So are there other parting thoughts?

Just the fact that our partners, there are organizations out there that can help us do this work and, you know, there is also Maine as an example. We have a project going with our 8th graders who did a real data collection and it was so neat for students, so the more that we can lean on our partners and find some of the systemic way to do that instead of just plugging in for an occasional cool project. But how do we forge a long-term relationship.

I think that is critical.

Good, and hope you kids are up on this and Bigelow \_\_\_\_\_ looking for bloom kids, alright.

I didn't quite hear what you just said.

Looking for bloom kids still, you got

I don't know where they are at with that, but there is a little bit of shake up but there is all kinds of good things happening. I mean they...we have a partnership with Colby so that is now creating all kinds of resources at that level and they started several piloting for special development with teachers so there is all kinds of things.

Well thank you, if you have any questions Tracy Harkins at Kids.com is that it? (all laughing).

And I will forward it to you Tom.

Thank you Tom.

If you haven't downloaded the free STEM learning guide, it is free. How many times do we have to charge, so please download...

Is it free?

It is free. (laughter)

How much does it cost.

Its free. (all talking).