

Room 319 Session I

Facilitator. Phil Brookhouse

Name of presenter: Henry Inguerson and Sally Plourde

Topic of presentation: elementary science teaching issues

Discussion: STEM Education in primary/elementary grades when math and ELA are supported but not STEM. Ideas: Teaching elementary teachers to teach science/inquiry.

I'll introduce myself and then you are also have brought something...

Yes I put the same one...

I'm sorry...

We are sharing...

We share they put us together.

Okay. Because I had not seen the final output.

I'm Henry Inguerson and I am a science, all subjects, grades 3/4 teacher at Wells Elementary. I have been there for 15 years but I also have a particular passion for science. In fact I started out the first two years just teaching science to all classes of students of (shuffling papers) my job, exploding in _____ I hate things like that. So that has remained my passion and I am a science instructor and team leader at the school. I serve on a political team also for the whole district but my job is really to engage and incite and now the place we seem to be at with the upcoming next generation science standards I find myself more and more, now that we have started to develop curriculum in science it is hard to engage teachers to teach it and as you all know if some of you are elementary teachers it is just a lot of different conflicts within that and it is mostly time and also I think a lot of it has to do, for me is teacher comfort and understand of science content and science instruction. So that is what we continue to run up against.

So my big question is still that and my interest is just building some kind of conversation around that, that might go further as to how we can sort of work together, what are the resources here now and beyond that would really help me in my school and you in perhaps your school or district. So that is what my kind of big plop is here in question, always has been.

I'm Sally Plourde. I teach in Westbrook and I teach second grade and the reason that I decided to host a non-conference is because at my level the district has basically said we teach literately and we teach math and you can kind of intertwine science. So it is in a focus. And when I went through...I am a nationally _____ certified teacher and going through my national board certification. It was a major focus. I became very engaged and I am determined to be change agent and we are going to...I have been given the go-ahead to really make changes in the pre-k to 2 level at the school that I am at. So I want to know what everyone else is doing, if anyone is at this level and is facing the same type

of uphill battle that I am facing. And I also...my life is Ready Set Science and if you don't own it, buy it.

I've got it on my list. So just open it up to people...

By the way, Ray says science is free reading on the I-Pad or any other thing from the national academy and stresses they are reading it as a PDF so the whole book is free.

So just go the National Academy and you can get it downloaded?

Yup.

That's great, good start.

I'm wondering...one thing I was thinking particular not as much teaching kids, although it would be great to talk about that too, but teaching teachers in the school and you said Ready Set Science (coughing) have used that as a way to engage teachers...

What grades that program hit, your pre K-2, what grades does Ready Set Science...

K-8. And the glory of it is, is that it includes case studies that are easily accessible by practitioners, they can read that and go to their ELL teachers or one of their special ed teachers. There is something that resonates with anybody in that book. I am very impressed with the book and I thank Anita very much for pointing that out to me. I really...

These are just...if you could just hold onto to these, they are just copies for the next question printouts. Okay.

So just other folks just pitch in for questions.

Well I am an engineer, I am not an educator. So I really don't know what to recognize in terms of the construction that seems like a reach challenge. Maybe if people have questions about STEM profession and how that links back I might be able to help with that but you cater mostly to...

Leadership makes a big difference in school.

It does. One of the things that the transition for my district because it hasn't been a focus at the level we are at now, I was a science teacher when I taught 4th grade. But since I have been second grade it is not. It has not changed from just themes, it is you now, theme you are teaching. A lot of teachers that is all they know, build a diagram and they do not do a lot of good practice that we know about now. I think it is imperative that professional development is a huge piece even if it is one small stone thrown in the water. I am doing a book study with some people right now...

Oh great, Ready Set Science?

Yea.

My name is Cal _____. I am in the insurance business with Jim Burke Insurance in Portland and I am on the board at USM, the _____ board for the Engineering School and I was just talking with _____ Anderson and one of the issues that sort of concerns me is, that is why I am in this particular session is how to we capture these young people, get them interested so when it comes time for them to go to further education college, especially in the STEM courses that they have an open mind, that they are willing to think about this. With the statistics I get they are not very good. They are not listening and they have other things they want to do and industry is crying for these kind of educated individuals.

Like I was talking before earlier and I taught Pre K and second grade and in fourth grade. When I taught fourth grade the information wasn't there at the kids reading level so trying to integrate any of the STEM topics was hard if you wanted them to read about it. And it has changed a lot, luckily, it has gone down to the reading level and it is more...presenting that information to the teachers or the parents in any way possible, getting the literature out there, getting the kids more excited about learning about new things. When I taught Pre=K it was a case of just introducing some of the simple fact of apparition. The kids were like, they seen it, they know it, it was them getting excited about it. I think part of it is just getting the word out that it is out there now and we can help youngsters really get involved. It is one piece.

I know there is a...with the whole common core coming out there has been a lot of conversations about making sure that we have non-fiction texts, you know matching to the science contents that are at different levels so that kids can be reading at an appropriate level with an interest in it, but certainly that whole big piece and I think that is great. I find myself that it is a lot of work but the other piece is that we need to make sure that we make space for science, actually science to be happening in the classroom where kids are actually doing it in the classroom (background noise) because they need preparation and background knowledge themselves as to what is going on in the science and you need to teach kids how to reason and to think and instruction with science notebooks, there are a lot of pieces to it. But, yea, I think it has to start with _____. And I see a lot of reluctance because there is always so much coming down for teachers. Now it is the common core...

I think with the framework now for common core helping toward standards.

The new standards haven't been developed yet, they are working on them. The framework basically says that there are going to be three pieces to the standards and one of them is going to be the science and engineering practices which is doing the stuff and there is going to be cross-cutting ideas and they are basically big ideas or big concepts that go across the disciplines like systems and models and changes and like that. And then there are the disciplinary core ideas and they have been reduced to no more than

five per core subject. It is a big change because there was this whole battery of stuff to go by and teachers were generally smitten with, my gosh how...I have been hit by this stuff what can I do. But with these core ideas you can relate everything to those and the cross concepts are important to because there is a unification that goes on and dealing with big ideas can really help. And if we are dealing in kindergarten with some of the important things, just the idea of colors and sorting buttons is actually a foundational skill to understanding atoms and molecules. It is...those are the sorts of things that I think are important for teachers to see where what they are doing fits in to the whole picture.

Not starting something completely new a lot of what they are already doing is part of that.

And then the fact that you if you are having trouble find time with science then the idea that science and math, we can be doing these together and you are aligning your science. I teach math at the college level at a K-8 method and so context is big for us. The math is being taught in these other areas when my students are out in the field and they are hearing from teachers what you just said, we don't have time. The idea is well you have to figure out what you are teaching in math and you are going to get it taught in the context of what you are going to use it for. Now that seem like a decent idea but how do you get...you see classroom teachers have a really complicated life and there is so many things that everyone is telling you, so the idea is how do you create an environment in which we free you up to say, ooh, wait never get to do this... You know but I don't sense that we just keep saying oh, yes, do this and don't do this and get through the book.

Exactly. (all laughing and talking) and I think what...

(all talking) send it to the office today.

What's that?

What unit are you on in everyday math cause we need it...

Well it is stuff like that...don't bother me with that, I have bigger things...

Hopefully by keeping the conversation going I can give an example of that. Right now I am doing matter, a matter unit and in math we are doing measurements and all the investigation they have to measure whatever it is and with teddy bear scales and everything else they are using, non traditional measurements and middle measurement and so my measurement is covered in an exciting way...so they, we fought to get conversation there. Someone used the term fling this morning. Whoever is excited needs to be that little flame in their school, in their grade level, in their little spot and try to get it going that way.

Somebody has to put a shield up around you. You are going to take kids for that weight walk...

And you have to have a good sense of the (background talking) I mean we don't my wife accuses me of that all the time. You do it, you have to have a revelries that matters with kids and when you teach and because there is all like...a good example every day math. Okay it is a pretty good program, we have good math scores in our school but the problem with it is that in it comes and it sits forefront and it is (unable to understand) so if you don't have people in your school and a few cohorts who talk about what it is to learn math and how it isn't about the program, it is about pulling the content into science. You got to have that, that has really helped me in my school to have 3 or 4 of the teachers that I can sit down with and say, this is what we need to be doing.

But we are still teaching it and it is a good program. Everything is nicely done, but we are still teaching it out of the book, I mean the book is there to show the sequence, how it is connected, give you ideas but we can't somehow put the book down until we know what is in it and then design the projects, we are not there yet.

Your right, is what it is. And you are on rails and the rails take you somewhere but you can't deviate from them and were the switches that allows you go off to a siding and explore.

I am not sure if it is that, we haven't yet gotten to the point. Now you two have because you can hear self-talking big ideas and how to tie things together, but I wonder if it is that we don't...the teacher and certainly my teachers who are new pre service, they don't quite know the content well enough that they see the connections and they even if they teach the measurement in your project, they know it, they have researched, they do it but the don't believe it yet that they can really do that and it is okay.

Well this goes back to leadership and what you were saying. You know, I get interns coming in to me all the time and they are getting the right message from their professors, you got to integrate units, you got to integrate content, you got to make it real and have kids apply it and have decent performance and it is great stuff and they are coming with great ideas but I think once you are in the system if you don't have support to continue to do that and explore and have the time to do it. Because that is the other thing, we need to sit down and plan these things together as teachers, so then the easiest thing becomes...

I am on this _____ tomorrow morning here (laughter)...

Placement. When you are doing the placement it would be the idea situation if your students when to someone who has embraced this but I think there is not as many...

Your rare, you are a rare commodity...

Yes, its not a norm at least from what I've seen.

Can I ask other people, where are you from and what is your background, who are we talking to.

I'm from the Cabone, Port Cabone district. Actually I was a high school math teacher for many years and last year became the technology curriculum coordinator, STEM coordinator as part of our district. So when I listen to what is going on, last, well the beginning of this year we developed a lego program for our elementary school teachers. The idea was we want to start...we have pre elementary student in the district and we want to branch out of one building and start to push into other places. Right now it is done essentially as a once a trimester activity for the students, it is not really enough, though the idea was to create a stem lab but resources being dwindling right now and this is not a good time to try any program. What we tried to develop this almost like an arts program where students would attend a STEM lab, get exposure to integrating what they are doing in every day math and what they are doing in language arts and what they are doing that would be science _____. But teachers keep doing what they do because we know how busy they are but pulling them to a place where now we can integrate those things...

So is this after school...

Right now it is after school.

That's _____.

So are you doing it in school next year as an allied arts position.

We are working on it, it is all the resources we have a person who right now is doing this pretty much out of the goodness of their heart and doing a little bit more than he should be, we can't bump them up to that next level where they can be fully responsible for the class.

I have heard this talks about money to after school program to infuse science and math. Start with the Maine Math Science Alliance, I think that is where I heard that.

We have a great program, it's the Educational Foundation of the Kennebunk's and they have done a great deal and supported us in a lot of these ventures that we....legos, now it is we have the resources to do it and now we need manpower.

What a great job.

We're starting, it is _____ you know.

Do you have sense that the way Kennebunk is headed is to have there be like a STEM during the day science lab that kids will come into.

We'll see, you know, we are going to pilot, the plan right now and it is all tentative, to pilot something small next year in one of our elementary schools, so we will see.

That is going to be good because when they get to middle school there are a couple of excellent science teachers up there who can really take your kids on a journey.

Actually at our middle grade, we have a school that is predominantly 4/5 and they started with a heavy robotics program this year so they completed this past fall and we have another competition this April, so that has really got a lot of energy and the other smaller schools that are K-5 have also started their robotics program, basic grades, still it is an after school activity and the kids sign up to participate, but it is a start someplace.

It is a good start because I have heard from, you know, Wells is right next door and different parents of kids from Kennebunk, the teachers over there are just awesome.

Are you doing your leadership support?

Most of this is, yea, this idea of a STEM lab is lukewarm. They are worried about, they are worried about getting teachers the sole responsibility right now because there is so much to do, so who is going to manage this and where are we going to find the resources continue to manage it. So...

How about you.

I use to be an elementary teacher back in the 80s. (laughter) That was way back in the past.

I am the technology consultant for Texas Instruments through New England. My job is a very interesting job, I go around to schools and talk to folks like you folks every day about TI's resources and what they can bring to science and math and engineering, technology and education. Do demonstrations of products. Most important is I talk to administration teachers about professional development. Most folks when they think about the education part of TI, not the wafer lab we have in South Portland but the education part is naturally they think calculators but they don't think about the calculators as in teaching and learning part of the teaching process. Think of it as we go out and think about a calculator is a way to get an answer to something and then when you are finished doing that you put it down. What we try to do now at TI is to show folks in beginning in methods classes pre service. A lot of time I will go to pre service classes and would be happy to come and visit your class if you want and make sure the teachers are going out into the profession and are aware of what is available from companies like TI particularly with respect to professional development and that kind of thing. It is sort of like being the TI ambassador in a way for schools which is to bring child and families _____. So what I am introducing is what peoples needs are because we try to structure our programs and what we offer according to what the needs naturally of teachers at _____ not just secondary, elementary as well and making sure that we take care of those folks that are the stronger to the profession.

I'm Jennifer Stanboro and I am actually a teacher librarian for the South Portland School Department. The teacher librarians in our district are kind of like tech integrators as well.

And so I work really closely with developing curriculums and stuff in science and we have a lot of STEM issues going on right now in South Portland. So, you know, I see what has been successful and some of the things that we have been trying is when we take an authentic problem approach to something. Having kids relate, solve a problem, that literacy goes right into it, math goes right into it and hands-on science. One thing we used was the _____ of the kids science challenge that came out in the National Science Foundation, every year they have a bunch of challenges. WE have been able to find ties into the existing curriculum to give kids real challenges and real contests they can enter and using the state resources that are now available for research. We have been having a lot of success, that is really the _____ we wanted it to. (coughing)

Can I ask you if you go down as far as pre-K or _____ or is this a full...

There has been (coughing) I'm at the elementary level and mostly focused 3-5 but am trying to pay more attention to and doing some projects in that area, just constantly trying to source for what are some authentic problems to solve and really getting a better understanding of the new frameworks so that I can really make sure that we are tying in to the new sets of expectations.

Shouldn't be hard.

Yea, it good.

(too low to understand)

I'm Linda _____ and I am a retired chemistry _____ Small Friends School and also an ex-kindergarten teacher and I have joined recently, something called Island Readers and Writers and we are trying to take literature into elementary schools STEM based things, so if you have a unit on crustaceans then we try to find the non-fiction and fiction stories about crustaceans for the teachers to use plus activities that will go with them developing curriculum and things so it would actually be like a boxed material or online material that teachers can pull up and use.

Thank you, thank you.

What's is the name of that...

It is called Island Readers and Writers.

That's great.

I just really find it so interesting being a librarian (both talking) fiction and nonfiction together because I think one piece of regulating or sustaining interest in science and math and engineering is really tapping into, you know, this is about imagination and wonder _____ as well as much of that has gotten pushed into the world of fiction, it is an unfortunate break there. And there doesn't need to be and because you inspire the

smallest children with the fiction stories and the nonfiction stories come after fiction stories and that is how you can teach children about the planets or anything because...

Are you familiar with books fix? It is an online program and book fix has a fiction and non-fiction component to it and the book is read orally to them and you could have it set up in the classroom and the kids could have earphones on and listen to a fiction story and then the non-fiction story and they are little, not physics, but simple things that go along with it. It also has some links to other things on line and I know a site license is something in the vicinity of \$1000. It is one way to bring non-fiction in and supply it too. I think it is a great resource if you want to go out and get the book so you can look right on their and they have tied non-fiction to almost any fiction about possible...

(laughter) Is that it?

That's it.

So it is \$1000 for the school...

But would you want to show it you could type in plides, and their user name, we give this to all our parents and panda is the password.

P-A...

N.D.A., we have the plides corner pandas.

Oh, oh. It is not letting us do it from here, so...

Probably a cookie...

It probably is...

I tried.

You did. Great.

I am also interested in what she said about how to _____ instead of just doing it out of the book because this morning they were talking about how 75% of the children wanted to be in the STEM-based field when they were adults but by the time they were in high school the jobs swing back and a lot of times I hear kids saying, I can't go into that field because I'm not good enough. You know that is so often said and its I think if the children...the more...the earlier you get them interested in math and that it applies to your _____ applies to...

But relevance is important, very important because they want relevance and kids are actually curious, kids are naturally excited about stuff and they want to be challenged,

they want to find relevance to their own life. I have said it for a long time. So if it is never... (laughter).

It's a _____ panda (all laughing).

Kids all call themselves scientists, they are, I tell me...I tell them oh come on scientists lets come do this. They already feel they are scientists. I think that is what is sad, they are not tapping 5,6,7,8, year-olds and we are waiting and you know how it gets harder every year they get a little older. But right now they are scientists.

And you hand that authority to them and they take that responsibility very seriously.

Right, and they have to do the problem solving, I am not giving them the answers so they just learn so much.

I'm Karen Capriell, I do curriculum staff development for SAD #15 which is Gray and New Gloucester and I am curious about engineering especially at the lower level and how you integrate engineering in because we definitely have two teachers who are definitely siloed(? in the way we approach curriculum and definitely have let science I think slip by even though Sue...we wish that wasn't the way that it was. You know for all accountability reasons I am one of those Nazi people who are saying show me the test scores.

Kim Bancroft, she was my student teacher so...

She still has time...

She will do it.

She will get some science in, yea.

And I agree with that, kids gravitate to science, they are naturally curious and we ruin them by the time they get to high school, unfortunately...

Absolutely.

We don't try to but it is just the way the system works. So any great ideas on engineering at this level.

It has to be built into the framework, it is the next generation of science standards and the way it is built in is approaching things as a problem rather than just a question. It sounds very simplistic but I remember listening to the inventor of the laser, he said he went to some scientists, they were basing their choice on what they already knew and they said this can't be done. He took it to engineers and they said we can do this. Yea, and that...to me that is the difference, lets figure out how to do it.

I happen to know as far as a content piece I haven't been doing a lot with that, we have been working a lot on other contents like matter and habitats and stuff like that but I have been working the process of science note booking, my students, so that they understand the process the scientists use when they go through a whole asking of questions and trying to solve, very systematic. It is really helpful when they get to STEM because they can see how they can inject almost any question in there and follow it through and in a logical way with a team member so that the science _____ have to work out from Michael Chrichie has done some stuff around science note booking which surely lays it out for how to we are going to introduce science to kids. That is a good piece.

I can tell you because I have been doing so much science that the kids wanted to know if the leprechauns were going to come to school, obviously they think at this age. So they said so we have got to build a trap and listen to that. It really brainstormed. Now if we do that then there is going to be an opening and they could probably climb up the wall and listening to how they thought about it. There is a lot of engineering going on and not because I said wells go figure out how we do we build a trap, because we have been doing so much through science they were questioning themselves and problem solving, they were hoping to catch a leprechaun. And through my literacy I have been reading about books from the (unable to understand)...

Not leprechauns.

And St. Patrick's day, so it tied in perfectly. There are ways to integrate it and still not fall off in the literacy.

I'm Sue Staples, I teach multi 3/4 at the Dunn School in New Gloucester and I have taught for 35-37 years now. And I fall into the trap of teaching to the standards and making sure they pass the assessment and there is so much time in the day and so many days in the year and those little boxes on the learning _____ math and the assessment and when you fall into that trap it is hard coming out.

Yes it is.

So...

So your boss it not here.

Oh we have a great relationship, she just smiled. You know, I love to teach, I can still say that I love the act of teaching. But some of it, wrapping yourself around it, you know, its tough.

What do you think you need for teaching...

That four letter word, time, would help greatly. I feel that we have teachers stressed and that stress filtered into the kid in the sense that I think, that like you own children when you are upset or worried about something your children can feel that in your home. It

happens in the classroom too and if having the time to work with colleagues which, and I want to say too and that is not because she is sitting here, we really do have great administrators to support us. They are the same as we are. They are accountable, they need the test scores and whatever but it is having the time to work with colleagues, having the time to let the kids breathe and construct their knowledge. It is remembering that we work with 8 and 9 years-olds, they are 8 and 9 years old. We have to work with the whole child, gone are the days where children walk through my doorway and I simply taught the academics. We are looking at, you know, this does Johnny have a place to sleep tonight, did he come to school with breakfast. There is just so many things on the plate and you really have to stay focused on the child. It is a huge job and I know that people in this room realize that. It has changed and not always for the better.

I have to be careful...I hate being a nasty person, but the main ideas I have that I put down are how do you approach a science program that goes beyond the book, where do kids do science and explore, it is a fair main idea according to what we have done. I also have leadership and professional development. And then I got lost in the conversation.

And then there were resources that people have mentioned.

Okay...

And that Stan Beleyia from Kennebunk was (too low) along with Randy _____. (not sure if that was what was said.)

Yea, that works.

And then what was your...that clicks...

The _____ clicks. Your idea of literature and non-fiction was really cool.

I want to point this out that this is available to all people in Maine can get the Marvel. Marvel can help with an awful lot and too many ignore this in so many different ways. You can actually find resources by Lexile by using Marvel and looking for stuff that is geared to your particular level, something that can happen. Another thing that I want to show before you leave...it knocked me out the first time I saw it...

The kids database, one of the encyclopedia Britannica will actually read to the kids.

Oh really?

Yea. Elementary level of the Britannica under the kids link.

And I want to point out because a lot of elementary teachers feel as if they don't have contact knowledge enough to explore and those of you who are familiar with science literacy maps, those big books, unyielding in so many different ways, this is an online version which is interactive, so if you wanted to investigate the physical setting, let's see,

we can go to, gosh this is a different mouse...lets look at solar system. You are taken to a page, what the literacy map, science literacy map,

Come on guys lets go, we are done at 2;15.

Okay and so that whole page but as we go through the page you see the connections and it goes from K-2 all the way down, it is the atlas, but if you click, lets go down to K-2 because it makes a big difference...scroll, scroll, not working. Okay so we go there and that you know that is a fair cosmology benchmark for K-2 I think and then you click on that you get resources that are available and see you have all sorts of different resources related to the National Science Education standards, related benchmarks and in addition to that viewing research on student learning so you can find out misconceptions as well. Every person I show this to who has seen it said, oh, this can be my friend. Well because they can put it into a conceptual framework and see what they are doing aligns with stuff that has gone on before and what will go on after them and the relations. Because you and I know that connections make all the difference. That is how you learn things, you make connections. And this provides the connections explicitly benchmark by benchmark, standard by standard. So that's...

I'm sorry.

I'm sure he is. What percentage of the students have a natural proclivity toward math and sciences. Do we have...

All of them till 4th grade maybe. I really...I mean Ready Set Science will tell you this. The research that has gone on in the past 10 years, has shown the kids come to you with their own...they have their own models of how the universe works and they actively participate in building their own models in their head.

And so, where do we lose them?

When it starts getting...

4th grade.

Yea, when it starts getting book learning and ...

And the standards get tough to match so you got to really make sure we get test performance...

If you stop and think what these standardized...I am profitizing here but if you stop and think what these tests have done. They have shown the kids that there is one right answer. And you either know it or you don't and it is just a check mark. Where doing science isn't that at all, doing science is exploring and investigating and finding out what works and what doesn't work and possibly coming up with three different answers to the same problem but looking at it in a different way and that is way up there in the higher

thinking skills. Where as answering a standardized test, that doesn't get you anywhere but where Sue is stuck.

And look how much work has gone on for us to now know connections and that work was standard work...

You got it, right.

That's what I mean. So this part is good, now if we could back up of the, oh my God, this many things, so if we can say but look, you will get there.

In my course this has proven to empaantic(?)guess, can you make it into an adjective, but they wind up having these epiphany saying now we don't think of the standards as a burden, think of them as a way to integrate, because I can see the connection. And they really feel good about it.

I think that is the next generation.

Okay, 2:15 and we are done. (all laughing and talking)...