

Mark Royce ([00:00](#)):

Hi, Andrea.

Andrea Williams ([00:01](#)):

Hi, Mark. Nice to meet you.

Mark Royce ([00:04](#)):

Nice to meet you too. I'm really excited that you're here with us for this conversation. I've heard some really good things about you and I think it's going to be cool to share with our listeners a little bit about your journey and what you're doing in the modeling community. So I know that you have been teaching science in middle school since 2003. That's 18 years you've been doing that. And you had your masters in science education. So did you complete your master's before you started teaching in 2003, or did that come along the way after you started teaching?

Andrea Williams ([00:54](#)):

That came along the way. It was probably in my second year of teaching that I started my master's program and Walden University is all online. So that was an interesting experience. It was my first experience with taking online classes. It was really the first time that I myself got the opportunity to engage in inquiry and learning science through inquiry. So it was a really valuable experience. We had boxes of materials sent to us and then we would do labs as a student and we would kind of discuss afterwards, as students first. And then we also would talk about from the teacher side of it. How did this help facilitate the learning and how was this experience maybe different than the way we had been taught? So in a way it was a little bit like modeling, even though it was labeled as inquiry at the time. So that really informed the way that I wanted to work with my students in my classroom.

Mark Royce ([01:59](#)):

Yeah. And I saw that your first modeling instruction workshop was in 2015. So that inquiry approach in your master's program was kind of a precursor to the modeling approach. That's really interesting. Cool. So you've been teaching and all of a sudden you hear about modeling in 2015 or is that when you first heard about it?

Andrea Williams ([02:29](#)):

That was when I first heard about it.

Mark Royce ([02:30](#)):

Yeah. And so you went to a workshop. Talk to me about what, first of all, what the workshop experience was like for you. And then we'll talk about your teaching since

Andrea Williams ([02:42](#)):

I really didn't know what to expect. I'm maybe a little bit of a PD junkie, so I always like to attend and I'm always trying to learn new things and it was an opportunity in the summer and it sounded like a really amazing experience. And so I went in and at first I didn't really understand what was even going on because they put us immediately into the role of a student. And I enjoyed the discussion, but I, at first didn't really understand, like, where are we going with this? From the student side, it was a whole different experience to be sitting there and not know what I was supposed to be getting out of the

learning part. So, besides those inquiry activities that I'd done in my master's class, I had only experienced all of the kind of cookie cutter labs where, you know, once you start to read the procedures, you kind of like, know where this is headed and you know what you're supposed to find out at the end. And it was, it was just a really eye-opening experience to be able to be involved in the discussion where we were working together to build our understanding and sharing our results and actually having the experience of different groups kind of coming in with a different interpretation and different, you know, procedures, maybe they had collected their data differently. And we were actually talking about the process of science. It was really life-changing and eye-opening to be a part of the experience.

Mark Royce ([04:25](#)):

So you had that workshop. It really influenced you to the point where I know you've gotten more involved in modeling than just employing it in your classroom, but also to in training and leadership workshops and that kind of thing. Tell me about how that happened, came about how you moved into that phase of modeling involvement.

Andrea Williams ([04:50](#)):

So our local ISD, the Oakland Intermediate School District has-- Mike Gallagher, who I think you had on as a guest on a podcast,

Mark Royce ([05:02](#)):

He did a really cool thing on systemic reform when I talked to him and that was really a cool episode. Anyway, sorry to interrupt. I got excited when you mentioned the name,

Andrea Williams ([05:19](#)):

He is an amazing person and I've worked with him for many years, just through Oakland Intermediate School District. I have done workshops for Oakland Intermediate School District with him. And he has spearheaded in Michigan kind of taking modeling and making it almost statewide in Michigan. He's been organizing the workshops in the summer for teachers and we've had them on the west side of the state, a lot in the Detroit area, some in the UP, and we have modelers in Michigan all over the state. And so I had already had a good connection with Mike Gallagher. And after that first modeling workshop, I was all in and I knew that it was something that I wanted to be a part of, taking out to other teachers and getting other teachers involved. And so I actually approached Mike after the first workshop.

Andrea Williams ([06:16](#)):

And then that following year, I taught it in my classroom. And, while being in the workshop was incredibly life-changing and eye-opening, actually doing it with my students was indescribable. It was just amazing. So many times there were labs that I hadn't actually done with myself in the workshop that I would look at. And I would say, there's no way, there's no way my middle school kids are going to get all that they expect them to get from this, from this data. And they would. And it was incredible. There was one in particular that jumps out to me was this lab where kids were looking at tidal data. And it was just oodles of data. It was like month by month by year by daily times for tides in this specific location. And the objective was to get them to understand the patterns in tides and start to see that there's, you know, two low and two high each day, and then start to get that sense of how that time shifts throughout the year.

Andrea Williams ([07:32](#)):

And that was the big one that jumps out at me where I was just like, there's, there's no way, there's no way middle school kids are going to be able to take all these numbers and get that. They might be able to get that there's two low and two high each day. But I just, I didn't believe that they would be able to come to that. And they did. And they were noticing that it was shifting. They were noticing that there were certain times of the month where the highest high ... There was the highest high out of all. I mean, they got all of it. And so I drank the Kool-Aid and I went to Mike after that first experience, and I said, I've got to be more involved in this. I've got to be a part of it. And since I already had that connection with him, he got me into one of the summer leadership training workshops for modeling instructors. And then I was on board from there and the next year I was kind of an intern in a workshop, with George Nelson. And Nell Bielecki who's, an amazing modeling instructor and took off from there. So

Mark Royce ([08:38](#)):

It seems like there's a lot going on in Michigan with the modeling group. And I know that Mike has been really involved in leading that. I know one of the things that happened there is that you guys started a thing called MiStar or am I saying that right? Is it MiStar? I assume the M I is for Michigan.

Andrea Williams ([09:04](#)):

We have a lot of M.I, Things in Michigan. So,

Mark Royce ([09:10](#)):

And so what's MiStar? And what's your involvement with it?

Andrea Williams ([09:14](#)):

A few years back when the Michigan state standards changed... Essentially our Michigan state standards are the next generation science standards. And what Michigan did was they adopted all of the next generation science standards, which are kind of national science standards. And then they added a couple in that are Michigan specific. So when we adopted that, there were some professors at Michigan Tech University that got together and they brought teachers on board and they started developing a curriculum that was designed to encompass all of those Michigan state standards. And it's a really, it's a totally separate curriculum from modeling curriculum, but it encompasses all of the standards and it's created in a project-based design. So, the standards are bundled and then there is a big question that kids are trying to answer.

Andrea Williams ([10:18](#)):

And then they go through a sequence of kind of, each lesson is designed to help them uncover a piece of science that they need to understand in order to solve this big question. And they're all real world based questions, centered around science topics and 21st century issues that are related to science. Climate change is a big one that comes to mind. So, for example, in the climate change unit, they're all trying to solve a problem of how can we reduce carbon dioxide emissions and help limit climate change. And then so they go through this sequence and then at the end, they put together everything they've learned with the science concepts and present how they would solve the problem using what they learned for science. And a lot of the Michigan schools have started adopting this curriculum because what's unique about it is it's ...a lot of the big box science companies that put out curriculum that are nationwide and not Michigan specific, kind of did backwards design. So they already had their curriculum established. And then when the science standards changed, they just kind of say, well, here's how these standards

could work with what we have for you. So things get left out and things don't really gel as well. So when MTU was putting this together, they said, we want to make sure all the standards are truly covered in here. And so they designed it after the standards, which is really the way to make sure everything is covered and it's Michigan specific. And they had teachers involved in the development process, like actual teachers that were in the field. So that was all field tested. It's a really good curriculum. So a lot of the districts are adopting it, but modelers want to do modeling. So we, we were brought in and this was with Mike Gallagher again. And we also worked with Colleen

Mark Royce ([12:24](#)):

It's, Megowan-Romanowicz is what her name is.

Andrea Williams ([12:28](#)):

Yes, Colleen. She actually came to Michigan to meet with us and some, really involved modeling instructors that are in middle school. We got together and we started developing a way to modelize the MiStar units, so that we could kind of bring together the best of both worlds, for the districts that have adopted MiStar curriculum and that we could still do modeling.

Mark Royce ([12:55](#)):

That is really cool. You mentioned MTU and I just wanted to clarify that that's Michigan Technological University, is that correct?

Andrea Williams ([13:05](#)):

Yes.

Mark Royce ([13:06](#)):

Correct. Can you tell us a little bit about MTU?

Andrea Williams ([13:11](#)):

MTU is in the upper peninsula. It's an engineering-based college and I am not very familiar with everything they offer because I'm a graduate of U of M so I didn't attend MTU, but I got involved with, MiStar when... I was just interested. I was curious cause you know, PD junkie again. So, I was teaching with modeling curriculum. But at the time when I started teaching modeling curriculum, the middle school curriculum was still kind of in process of being designed and put out there for teachers to use. And so I was interested to find out what MiStar had to offer, because I felt it might supplement some of the things I was doing with modeling. And then, after I went to the workshop that I attended and I started kind of playing around with it in my classroom, lo and behold, a couple of years later, my district has adopted it as our curriculum. So we are teaching from the MiStar curriculum. But we're using the modeling units that we've come up with so far. So we're doing modeling and MiStar.

Mark Royce ([14:25](#)):

So are all of you in Michigan sharing your resources with people outside of Michigan? Have you guys like, are you guys connected with AMTA at all with sharing resources and the things that you guys have learned? How would people that are listening if they were interested in finding out what you guys are doing, how would they get that information?

Andrea Williams ([14:48](#)):

We are connected with AMTA. I believe that the intention was to make the modeled units available through AMTA. I'm not sure where we're at with that because we've just been doing this modeling MiStar for two years now. So this would have --actually last summer would have been our second round of summer workshops, but because of the pandemic, we did a few things virtually. That was two summers ago. This past summer, we still weren't able to do our face-to-face for the middle-school modeling. Modeled MiStar units. So it's very new still. We have modeled six units out of a lot of MiStar units. There's three grade levels' worth and there's approximately five to six units at each grade level. So we're still new with what we've done and I'm not sure where we're at yet with the connection with AMTA and how they're going to push those out through AMTA, MiStar, they're now in the process of making the, MiStar curriculum open to outside of Michigan as well. So that is just happening. That's new.

Mark Royce ([16:08](#)):

That's cool.

Andrea Williams ([16:09](#)):

Yeah, but MiStar has a website where people can access information about the MiStar curriculum and the units that we have modeled are available to teachers that are using MiStar curriculum. So they're available on there. Mike Gallagher is always a good contact for more information, if anyone from out of state wanted to get more information as well,

Mark Royce ([16:35](#)):

The pandemic has slowed a lot of things down and kind of changed how we've been able to move forward with projects that are in process. And it's been really tough. I have you been teaching face-to-face or online, or how's that been going for you for the last year and a half, two years?

Andrea Williams ([16:57](#)):

Our district did a really great job of making sure that we could go back in person last year safely. Last year we started right out the gate in person, but we did kind of a hybrid version. So what they decided to do was, our academic classes, our core academic classes, math language arts, social studies, and science would be in-person and electives would be taught virtually. And so that way we were able to have half the kids at school in the morning and do their in-person portion, and then they would go home and do their electives online while the other half came to school and did their academics in person. So we were in person from the beginning of the year, up until, I think it was right around Thanksgiving. We did go completely virtual because cases and numbers were high in the county.

Mark Royce ([17:59](#)):

This is 2020.

Andrea Williams ([18:01](#)):

Yeah. This was 2020. Yup. Of course the end of 2019 was just a mess. We, we went out in March and we never went back, but we did do some-- it was more kind of asynchronous lessons for kids. And then we would have like office hours where kids could check in, because of course at the end of 2019, nobody knew what we were doing and then we figured it out. It was a challenge being virtual. We did some

interactive things. I learned a lot of digital stuff that I didn't know before. I learned a lot about how to use, have kids working collaboratively and like Google slides and Jamboard and Padlet, all kinds of crazy virtual tools that kids could use and work together at the same time in. And we made it work. Discussions were a little more of a challenge with the modeling pedagogy because kids didn't want to even show their face on the camera in a Zoom, but we made it work and we only had to be out virtual from right around Thanksgiving until the new year. And then we were back face-to-face. And we've been back face-to-face this year, too.

Mark Royce ([19:18](#)):

I heard they did a deep study on what caused COVID and what caused the pandemic and when they uncovered it all, they discovered it was Zoom.

Andrea Williams ([19:29](#)):

It was a conspiracy. That's what I thought!

Mark Royce ([19:33](#)):

Yeah.

Andrea Williams ([19:35](#)):

Yeah. All of a sudden Zoom. It's just, everybody knows what that is. Nobody knew before.

Mark Royce ([19:45](#)):

Yep. Before you learned about the modeling pedagogy, you know, how has your classroom changed? How has your approach changed? Talk to us a little bit about what that transition or transformation, I should say, what happened there?

Andrea Williams ([20:06](#)):

So in the beginning, I taught the way I had been taught. And when I started teaching in 2003, my mentor teacher taught me to teach the way I had been taught. And so there was a lot of textbook reading. There was a lot of answering questions in the textbook. We would do the reading about the content first, so that they already had the actual, like, you know, the way it was written in the textbook scientific description of different topics, or, you know, if we were, for example, if we were doing a unit on light and how light interacts with different things, we would read about it first, and then we might watch some videos. And then we would do a lab at the end, which would be like a confirmation lab, basically. So there was no discovery. It was like, okay, you read about this.

Andrea Williams ([21:05](#)):

And you learned about how light interacts with, say a prism or a mirror. And so now we're going to go into the lab and I'm going to have you walk through these procedures that are already spelled out for you and you follow the directions and you do the things, and then you answer the questions at the end. And I was always left feeling like something's missing because I would see the kids in the lab and they would, Ooh. And aah, but then they still really couldn't articulate how, what they were doing in the lab helped them to understand the science concept. They wouldn't make the connection between-- they weren't able to make the connection between what they read about and what they were seeing in the

lab. They thought it was cool, but they didn't really get it. And so that was always like, kind of a let down, to, to feel like I had given them this experience, but they weren't able to really benefit from it.

Andrea Williams ([22:11](#)):

One of the things that I always think I've been good at though is kind of asking kids questions. And even in my first year of teaching, when we were "going over the homework," I wouldn't tell them if they were right or wrong. And so I think that gave me an advantage going into modeling instruction is that I already, I actually had a kid-- never forget it-- in my first year of teaching, ask me a question. And I said, well, that's really interesting. What do you think about that? And some other kids says, Mrs. Williams, you never will tell us if we get it, or if we don't will you? You're never going to tell us if we're right. And I said, no, probably not, because you need to think about this and you need to talk about it.

Mark Royce ([23:01](#)):

You were a born modeler.

Andrea Williams ([23:04](#)):

Yeah. I always thought about it as kind of like a Socratic kind of questioning. Like I would ask the kids more, and of course I've learned a lot more about how to get kids, not just to do that with me, but to do that with each other. That's one of the things that modeling has helped me expand in that discourse of working with kids. We would have class discussions, but it would always be kids sitting in their seats facing me. And it would be like, even though I was asking them questions and I might say, well, what did you think about, you know, what Johnny said over here and try to get them to really listen to each other. It really ended up being that kind of ping pong, where it was like, the kid asked me something, I asked them something back, the kid says something, another kid says something, it goes to me, I throw it back to them.

Andrea Williams ([23:55](#)):

And so it was just kind of like this back and forth between me and the kids, but not really between kids to kids and not really sharing data, because if you follow the lab, we all got the same answer. So now we're just trying to, the questions are more like, well, I still don't understand X concept. Can you explain it again? And then I might throw that back out to, well, somebody can, somebody else talk about how you understand it. And it really wasn't a discussion of data. It was a discussion of did we get what we were supposed to get?

Mark Royce ([24:29](#)):

So before modeling, you teach out of textbook, watch some videos and then do a lab. And you said you had a difficult time having the kids make the connection and make, really get the understanding down. How has it been different than that since you started the modeling approach?

Andrea Williams ([24:51](#)):

It's been... So many ways it's been different. It's really hard to pin down just one way. Having the kids come to a discussion with data and, and having them actually discuss what their findings are, has just given us a platform for discussing not just the content, but also the process of science, which is phenomenal. The learning is more student-driven because they can talk to each other about what their understanding is. And when they hear other kids explaining things, they're more apt to think about the concepts and the content in different ways. And you see light bulbs going off because somebody doesn't

understand something. And then they hear another student say, well, this is what I think. And here's why I think this, and then suddenly a light bulb will go off.

Andrea Williams ([25:58](#)):

One of the first things I noticed in the first year I was using the modeling curriculum was the amount of student use of vocabulary. It just shot through the roof. How many kids were actually using the science vocabulary and using it correctly? In my previous years of teaching, we did the old school where, you know, part of the test was the section where it was matching with the vocabulary words. And there was the textbook definition and they had to match the answer. And if any of those words were even slightly changed, kids didn't understand the word enough to make the match between the definition because they were just memorizing it for the test. And then if they tried to use the words in class, they would use the words slightly off or sometimes completely inaccurately.

Andrea Williams ([26:52](#)):

They weren't really internalizing and understanding the definition, but when we were able to have experiences first and come to our discussion and kids would bring something up and then there would be that moment where I would say, wouldn't it be nice if we just had a word that meant that what you just said? And, and then I would say, guess what scientists have a word for that, that word is density, or that word is, you know, whatever it is. And then in class, when I would walk around in subsequent activities, you'd hear kids using the words and using them accurately. And it was just... I describe it like, you know, at the end of the Grinch that Stole Christmas when his heart swells and it burst straight out of that frame. Like, that's what I would feel when I would walk around the room. Like this is just amazing. And you could tell from their conversation and the way they talk to each other and the way they used their understanding of the concepts and the vocabulary that they were getting this much deeper and richer understanding.

Mark Royce ([27:56](#)):

A lot of modelers that I've talked to are high school teachers. And they typically will teach one of the areas of discipline in science, chemistry, or physics. I think what modeling started out, it was primarily focused on physics and there's a big contingency of physics modelers, but you're in a different situation in middle school. You're not just teaching one of those disciplines, am I right? You're like teaching science on a more broad level with those kids. Talk to me about the difference in using modeling in that kind of a situation, that environment than in just a single subject focus.

Andrea Williams ([28:41](#)):

It's interesting because when you talk about the target model, which is a conceptual model of an idea, the physics models and the chemistry models tend to be more... They're a little easier to pin down. Biology and earth science gets a little dicey because of the fact that even for biologists, like a target model for evolution essentially boils down to a kind of a list of agreed upon... Not facts. That's not the right word, but ideas, a list of agreed upon ideas that explain how evolution happens. Whereas with physics and chemistry, even you can get target models, which are more of an equation. And it's when you, when it comes to the modeling cycle and you get to model breaking, it's a little different when you are talking about biology and earth science, because you're not really breaking a model, you're just adding another idea if that makes sense.

Andrea Williams ([30:01](#)):



So in a physics concept, you might have developed a formula to explain how acceleration occurs and then something happens differently. Like, you're traveling in a straight direction and now there's going to be a turn. And what does that look like? And that kind of changes things and you can adjust your conceptual model and your equation appropriately. But with biology, if you're talking about evolution, you might find something that doesn't quite fit to an idea that you already have in there. And you don't really break that idea. You just need to add a new idea. So when you're building the conceptual models, there's a little bit of a different process that you kind of need to go through with kids. So that's a little different, and then you're kind of shifting gears because you might be doing, in the MiStar units that we've modeled. When they bundle topics, you might have a unit that covers some physical science topics and some earth science topics and some life science topics, because they've kind of bundled them with the idea that all of these work together to answer this big question that kids are trying to answer. So you might be shifting your focus a little bit to build your model. You actually have to think about including ideas from physics and Earth science and biology. So that's a little bit of a challenge sometimes

Mark Royce ([31:40](#)):

Is your school seventh, eighth, and ninth?

Andrea Williams ([31:43](#)):

Our school is sixth, seventh and eighth.

Mark Royce ([31:46](#)):

Okay. And do you teach in all three of those grade levels, or do you teach one of those grade levels?

Andrea Williams ([31:53](#)):

It varies from year to year. Most years, I've had a mix of sixth and eighth grade students throughout the day. This year I have all sixth grade students. And I have taught seventh grade. So it varies from year to year. Next year we'll be moving into a brand new building. We're merging two middle schools, and we're kind of working on a new way of...I don't want to say a new way of teaching, but some new and exciting developments where we might actually have kids in our classes of all three grade levels at the same time. So that's kind of exciting.

Mark Royce ([32:38](#)):

Do you find it difficult having students who are as young as sixth grade in the same room with eighth graders, with their cognitive abilities, understanding what you're teaching?

Andrea Williams ([32:39](#)):

So far I haven't had that experience yet, but having had the experience of teaching them separately. What I see is that that age span from six to eighth grade is so varied that it's really hard to even say, what does an average sixth grader look like? What does an average eighth grader look like? Obviously the eighth graders tend to be physically bigger. But I've had sixth graders that have been in double advanced math and are just ready to take on the world when it comes to science. And I've had eighth graders that are still reading at a third grade level and need a lot more assistance and guidance and scaffolding and all of those things.

Andrea Williams ([33:35](#)):

So one of the things that we hope to be able to do with kind of making our classes multi-age and multi-grade is that we can differentiate more by individual student need, versus "this is how we teach you when you're a sixth grader. This is how we teach you when you're a seventh grader. This is how we teach you when you're an eighth grader," because it's not even at, at a specific age level, it's not a one size fits all. Then we can even do some, you know, we hope to be able to do some really cool, like peer-to-peer mentoring, and things like that across ages, because I've had sixth graders that could teach my class, so it's pretty exciting.

Mark Royce ([34:17](#)):

That's awesome. My wife teaches in a college prep charter school. She teaches chemistry to sophomores and the school is a physics first school. So their freshmen learn --and it's all modeling -- throughout their four years of science in the different classes. And she often laments that kids coming into the school have not been taught in a modeling style. So one of the things they have to do is to help those kids acclimate to that style of learning and teaching, you know, coming to them. And she would love to have students in your school. You know, there's just not enough middle schools that are employing a modeling approach. And so we'd love to see more and more middle schools that start engaging in it and what you're doing sounds awesome. And, kudos to you and your team. That's really cool. What's a secret that you would share that you wish you knew before you started modeling?

Andrea Williams ([35:27](#)):

Well, I would say one of the things that I've learned in doing modeling is patience. Patience, patience, patience. Especially at the middle school level, sometimes it is a challenge facilitating discussion because every day is different for kids and kids that are just on it one day might come in and they've had a bad day and they're grouchy and they're snappy and it derails the conversation. And so I would say patience and forgiveness for yourself as a facilitator. I know I took a lot of those situations personally, when I left, in the beginning when I had just started with modeling and doing those discussions in my classroom. And I would feel as if I've done something wrong. This is my fault. And just not really realizing that it's not the end of the world if one conversation doesn't go as well as you would've liked.

Andrea Williams ([36:35](#)):

And just kind of that idea that you're not really, at least at the middle school level, it might be different in high school, but you're not really ever done kind of teaching them the social norms of discussion. I think that's one thing that might prevent some teachers from trying again and continuing in using modeling instruction is that, sometimes we have this idea that, you know, they should know how to behave themselves. So if we give them a list of, or even if we create it together, a list of norms for discussion, and we post it up in the room and it's there for them to look at and remind themselves of that, that you can do that in kind of this one and done, you know, we do it at the beginning and now they know it.

Andrea Williams ([37:27](#)):

And now we're going to have these great conversations and I shouldn't have to teach you again that you can't just yell at somebody if you don't like their ideas, but at least in the middle school level, it's going to happen. You'll get all the way to March. And you've been doing this since the beginning of the school year and somebody is going to have a bad day and somebody's going to feel grouchy and snap at someone. And you're going to have to take that as a learning kind of a teachable moment. And, you know, we're gonna back up and we're gonna take our emotions out of this. And we're going to talk

about what could we have done differently in this situation? And in the beginning, I didn't. I was one of those people that thought, but I've already taught them how to talk to each other.

Andrea Williams ([38:08](#)):

So why are they still not getting that part of it and how come that keeps interfering with our learning? And now I've come to kind of have some grace with myself and... We're going to have to learn it again. We're going to talk about it again. And really, I think for me, that is part of one of the, at the middle school level, that is part of the beauty of modeling pedagogy and modeling instruction is that it provides this opportunity for kids to learn how to collaborate with each other, how to communicate with each other effectively. And it's-- where else are they going to get that kind of experience to be able to learn how to work together with other people to build this common understanding and work towards this consensus together? Those social skills are really important and it provides an opportunity to teach those as well. So patience, grace, forgiveness; try it again. That's what I wish somebody had told me in the beginning. Don't give up.

Mark Royce ([39:14](#)):

Patience, grace and forgiveness. Guide for the teacher in the classroom. That's really good. That's awesome. So is there any, like single, if you were talking to a new modeler, what big tip would you give them for as they launch on their journey or as they continue their journey, what would be your big tip for them? As a modeler who's been doing it for a while now?

Andrea Williams ([39:45](#)):

I would probably tell them to trust in the process, and believe in your students, because, like I said, in the beginning, I was doubtful that some of these big ideas that kids would be able to uncover from these lab experiences. I'm a bit of a control freak, so I've learned to control other things. So instead of controlling, like the procedures for the lab that kids have to follow, I control other things in the room. Like making sure that everybody's engaged when they're working in small groups, that there's not somebody off roaming around. The timing of things; you're going to have 10 minutes to finish this piece and I put the timer up. So I've learned to control other things besides controlling the direction of their learning.

Andrea Williams ([40:45](#)):

I had to learn how to be able to step back a little bit, how to not tell kids when they're wrong about things. I was always kind of that more of a Socratic, I wanted to question kids. I wanted them to figure it out. But in the moment sometimes when, for example, if a kid is trying to design an experiment and I know darn well, it's not going to work. Your first reaction is just to be kinda like, hold on. Why are you doing it that way? And instead, just step back and let it happen because the most beautiful moments happen when kids bring data to a discussion that is different. And the difference comes from the fact that they decided design their investigation differently. And that will come out in the discussion. And it's so much more powerful for those kids than me standing there telling them, wait, wait, wait, why don't you try it this way? Because they won't know why they should try it that way other than that the teacher told them to. But if they come to the the discussion and they have different results, and we can talk about the process of science and what might've caused these results to be different, well, how did you design your experiment? And we can have that conversation, those light bulbs can come on and they can realize that that whole process, and that's important as well. And they'll have that understanding that they wouldn't have had if I had just told them what to do. So being able to kind of step back, let go

of the reins a little bit, and then find your way to control things in other ways, like with your facilitation of the discussion and, giving the kids timeframes for things and, and believe in it because it will happen, they will learn. Amazing.

Mark Royce ([42:42](#)):

That was great advice. Thanks. Gosh, Andrea, it's been really great getting to know you over this conversation. Now tell me a little bit about outside of your teaching world, which you're obviously very involved with. What are you into these days? What, what do you love?

Andrea Williams ([43:01](#)):

Oh, well, I could talk about so many nerd things. Um, There's Dr. Who. There's star Trek, there's a ComicCon I'm going to be going to in a couple of weeks,

Andrea Williams ([43:15](#)):

But right now, the big thing that I'm into that, it's kind of like-- it's not new --it's bringing it back to me. My husband and I watched this show it's on Apple TV or whatever. One of those, you know, streaming networks, I think it's called Apple TV. The Apple streaming service, the show is called, For All Mankind. And it is this really cool, like sort of fictionalized, science fictionalized version of the space race. And this isn't going to be any spoilers because this is basically if you watch the trailer for the show, they tell you this much, but essentially, instead of the United States, winning the space race and getting Neil and Buzz and Mike to the moon first, it's the Russians get to the moon first and that sets off this chain of events where it's like... So in reality, we made it to the moon first. And so we kind of stopped everything like, woo, we won, we're done. We don't have to really do anything else, but in this fictionalized version of it, when the Russians gets the moon first now we're like, oh, we're winning everything. And so it really propels like a whole different sequence of events. And what's cool about it is it's not sci-fi in that they change everything. And now all of a sudden there's technology that doesn't exist and all this stuff. They still maintain the same level of technology. It's just that like events around it are changing. So when they're in the sixties and the seventies and the eighties, they still have the same, like big clunky desktops with the green little blinking DOS screen and all this stuff, and it's just a really incredible, and actually there's characters in it that are real. They were really part of the space race. So it's the actual, like people from NASA and there's a few fictional people too, but it's just incredible. And they bring in there about equality and women's rights and African-Americans' rights and inclusion and things like that. And it was really good, but it really sparked this interest in me to go back and start reading some of the information about the actual space race and learning more about it. And, I'm just obsessed with NASA all over again. So, really cool. It was really good. And then I went back and read Norman Mailer's book, "Of a Fire on the Moon," which if you've ever read anything by Norman Mailer, it's really good because there's a whole lot of the actual like events from a journalist's perspective who got to be there when the first moon landing happened, who got to see the actual press conferences when the astronauts were brought out to talk to the press and things like that. But Norman Mailer is an interesting cat. He takes you on some little weird mind trips and it's like, okay Norman, I think that you need to come back down for this part, but it was really good. And yeah, obsessed with NASA again.

Mark Royce ([46:46](#)):

Well, Hey, it's been awesome talking with you, and I want to remind everybody, you can find out more about Andrea and about we'll have some links to the things she's mentioned on our website at [sciencemodelingtalks.com](http://sciencemodelingtalks.com), and you can find the page that features this interview. Boy, it's been great. I

want to just say thank you so much for taking the time out of your day to spend with us. I think you've had some wonderful things to share with our listeners and I really appreciate it. Yeah.

Andrea Williams ([47:21](#)):

Yeah. This was an amazing experience. And thank you so much, Mark. I'm flattered that you would include me and invite me to join in.

Mark Royce ([47:32](#)):

Well, your name has come up a few times in the last few months and I wanted to make sure we got you recorded. It's good. Thanks again. Thank you. Okay. We'll see ya.