

\*Ukulele Music\*

Keith: Welcome to the LeeCoSchools Edcast number 20 from STEM day at Sanford middle school now for those of you who don't know Sanford middle school is the Middle School in the Beauregard service area and they have a STEM day each year of course we're referring to stem we're talking about the fields of science technology engineering and math some people throw art in there to turn STEM into STEAM which I personally prefer but Sanford middle school invites people from the community from Auburn University in their various outreach programs and parents of students in particular fields and they all come out to the school to give presentations and demonstrations showing these students how the subjects that they're currently learning or will be learning in the near future have real-world applications when I was in school I remember a common complaint going when will we ever need to know this stuff well STEM day at Sanford shows these students exactly when they will need to know this stuff so as you listen this episode you'll find that it's a little bit inconsistent compared to other episodes and that's because as I was walking around the Sanford campus I was recording with the presenters when I had a chance and so each chat has its own ambiance because I'm just in a different place in a different environment you might also notice that we are down a host Kyle was unable to make it to this event so you get just me chatting with people for this episode but after listening if you find yourself with any questions comments complaints criticisms compliments colloquialisms conundrums or concerns as always you can find us on the web at [www.lee.k12.al.us](http://www.lee.k12.al.us), you can find us on twitter and instagram @leecoschools you can find us on facebook at [facebook.com/leecoschools](https://facebook.com/leecoschools) we have our own little icon on the Lee County app which can be found in Google Play or the Apple App Store and finally you can email us at [edcast@lee.k12.al.us](mailto:edcast@lee.k12.al.us) since Kyle isn't here for this one I'll say Allons-y! which is French for leeeeeet's go!

\*Funky Transition Music\*

Keith: alright so I'm here with

Guest: Adam McIlyea

Keith: and you're from Auburn University College of Education very nice

Guest: yep secondary science

Keith: so we are supposed to do rockets but because of the weather yeah we're doing

Guest: we're making roller coasters out of cardboard tubes and popsicle sticks

Keith: wow that's cool yeah so what is the process just

Guest: so the goal is to have them make a roller coaster that goes through one turn and over one hump and then can come to a stop but it's open so there's potential for it to fly off so we're trying to get them to recognize inertia and how gravity affects it and how acceleration is also affected by gravity and the goal is to have them realize through trial and error that rollercoasters involve not a whole lot of science right there's just gravity involved right and you know maybe a class or whatever yeah but through the process they're just going to be making the rollercoasters holding it up with the popsicle sticks and tape you got play-doh for him to stick it to the table and then if they need to hold it up with their hands they can do that to you and at the end of everything we're gonna give them a rating and we're gonna award them with some candy or something and so it should be good somehow

Keith: so how are you gonna test it are you gonna put like a gerbil in a little car

Guest: to represent the car we've got a few marbles for him to use varying in size so

Keith: so it looks like stuff that you put on your pipes to insulate in the wintertime cut in half is about

Guest: yeah it's like something that you'd stick over like a PVC pipe or something

Keith: well I got to tell you I've been to some places that probably had rollercoasters that weren't much better built than what you're gonna have here yeah yeah but alright well that sounds cool it's so they're gonna learn about gravity and inertia

Guest: yeah yep Newton's first law

Keith: in that whole... any kinetic versus potential or

Guest: not in this one I felt like that was probably a little too advanced for what we're trying to do

Keith: I'm 35 years old and I still sometimes think about okay at a certain point it's equal I just I can't wrap my brain around it right yeah well all right well I appreciate your talking to us

Guest: yeah no problem

\*Funky Transition Music\*

Keith: so I'm here with Rachel McDonald you are from

Guest: Dauphin Island sea lab down in Dauphin Island

Keith: all right well you come up here and still get the nice rainy weather

Guest: right rain and fog, but that's ok it's warmer than I was expecting so I like that

Keith: that's good that's good all right so what are what are the kids learning with you today

Guest: so the students are building some what we call roves or Rovers these are remotely operated vehicles and so we just talked about was what they were used for in the ocean so we take these out to explore and do anything that we don't want to put a person in the water for

Keith: right because they can withstand the pressure of the sea a lot better than we can right

Guest: yeah it's right much easier and it's a lot cheaper to build something you don't to worry about sticking a person in and worrying about human life too the cost as well as just you know safety

Keith: that's why we keep sending those robots to Mars instead of us right

Guest: exactly we send the robots first and see how it goes

Keith: if the robot dies it's not a big deal

Guest: exactly

Keith: okay so they're starting so they start out with somewhat pre-built

Guest: they start out kind of prebuild the ROV itself so all the wiring has been done so the motors are attached to a long cable that we call the tether which kind of gives them the the feed that they can use to get down into the bottom of the pool and then it has a controller which is gets the main remote operated vehicle there and they are working on the body of it so the frame with our PVC pieces and they're trying to come up with an arm because they've got to make their ROV do something today and they've got to collect rings as a competition

Keith: okay that's very cool yeah so what all kind of materials do they have where they can modify these things

Guest: we have all different lengths of PVC and then PVC joints but really you could use any material PVC is just easy for us to use and for the students to easily plug apart and put together and kind of change the design however they think so it's a really easy hands-on engineering practice right where they go through that engineering design really quickly they all realize that you're constantly modifying and changing it

Keith: and so do you find that these the younger the younger students with their video game experience helps them control the robots a lot better

Guest: you can normally tell and they'll tell you oh this is just like my video game and they do normally again it gives them a little bit of an edge to driving these and what I tell the classes and normally I have a little more time is hey if you're a video gamer or you love to do simulators that's actually on these applications right these guys are normally excellent video gamers an application so there is a job out there for them

Keith: well that's good news for everybody

Guest: because so many of us love to play video games

Keith: when I was growing up we were always told you're not gonna be able to do anything with those video games turns out they were wrong

Guest: they are now the only downside is you have to like to go out on a ship but they are working on making ways around that

Keith: well is very cool so this can be used for scientific expeditions going and I heard you mention the Marianas Trench

Guest: going to the Marianas Trench yup so right now there's almost very very few vehicles really the governments of the world don't have vehicles to go there because it's so deep you can most of the ROVs can go down to a little over 4,000 meters a lot of the big ones and that's you know average depth in the deep ocean they can get everywhere besides those deep trenches and then there's just a couple that can get down there

Keith: because I've heard and tell me if this is wrong but I've heard that we know less about the deepest part of the ocean than we do about the deepest part of space

Guest: that is correct so we've really for the deep ocean discovered and looked at less than 5% of what we know is down there so whatever they do these expeditions and there's a couple of ROVs that are just

used for exploration they discover new species on every expedition which is just fantastic either new corals or you know new deep-sea species of fish or different types of plankton and jellyfish

Keith: that's great and so how did you get into this to this field

Guest: so I always wanted to go into Marine Science I'm originally from Missouri and I wanted to get down to the coast

Keith: not much sea water around Missouri right

Guest: there are a lot of lakes and you could use these in lakes too but I wanted the ocean so when I got down there and joined the education department they needed somebody to head up robotics like I love building things this sounds great yeah and so it's just kind of grown from there so we bring these to the students and they come down we do competitions with them too but it's just fun hands-on learning

Keith: and so what all what all y'all do down at Dauphin Island

Guest: so Dauphin Island sea lab is the sea lab for the state of Alabama okay so we work with about there's a consortium of about 22 colleges and universities across the state they can send down their students so they're their graduate students undergraduate students during the year to take classes or in the summer to take classes professors can come down and do research and bring their classes as well and then the Education Department that I'm in the discovery hall programs we work with student group so we have K through 12 and then we also do teacher training Wow oh we did really do everything and then there is a public aquarium too which is what a lot of people think the sea lab is but we're a lot more than that we're bigger than that we do everything

Keith: well I really appreciate your time I'm gonna let you get back to the look like they're getting ready to get in the pool

\*Funky Transition Music\*

Keith: all right so I'm here with Mr. Frank Ware so you are with SCORE which is

Guest: Southeastern Center of Robotics Education we're part of Cosam outreach Cosam - college of science and math Auburn University and our job is to reach out to k12 teachers and students and teach them robotics and the teachers in particular how to use robotics in their curriculum even if they're an English teacher a math teacher whatever they are

Keith: now how long have you been doing this outreach

Guest: we I helped Auburn with summer workshops and outreach for 25 years but this organization score will be two years old December the 4th oh wow ok no we were just spun off of Co Sam two years ago

Keith: now fun fact is that I was part of one of your first outreach things with us Howard Hughes program at Auburn back in the day back last century

Guest: Howard Hughes initiative was very ambitious we started kids in the seventh grade mm-hmm and we taught different workshops all the way through senior year and then we were supposed to track them for ten years out and to be honest

Keith: I don't think they did the tracking

Guest: it kind of collapsed around the 11th grade year the funding ran out didn't get renewed and yet a little but not much tracking we see a lot of folks like you working in the business ya know it worked

Keith: yeah it was a lot of fun I look forward to it every summer yeah yeah and then we also did a couple of weekends in the spring too

Guest: and I'm a biology major so I had to learn all this including this robotics

Keith: so how did you get into a robotics thing

Guest: Marlon Simon the guy that got Howard Hughes started if you remember we worked with Legos a lot yep and those were little robotic platforms yeah I taught Legos outreach for Auburn for decades okay and when they formed this outfit they had hired their assistant director TJ Wynn and they needed somebody else to anchor the place it wasn't just the student workers so I'm what they call temporary employment service with Auburn but I still work every week yeah we

Keith: yeah so what are you showing the kids here today

Guest: we're showing them vex IQ super KITT bass robot that's programmed to play a game called zombie freeze tag okay so they there's a bumper a sensor on the back and it hits the sensor and they have three lives every time the sensors hit they're frozen for five seconds and then at the end we didn't used to do this it turns into a very slow zombie that can't be killed but also it's already dead yeah it's a lot of fun for adults and kids and and we talk about the different types of robotic propulsion and control

Keith: yeah this is with vex robotics we've been talking to we talked to the Loachapoka high robotics team and we're talking some other folks for the PLTW Project Lead The Way

Guest: they're also using vex and they will use that they using this platform and then up towards the high school they used something called EDR or VRC which is uh anybody remembers the rector sets with metal parts yeah it builds a bigger robot but actually a simpler brain they're upgrading that they'll pretty soon they're gonna be equal but it's just a different level harder to build but but more flexible yeah this is more like Lego snap together so the younger kids we take this all the way down to fifth grade Keith: Wow okay well mr. ware I appreciate it I got to sit in on one of them and it looks like the kids are having a lot of fun playing playing zombie freeze-tag so it's good seeing you again

Guest: yeah you too and send me a link so we can tag it up on our social media

Keith: all right all right appreciate it

\*Funky Transition Music\*

Keith: all right so I'm here with mr. Carl Wiggins so mr. Wiggins tell us about yourself real quick how did you get to come here to Sanford for the stem days and what do you do for your day job

Guest: okay well I was asked because I have I have two children here uh-huh and I actually this is my fourth child coming through Wow I have one here currently in the eighth grade and one in the sixth grade and I am a consulting forester okay and so I manage timber land for private landowners okay and they asked me to come and speak about forestry and how to measure trees mm-hmm in a practical way

and how do we use math and science and why is it so important in my job and why is it so important to them

Keith: right yeah so I just sat through your session and so you bring a lot of the different elements together the math the science the language your line absolutely so communication these are stem days but a lot of people I hear add an "A" in for Arts yeah that's right so I wasn't I was an FFA when I was in high school so I know a little bit about like the tiniest fraction about what you're talking about but so tell us a little bit just give us a little thumbnail sketch of some of the stuff you're talking with the kids about with measuring trees and those kinds of things so you bring it in geometry and

Guest: in trigonometry and finance yeah yeah in just math in general and then the grade level that I'm teaching right now they're not yet to that point but maybe if they see a little bit of this used in a practical way right then when they do get to this point and I think it's next year they're gonna start this Miss Boone's class then they will know or have a reason why they're doing it I know it for me having a reason why am i doing this how is this usable how is practical then it makes it a lot more interesting yeah and seeing that they can actually take some of this stuff that seems so crazy and actually make a living doing this

Keith: yeah that was a common complaint when I was in school oh what am I ever gonna need to know how to solve for X but you find out that there are a lot of areas where you do need to solve for x

Guest: and just knowing you know not only I said like I specialize in trees but knowing how what I'm actually hired to do how it's impacting the big picture and that's where an overall knowledge of the science comes in you know why do I need to know about bacteria and water and fish well if you're managing the forest you're impacting the wildlife you're impacting water quality you're impacting and by impacting the water quality you're impacting the algae and you're impacting the bacteria which are important to the to the resource for management right because trees actually need the bacteria out there right right so you have to you have to know okay if I'm fertilizing if I'm using herbicides is this helping in the short-term but hurting in the long-term and you can't know that unless you have a fundamental understanding of the symbiotic relationship between that tree and the bacteria mm-hmm does that make sense

Keith: it absolutely does

Guest: and you have to be able to communicate that in these kids it's you know why do I have to read so many books well okay you knowledge is is precious but sharing of knowledge is even better that's and you can't share it unless you can communicate it

Keith: that's very true that's very true so you were talking towards the end with the kids about things you have to take into consideration you're not just managing the trees you're manage that whole property in the ecosystem that is on that property and so talk to us a little bit about the the science or you know what your considerations are in thinning out versus harvesting wholesale and you know do you ever do it in controlled burns or

Guest: absolutely that's one of the things I specialize in are control burns and that's both for site preparation and for stand management and we do what's called understory burns and that's to promote wildlife and aesthetics and also risk reduction so if you burn on a periodic basis you reduce the fuel load out there which is just like buying insurance for your timber you know what happened in the Smokey

Mountains here year before last yeah eighty thousand acres just burn in the blink of an eye and probably 30 40 percent of it killed permanently mm-hmm well that doesn't happen in a stand that is managed with fire is a tool yeah to reduce fuel loading in the stand

Keith: yeah the first time I've ever heard about that that seems so counterintuitive to me is burning down part of the forest to save it but how does that affect the the timber down at the on the lower levels with what the fire is that

Guest: well first of all it's a controlled burn we write a prescription and so that prescription calls for certain weather conditions so it's temperature humidity and then the moisture content of the fuel okay and the wind speed and direction for smoke management and so when all of those line up we can light a fire and burn that stand and it will not harm the stand and it will actually promote growth okay because it's releasing nutrients into the soil at a rapid rate and it controls competition and a lot of people don't know this but most native species in the southeastern United States actually depend on fire the seeds won't even sprout unless there's this process called scarification the seeds have to be prepared to germinate most species that like deer browse only herbs and forbs and grasses they require fire to scarify that seed and without fire these species are going extinct

Keith: yeah it can be destructive if it's not in check

Guest: that's right

Keith: but as long as we keep it in check

Guest: and before Europeans took over and we put roads everywhere in Smokey Bear and we started extinguishing all fires fire is bad will see the the landscape burned naturally mhm and the Native Americans burned right and so it didn't matter when they burn they could burn year-round you know they could burn on the hottest day in August and it didn't hurt anything because they burned it every other year or every three years anyway so there was very little fuel in the fires that took place they burned slowly and they burned cool

Keith: for I guess anybody that I be listening to this I might be thinking about hey I've got some trees on my land how big of a realistically how big of a plot do you need to have

Guest: yeah there is a minimum threshold you know a bottom and you know you can cut any tree yeah but to make money and to manage it I'm gonna say a target of 30 to 40 acres you can certainly cut and plant trees on smaller parcels but below that 30 to 40 acre mark your that's eroding the value of the timber itself because there is a fixed cost associated with moving a logging crew to the site and so you have less timber to spread that fixed cost out on it coming it costs them thousands of dollars to locate to that track right so if they're locating the 10 acres and they're done in two days they actually lost money but if they can stay there for a week or two weeks then they can make profit okay so the bottom threshold if you're if you're looking to invest in properties to grow timber on I'd say that 30 40 acres and above

Keith: so Lee County's always growing and so there's always a whole area being cleared out for a new subdivision or something what's the difference between that and harvesting or is there a difference between that and harvesting a plot to sell the timber

Guest: well typically when they're developing like another Walmart a neighborhood

Keith: or right here another Dollar General

Guest: yeah

Keith: everyday I figure I might go home and find one of my backyard

Guest: well those are typically on the smaller scale and that timber is basically in the way and those contractors that are building the building contractors they want it out of the way in a very short period of time and so to make that happen and say it's only on two acres you just about have to give the wood away that is an incentive for the logger to actually move in there and cut two acres because it gets the wood at no stumpage cost so the wood he cuts he can apply towards profit

Keith: now I'm I'm a semi amateur woodworker on the side so I like to go and get some you know like to build things and stuff like that so one of the things that is the bane of my existence are knots and you know gumming up my my saw blade and stuff so is there a way to grow your timber to cut down on the knots that that come out of the boards out of them

Guest: yeah so like in a pine plantation or hardwoods like red oak white oak ash gum Hickory hardwood if the stand is too open that promotes what's called epicormic branching sunlight hits the trunk of a hardwood tree they're going to start shooting limbs out everywhere so when we're managing hardwoods high-value hardwood saw timber trees and a hardwood stand if we do a thinning we always want even if it's a junky tree we want to leave shade on the trunk of that hardwood tree okay Pines you want to plant high density early so anywhere between five hundred and forty-five trees to seven hundred trees per acre and then they grow up tall and straight and pretty they self prune okay then once you thin them at age say we'll just say fourteen or fifteen they do not grow once once that tree is up it will never go back and put limbs on again okay once the tree once the limbs have pruned themselves off they're not going to sprout new limbs okay so you can thin a pine stand down to that hundred and fifty two hundred trees per acre and it won't promote epicormic branching well but you have to have the density upfront to promote self pruning the limbs fall off okay if you plant a hundred trees to the acre and they're all seedlings out here in this field they're all going to look like that cedar tree they're gonna be limby from top to bottom and they'll never be usable for really anything but pulpwood right so it's how with the spacing when we plant them and then for hardwoods we do have to manage them as long as they're in the ground growing we have to manage it with shade on the trees so they don't initiate sprouting of limbs epicormic branching

Keith: okay one last question and just because since I've got you here and the you had are such a great answer for the last one I go to the Home Depot and I'm looking at the boards and some of them look like they're like a corkscrew and some of them are good and straight and so is there is that just how they're processed or is that now they're grown so how do we how do we grow the right ones that are nice and straight

Guest: spacing spacing again yeah it's all about space and so you want to plant a minimum there's some opinion in this but they know that pine trees grown at higher densities that grow a little slower but they produce a much higher quality wood so I'm gonna say the minimum is that 500 550 trees per acre at year one and then you try to manage that stand to grow in a controlled way way throughout the rotation that you want them to grow faster because it makes you more money mm-hmm unfortunately you know on the stump when when they're appraising the value of that stand it's a ton of wood growing



really fast is the same value as a ton of wood growing really slow okay they don't care it's tonnage is what you're being paid for really but if you can get somewhere around ten rings per inch ten to twelve rings per inch that's generally pretty good quality wood okay and the more the better so like these longleaf pine out here mm-hmm that's as good a lumber as you'll ever grow right there right that is fine I mean there's probably 20 rings per inch yes slow growing it was natural wood and that's good stuff

Keith: awesome. well, Mr. Wiggins, thank you so much for your time it was good talking to you

\*Ukulele Music\*