

## **MARCH – HOW TO INCORPORATE STEM INTO YOUR TROOP**

### **Music Full then Under**

LEE: Hello everyone. Welcome to ScoutCast for March. We're so glad you stopped by.

PAULA: This month is all about how to incorporate STEM into your troop activities.

LEE: I hear there's some pretty cool things going on with STEM. Let's introduce our guest and get started.

### **Music Fades**

LEE: Ron Colletti has been an active BSA volunteer as a member of the Greater St. Louis Area Council since 2006 and has had various adult leadership roles in Cub Scouts, Boy Scouts, and in the Order of the Arrow. He is a member of the National BSA STEM Committee and is helping to develop new Boy Scout NOVA awards, and has led many STEM counselors and mentor training sessions. In addition to promoting STEM in Scouting, Ron is also a member of the Science Outreach program at his company and visits classrooms to do chemistry demos with students. Welcome to ScoutCast, Ron.

RON: Thank you for having me.

LEE: Ron, that's quite a bio on you. I can't wait to have this discussion, but before we get started can you explain to me and my listeners what does STEM stand for?

RON: STEM stands for science, technology, engineering and math.

LEE: Thank you much. Along those lines, what is the BSA's focus with STEM?

RON: The BSA STEM NOVA program started in 2012 and the focus right now is to reach out to Scouts and provide some materials to them so that they can learn more about science, technology, engineering and math, hopefully to get them excited and hopefully get them to go into careers in that field.

PAULA: Can you expand a little bit more on the purpose of why the BSA's initiative in STEM exists?

RON: The STEM initiative in the BSA exists primarily because we were contacted by ExxonMobil a number of years ago with a request to help them get youth more interested in science. They were having problems finding qualified candidates to hire in those fields in science and engineering and math, and they came to the BSA and said, "We have such a great program to help develop youth. Can we put something together that would help the youth learn more about STEM, get them excited, and get them going into those careers?"

LEE: I have a question for you.

RON: Sure.

LEE: What's the difference between science and technology?

RON: That's a good question. A lot of people regard science and technology as being just about the same, but there are some subtle differences. Science is more focused on gaining knowledge, and fundamental theory while technology involves creating products that make our lives better. Technology is using what we've learned in the science part and applying that. For instance, there's a lot of science that's been done to understand electronics and wireless transmission of data and sound. Cell phones would be the technology that uses that science.

PAULA: Okay, let's get down to the nitty-gritty of this BSA initiative in STEM. What activities can you plan for the troop for each letter of the STEM acronym?

RON: I've actually put some kits together with lesson plans so that I can just go into a troop meeting and have everything I need for one of those activities and I'll go through just a few.

For science, activities can involve projectiles in space. Several of those are listed in the Nova guide book that BSA offers. There's also chemistry activities such as experiments with Diet Coke and Mentos.

So I've got one that contains Diet Coke and Mentos and all the, Mentos launch tubes and why we get that reaction when you mix those two together. One of the things we try to do is take the Diet Coke and we'll put some outside in the heat and let it warm up. We'll put some on ice, let it cool down, and then we can measure the temperature and look at how that affects that Diet Coke and Mentos reaction. Everyone likes working with that.

I have one on baking soda and vinegar that we've got the kits there that they can look at the amount of baking soda versus how much gas is generated. What we do is put the vinegar in a bottle, baking soda in a balloon and put the balloon on the bottle and flip it over so it generates the CO<sub>2</sub> and, and fills up the balloon.

I've also got another kit that has pieces of pipe foam covering and I've split those in half so you've got like a U-shape, and you can build marble runs with those using some duct tape and those pieces of foams and some marbles. So they can design like their own rollercoaster and they learn about potential energy, kinetic energy and what type of angles you would need to keep the marble or riders on the track.

PAULA: It sounds like a lot of fun stuff (Laughs)

RON: It does! Technology's a little bit harder to put together an activity. It takes a little bit more planning but there are activities available - most of those around kits that the Scouts can obtain to build, like a working radio or a clock. The Scouts can learn and explore more about the technology that's used in making movies, such as Star Wars. Even just a single scene in a movie takes a lot of technology on how to plan that background and everything you see.

I also have a kit that's designed around robotics, so I've got a Lego robot there and some other information about building model robots and what's involved, the components of a robot, what you would need to make one mobile and that fits with the technology theme.

For engineering, those activities involve making things, so making buildings, bridges, paper airplanes just to name a few.

I also have a kit on catapult-building and it basically contains a lot of paint sticks that I've gone to our local Home Depot and asked them for and they've donated those boxes of rubber bands. And then I've got pictures of designs of catapults that I've pulled off the internet that Scouts can build.

Typically what I like to do though is, this is one of the activities in the Science Nova so there's a very good description and links for additional information in that guide book. But I ask the Scouts to build a catapult.

This is what I want you to do with it, shooting projectiles, and you have to reach a certain distance and then we're going to look at accuracy as well. So they have to build that catapult but then they also have to calibrate it. They have to figure out how to make it, not just shoot, but shoot where they want it to go, which is kind of interesting. And I usually don't show them the pictures of the catapults I've pulled off the internet 'til afterwards because I want them to use their imagination and come up with some unique designs. So that one's a really cool kit to do.

And then for math there's activities around the use of numbers and measurements. This could be as simple as measuring physical sizes, the volume of a room, to making cyphers and codes, or even more involved in tracking of sports data leading to statistical evaluations. And the Nova guide book has lots of examples that use modeling and predictions. There's also a bungee jumping modeling activity that I have that fits the math field. It's actually a Super Nova activity but it goes through basically taking action figures, Barbie dolls, I've got a Star Wars figure, I've got rubber bands and then we calibrate how many rubber bands it takes to have that figure drop off of a platform and how far it will go with a certain number of rubber bands. And we measure the distance versus the number of rubber bands. They'll go and plot that, and then what I typically will do is I'll go outside and I'll find something like a playground piece of equipment, something that's 8-10 feet off the ground, maybe a slide and measure that and I'll tell them, okay, now you've measured how many rubber bands and what the distance will be in the classroom using tables. Well now I want you to go and use your data and calculate how many rubber bands it would take to hit 12 feet to give you the maximum excitement without hitting the action figure's head on the ground. So we go outside and we have a little contest to see who does the best. And it's kind of an interesting activity because obviously bungee jumping's not a BSA-approved activity, and the lesson plan actually goes into questions about why do you think this is not an approved BSA activity and have you

learned more about the safety and what would be involved, the variability and the bungee cord or rubber bands? So it's a really good learning lesson there as well.

LEE: Ron, I'm getting smarter just listening to you.

PAULA: (Laughs)

LEE: Hey, tell me, how does the STEM program fit when it comes to rank advancement for the Boy Scouts of America?

RON: Good question and I've got some cool answers for you because it's really kind of exciting as someone who's passionate in STEM and Boy Scouts. The STEM program provides additional areas for the Scouts to explore, along with their requirements for earning rank advancement. So it fits in with the Merit Badge program. The Nova requirements all have a merit badge requirement in them so they've got to earn a merit badge as part of the requirements. The Super Nova awards also require a Scout to be First Class or higher, and I've found many Scouts who are not first class but have earned Nova's and have been excited by that program are now interested in earning the Super Nova. So it's kind of an incentive for them to finish their ranks and earn at least First Class so they can work on those Super Nova awards.

PAULA: Ron, the STEM program is very exciting but it also could probably be a little daunting to some leaders, especially those of us who are grounded in the humanities. What resources are available for a leader to assist them with STEM activities?

RON: The thing that I always tell Scouts and the adults because I work with a lot of adults in the troop, go out and pick up one of those Nova Awards Guide book(s). You can get them at the Scouting stores. This really has

everything the Scout needs to earn those awards and learn about the science, technology, engineering and math topics that are in there. It also contains links to sites where they can find additional information. So for the adult that's a counselor or mentor, it also provides the information to help them work with Scouts so they can learn that material and help those Scouts earn those awards as well as giving them more ideas. What we've done in our troop and I recommend is that they assign an adult as a STEM coordinator. Troops can also look to connect with external resources like setting up trips to local STEM companies or universities or they can also find guest speakers that could come in and talk or present at troop meetings or campouts. Bringing in the external experts can really help troops to conduct a Nova program and help those Scouts learn more about these STEM fields, especially, as you said, if the adults in those troops don't really have much of a STEM background. And troops will be very surprised how quickly these professionals are willing to share their time and love of science. We've used that opportunity many times.

PAULA: Ron, your resources list there was extremely comprehensive but I would like to add one thing and that is to let everybody know to be on the lookout for the *Boys' Life* special STEM issue that we're going to be publishing in September. That's a little ways off from here now. It's only March but we have to plan way ahead in the magazine department, and six months from now we're going to have that special STEM issue that will have some fun activities and experiments in it for the Scouts. We're going to feature a STEM campout university. We're going to be profiling a guy who is a chemical engineer, very much a STEM-related field, but he works as a candy maker for Hershey's.

LEE: That's quite a plug. I'm looking forward to it.

RON: And there's already been some articles in *Boys' Life*. I should've mentioned that. There's already been some in there with examples of some science activities that Scouts can do in a Boy Scout troop.

PAULA: Yeah. Just about every issue we have something STEM-related.

RON Exactly.

LEE: Okay, Paula, this is enough.

PAULA: (Laughs)

LEE: Ron, you've shared plenty of information with us. I'm sure there is probably something else you would like to mention that we haven't talked about that you think our listeners ought to know. Is there anything left in the tank?

RON: It's not a difficult program to start. Even though it can be daunting, get that book. It's not a difficult program to start and develop. It does require some adults that are willing to help get it moving, but what I find is that the Scouts really enjoy this program.

The PLC (Philmont Training Center) had science as one of their monthly themes recently and those Scout leaders put together a lesson plan so that for every troop meeting in that month we had covered the requirements for the Shoot! Nova for science. And we had told the Scouts up ahead we're going to be doing this; those were some of the most well-attended meetings we had. They wanted to earn that Nova and they got to do a lot of fun activities and it generated a lot of conversation about the STEM Merit Badges and the other Nova awards. After we finished the Nova work, many of the Scouts wanted to do another one. They were really excited by this. The parents have also asked me about the Nova's and what else the Scouts could do. Some have even volunteered to help

put together lesson plans for another Nova. I had a couple of Scouts that got together after school and they built a much larger, more involved catapult and they brought it in to show the other Scouts in the troop meeting and to talk about it. So, bottom line there's a lot of fun things to do within STEM and Scouts and one that will definitely help prepare these youths for the future.

LEE: I love your excitement, Ron. It's so great that STEM's becoming a bigger part of the Scouting program. Thank you for coming on ScoutCast and letting our listeners know how they can incorporate more of it in their troops. You were great.

RON: Thank you. I appreciate the opportunity.

PAULA: Let's step behind the curtain of the March CubCast, and then we'll be back with Reminders and Tips.

### **(Cubcast: Adopting the New Cub Scout Program)**

PAULA: And now the promised Reminders and Tips.

LEE: Be sure to start finalizing details for your summer camping opportunities. Make sure you have all of the equipment checked out so that everything is working properly. Also, be sure that each Scout is current on his scheduled camp payments.

PAULA: If you haven't already done so, be sure that everyone has their proper training. Hazardous Weather training is required by at least one person before any campout. Other trainings, such as Safe Swim Defense and

Safety Afloat, may be required - depending on your activities. Contact your local council for training dates.

LEE: In the March-April issue of *Scouting* magazine 500 Scouts retrace the steps of the barefoot mailman who, in the 1800s, walked from Palm Beach to Miami to deliver the mail. And the *Boys' Life* gear guy gets us ready for camping season with a guide to the best tents.

PAULA: One last thing. Have you supported your council financially? Be sure to participate in a Friends of Scouting, or FOS, campaign or other fundraiser. Remember, financial donations don't always mean cold, hard cash, so see what gifts-in-kind you may be able to provide.

### **Begin Music Under**

PAULA: So now our March episode comes to an end. Thanks to our guest, Ron Colletti. Now I know you've been meaning to but just haven't gotten around to it, but don't forget to register for the research panel surveys. Members will get to express their opinions on a variety of topics related to Scouting programs. Just go to [www.scouting.org/about/research/researchpanel](http://www.scouting.org/about/research/researchpanel)

LEE: Don't forget you can send us your ideas and comments to [scoutcast@scouting.org](mailto:scoutcast@scouting.org) or a tweet to @bsascoutcast. Be sure to tune in next month as we explore how Venturing can help, not hurt your troop. Thanks for listening everyone. I'm Lee Shaw.

PAULA: And I'm Paula Murphy. If you know somebody who doesn't have internet access, make them a copy of this episode so they'll know more about incorporating STEM into their troop activities. They'll be glad you did.

**Music full to finish**