

Robots Teach Teamwork



Spegonaut Baker McFall positions Rovee the robot in its corner base to prepare for a practice run.



Spegonauts Sam Brady, Eleanor Lawrence, Caleb Thornton, Roscoe Johnson, Aron Greco (behind Abby) and Abby Lundsford (left to right), along with Coach Ford McFall (blue shirt), arrange the robot competition table for some practice runs at a team meeting in November.

The words “gracious” and “professional” don’t naturally spring to mind to describe a gaggle of 9-14 year olds, but David Lawrence aims to change that.

Lawrence, a Jefferson Lab Hall D staff scientist, coaches a team of seven young people for the FIRST LEGO League robotics challenge. The annual robotics competition teaches youngsters to work together to overcome challenges in the science, technology, engineering and math fields.

He is one of three volunteer coaches for the Spegonauts. The team is based at Hines Middle School, where Eleanor Lawrence, his daughter and a Spegonauts team member, attends school.

“The program emphasizes collaboration. Because if they’re going to be working in engineering fields, they’re probably going to have to work with other engineers,” Lawrence says.

He says the kids learn these skills as they conduct a research project, build and program a robot for competition, and compete against other teams. The teams are graded on each of four aspects of the competition: robot performance, robot design, core values and a research project.

“The first aspect is the robot competition; that one is the most visible part and is the thing that draws everybody in and is interesting and fun,” Lawrence says.

The robot is built from parts in the LEGO MINDSTORMS NXT 2.0 kit. The Spegonauts built four identical robots for the competition, along with several attachments that could be placed on the robots. They then programmed the robots to complete pre-determined tasks in the game.

“You play on this four-foot by eight-foot table. You have LEGO items that are set up on the table when the mission starts. The robot has to start off in one corner of the table, and there are a dozen different missions that the robot can attempt,” Lawrence explains.

The 2011 competition, called food factor, featured tasks that relate to keeping food safe. In one task, the robot gathered LEGO fish and brought the pieces back to its corner, while in another, the robot placed LEGO food on a table. The robot has 2.5 minutes to accomplish its tasks. Teams are awarded points for each task their robot completes in the time allotted; more difficult tasks have higher point values.

In addition to the robot portion of the competition, the teams also

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present the findings of a research project on a food-related topic and display their problem solving and teamwork skills in a judged group exercise. The Spegonauts conducted research on clean water, with the help of volunteers from a local office of CH2M HILL, an international engineering firm. The students communicated some of what they learned in their research project in online comic strips. For the group exercise, the students were given a problem to solve and was then judged on how they worked together to come up with a solution.

Throughout the competition, teams are also judged on how they display “Gracious Professionalism” and the program’s core values, including teamwork, friendly competition and knowledge sharing.

Lawrence says the students worked hard to prepare for the competition. Meetings began in the summer with LEGO building activities and kid-friendly programming challenges. The team ratcheted up their program in the fall, as details of the game were announced and the competition date approached.

“We were meeting three hours after school on Friday and three hours on Saturday. They do an hour after-school activity time on Thursday, mainly dedicated to the research project.

That’s seven hours a week these kids are putting into this, in addition to any homework they did at home,” Lawrence says.

All the practices and meetings paid off when local teams came together on Nov. 5 at Crittenden Middle School in Newport News for the local competition. The Spegonauts’ robot, named Rovee, placed first in the timed robotics event.

Overall, the Spegonauts placed in the top third in the Newport News competition. Unfortunately, the Spegonauts needed to finish in the top two to proceed to the next level of competition.

Still, Lawrence says the team learned a lot in its first season.

“They have all stepped up and done rather well. It’s been very rewarding,” he says.

The Spegonauts are planning to enter the competition again in 2012 with the aid of a grant from the Jefferson Science Associates Initiatives Fund for entrance fees and related costs. The team’s primary sponsor for the 2011 season was CH2M HILL, with support also provided by The Village Doctor, The Real Estate Book Hampton Roads, SAIC and Jefferson Lab.

*By Kandice Carter
Science writer*

Spegonauts Eleanor Lawrence, Roscoe Johnson and Aron Greco (left to right) prepare Rovee the robot for a practice run.

