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39120 Argonaut Way #335 Fremont, CA 94538
510.494.1999 Fax: 510.796.2452
tricityvoice@aol.com

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Robots fire up the imagination



by Joe Samagond

A group of sixth-graders from three different elementary schools in Fremont recently participated in an international Robotics competition for the first time...and they had a blast. The team - they called themselves the "NanoDroids" - consisted of Mrinal Chawla, Alex Kunz, Rajiv Samagond and Kane York.

This event is an international competition organized by the First Lego League for children ages 9-14 that combines a hands-on, interactive robotics program with a sports-like atmosphere. Last year over 60,000 children in 7,500 teams from over 100 countries participated. Teams consist of up to 10 players with the focus on such things as team building, problem solving, creativity, and analytical thinking.

Every September a challenge is unveiled. All teams are provided the same kit and plans. The kit is comprised of parts from the LEGO Mindstorms robotics kit. Over the course of two months, contestants strategize, design, build, program, test and refine a fully autonomous robot capable of completing a range of challenging missions. They use the LEGO MINDSTORMS(tm) technology which is really a cool way for children to play with adult-like toys!

This robot is powered by a 32-bit ARM microcontroller brain, has Lego Technic rods and beams that work with light, touch, sound and ultrasonic sensors that allow the building of full-fledged, programmable robots. Software allows you to write programs on a Mac or PC, and connects with the bot via a USB cable or bluetooth. The robotics construction kits are gender neutral and represent a balance of fun and build-your-own toy with the depth of an educational tool.

This year's theme, Nano Quest ("Exploring existing sciences at

the molecular level"), challenged the children to explore the new frontier of Nanotechnology that impacts every facet of society, from medicine to computers to the environment.

Nanotechnology is about applying science, engineering, and work on the "nano" scale, where measurements range up to about 100 nanometers-the size of a few molecules-and everything is moving and shaking. Nano means 1 billionth. A sheet of paper is about 100,000 nanometers thick. The diameter of DNA is in the 2.5 nanometer range, while our red blood cells are approximately 2500 nanometers.

The missions were designed to help the teams relate Nanotechnology to their day to day lives. For example, one mission helps them understand a special treatment for fabric, that is already becoming available, that can make it impossible to get your clothes wet or dirty! Another mission emphasizes the body. When we are given medicine, it usually circulates throughout the body, and often causes harmful side effects in unintended areas. But through nanotechnology, some medicines can be strategically placed inside special molecules like the C60 Buckyball molecules, which only allow delivery to the exact area where the medicine is needed.

The carbon atom is of special interest in nanotechnology. One of the reasons for this is that carbon atoms can be arranged to form carbon nanotubes, which can form the basis of some unbelievably strong materials. Imagine a cable as thin as a toothpick, weighing one-sixth as much as a steel cable of the same size, yet it could support the weight of a car!

The team assembled their practice table in a garage and built their missions on it. It is 8 foot by 4 foot table on which the competition "mat" is laid out. Following detailed plans from FLL, 9 missions were built by the team members. The team programmed their robot to accomplish the various missions including hairpin turns, picking, moving or unhooking pieces. Local qualifying tournaments are held in November and December. The best teams will compete in the CA qualifying tournament in San Jose on Jan 20, 2007. Teams are chosen from here to advance to the World event in Atlanta, GA in April 2007 where 104 top tier teams from almost 40 nations will compete.

When children build and experiment, they experience the entire process of creating ideas, solving problems, and overcoming

obstacles. They learn how to work together. The technical skills they learn, like programming language and the technical know-how are fleeting. More lasting are lessons of teamwork, project management and troubleshooting. Participating in this year's tournament helped to shape a positive perception of science and technology in the minds of these young children.

For more information visit www.firstlegoleague.org or contact Mark Edelman, marke@playingatlearning.org, 510-656-8664.

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