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## Robots not just for geeks

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If you haven't noticed, robots are making a heck of a comeback, whether it's the "BattleBots" on TV or the tamer variety, like the Lego Mindstorms robot.

Lego released the latest version of its Mindstorms robot kits, the NXT, last fall. And Lego and tech inventor Dean Kamen have come up with a great way to get kids interested: tournaments.

The First Lego League ([www.firstlegoleague.org](http://www.firstlegoleague.org)) spun off from an organization that Kamen founded to get kids excited about technology. Kids ages 9 to 14 design robots and use them to compete in the tournaments. The league has grown to more than 77,000 kids on more than 8,000 teams in 35 countries worldwide.

The Lego Mindstorms robot construction kits are gender neutral and represent a balance of the fun of a build-your-own toy with the depth of an educational tool. About 35 percent of the team members are girls.

Since the first Mindstorms robots debuted in 1998, they have become a hit because hobbyist-fans built tournaments, like those run by the First Lego League, around it. The 8-year-old robot kits were still selling about 35,000 a year (with no advertising) when Lego released NXT in September.

"A lot of the ones that came before it required electronics savvy," said Tandy Trower, general manager of Microsoft's new robotics software business, which just released software that enables Mindstorms programs to be run on other robots. "Here, you use building blocks."

Lego tapped the Mindstorms fans to help design the new robot kit. The new NXT model has a smarter brain with a 32-bit ARM microprocessor that replaces the older 8-bit RCX brain. You can attach motors with gears to it and equip it with sensors that can detect sound, touch, light or ultrasonic waves.

The older robots could handle only three sensors at a time, while the new one can handle four. The whole point is to build it your own way and experiment.

"The robotics team seems like a good environment to stimulate a kid who has that kind of `engineering creativity,'" said Linda Swenberg, an engineer and mother of a girl on a Silicon Valley team that calls itself the Robochicks.

I know this because I heard the deafening screams as my 10-year-old daughter, Tanya, and five other girls -- Nadine, Meredith, Emma, Emily and Maya -- on the Robochicks edged out another team in a recent tournament.

The team spent the past several months in preparation as they programmed the Lego Mindstorms NXT model to perform nine different tasks in 2 1/2 minutes. Watching the tournament -- and the preparation for it -- gave me some insights into how Lego has engineered something masterful, and how building a social network around a device makes it far more appealing.

"The aim is to get kids interested in something that they wouldn't ordinarily know anything about," says Michael McNally, brand relations director for Lego. "At the age of 10, it's not typical for a girl to be excited about science and technology."

In Silicon Valley, the air is thick with the belief that kids need to understand technology in order to do well in life.

Parents worry that children may drop out of the science and math track too early. Sticking with these subjects until there's a big payoff isn't an easy thing to sustain, particularly for young girls who haven't historically been nudged toward technology pursuits.

As with any tool, how you introduce it matters. If you tell your kid this \$249 robot is good for them, it will just gather dust in the closet. It's a sophisticated piece of technology (aimed at 10 years and up).

The girls on the Robochick team had two engineer coaches, Eddie Kessler and Jonathan Sweedler, who volunteered their time for three months of training. By reading Lego materials and fan sites, they were able to teach the team about the robots without prior experience.

Within a few meetings, they were building robots. They didn't look cool or sexy. They just got a job done. The league provided a theme, "nanotechnology," and it came up with the tasks the robot had to perform, like dropping a ball into a very small slot. The Robochicks and the 11 other teams in the tournament had to create a robot that could do all the jobs quickly.

They programmed it with a laptop; either a PC or a Mac works with the NXT. The programming is intuitive and visual. Using a mouse, they simply drag a block and drop it into a chain of other blocks on the PC screen. Each block executes a command, such as telling the robot to move forward.

When they're done, they save the program and download it into the NXT brain of the robot with a universal serial bus (USB) cable, which is standard on most computers. Lego turned to National Instruments in Austin to come up with the user-friendly software. Lego says the better software allows someone to design a robot in less than half an hour.

The NXT also has Bluetooth, or short-range wireless communication. The combination of Lego bricks and other objects allows for the creation of more durable robots than was possible in the past. There are three new types of servo-motors, which control the mechanical movement of the robot. You can even program a handheld device or mobile phone as a remote control.

The tough part is that the robot didn't always do what it was supposed to do. The girls learned this at the tournament, where a program that told the robot to move a pile of bricks from one place to another went haywire. With just 20 minutes to spare, they had to fire up the laptop and rewrite the program on the fly. The troubleshooting was hair-raising.

They fixed the robot and won. But the programming lesson is that you have to plan for backups and for things to go wrong. It's a good lesson that Sweedler and Kessler say is important for all engineers to know.

Technically, the skills kids pick up from the NXT are secondary. They learn a programming language. The value of the technical know-how itself seems fleeting.

More lasting are lessons of teamwork, project management, learning something hard and troubleshooting. An ordinary toy can't teach all that. The robots by themselves are just things. But put together with the nonprofit tournaments, they become much more powerful. It seems to me that Lego, founded in 1932, has figured out a way to make itself relevant for a long time to come.

"This program is a way to get them early and keep them in," said Alison Ross, one of the coaches at the Nueva School in Hillsborough, Calif. "It's a technology head start."

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For more information on leagues, check out these links: [www.usfirst.org](http://www.usfirst.org) or [www.firstlegoleague.org](http://www.firstlegoleague.org).