



**STATE BUDGETARY  
EDUCATIONAL INSTITUTION  
SCHOOL NO. 1557  
MOSCOW, RUSSIA**

## **LEGO® MINDSTORMS® Education EV3 Boosts Learning for 20 Years and Counting**

*“I have very important advice for people who begin to work with LEGO® MINDSTORMS® Education EV3,” says Lydia Beliovskaya, IT Teacher and Robotics Project Manager at the State Budgetary Educational Institution School No. 1557 in Moscow. “If you want to test the algorithms of system operation, explore mechanics, know the theory of automatic control, clearly test created programs, all while working on a team, this solution is for you.”*

Lydia knows because she has been using LEGO MINDSTORMS in the classroom with her students for 20 years, working with Control Lab, RCX NXT, and EV3. Her first *FIRST®* NTTM exhibition contest was in 2001 at the All-Russian Exhibition Center. Her students’ energy-saving ventilation project won a silver medal.

She likes LEGO MINDSTORMS for its simplicity and wide range of applications. At the beginning, she says, the students could program and design models using NTTM. But these activities were labor-intensive and time-consuming. Only those who were familiar with LEGO® could create “living robots,” seeing their ideas come to life. With LEGO, it was easy and fast for the students to carry out their ideas.

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LEGO® Learning at  
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**About LEGO Education**

From preschool to middle school and beyond, LEGO Education provides a continuum of hands-on, playful learning tools that engage every student’s natural curiosity and help them develop the skills and confidence they’ll need in the future.





“You do not need to learn the constantly changing and quickly evolving elements of equipment,” Lydia says. She prefers developing new topics with her students, practicing methods of teaching programming, designing, or exploring with machine vision. Her approach is to get students started quickly in engineering.

Working with LEGO, the students acquire design skills as they create a working prototype. “This kind of activity is new and unusual for teenagers,” Lydia says. “LEGO gives us happy moments, with students shouting, ‘Hurrah! We have it! It works!’”

Using LEGO MINDSTORMS helps students understand why they need mathematics and physics, Lydia says. They need these concepts to build something from their ideas. Students are proud of their work. The projects encourage them to boldly start making and to not be afraid to try and fail.

Lydia’s students are deeply involved with their projects. And they tend to stay involved. Almost all of her former students have graduated from universities, and work in fields related to technology and programming. They work in a range of areas, from microsurgery to face recognition to underwater robots. Many of them teach at robotics schools and summer camps using LEGO products.

One memorable project was a student-designed model of a tomograph, also known as an x-ray machine. This work was presented at a contest held at Moscow State University, where it gained much attention. After that, numerous medical tomographs appeared in Russia. Lydia believes it would be great to do models like that for all vocational schools, where students are taught to repair tomographs.

Projects Lydia’s students have worked on also include agricultural robots, nanorobots for removal of cholesterol plaques in blood vessels, and cranes for sorting hardware. They have made huge robots to gather tomatoes of different ripeness and built installations for the study of rainbows. One project that particularly delighted Lydia was the creation of pneumatic manipulators with a large stand for loading. “Everything worked perfectly,” she says, “Well-fastened with unimaginable children’s fantasies and contrary to all laws of mechanics.”

Today’s students are seeking their place in a high-tech world, Lydia says, trying to decide what they need to learn to be successful in the future labor market. Teachers are challenged to motivate students with a learning process that leads to the development of their abilities and life interests. “Teaching should be exciting,” she says. “And with LEGO Education solutions, we learn enthusiastically.”