

00:00:12 – Program Title: "Bolshaya Studiya (Big Studio)"

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The future belongs to engineers and inventors, according to the Government of the country. Prime Minister Mikhail Mishustin announced that children will join the advanced engineering schools, which were established based on universities last year.

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Vladislav Chukhrov: From their school years, they will be able to participate in projects and delve into all technical processes.

Margarita Khizhnyak: This is the talk show "Bolshaya Studiya (Big Studio)." My name is Margarita Khizhnyak.

Vladislav Chukhrov: I'm Vladislav Chukhrov, hello. In the Chelyabinsk region, there are currently no such advanced engineering schools.

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Vladislav Chukhrov: Unfortunately, we did not pass the selection last year. However, there are all chances for their creation this year.

Margarita Khizhnyak: Especially since technical specialties have long been a priority in the South Urals due to demand from enterprises.

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Margarita Khizhnyak: In our region, technoparks and quantoriums are actively operating, and in small towns and villages, additional education centers called "Tochki Rosta (Points of Growth)" are opening. Schools for young inventors and stations for young technicians are being established.

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Vladislav Chukhrov: In our studio, we'll explore what inventions schoolchildren and students are creating right now, how one can learn these skills, and where to apply them. Engineers are the new rock stars. That's the theme of our program today.

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Vladislav Chukhrov: And Liliya Emelyanova, director of the IT Lyceum "Privilege," is here. Hello. Andrey Mironov, an instructor at the School of Young Inventors. Hello. Ivan Schmidt, director of the Young Technicians Station in the city of Kopeisk. Good evening.

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Margarita Khizhnyak: And also, Yulia Bolotina, deputy vice-rector for academic affairs at South Ural State University. Hello. Igor Suetin, a student of the Quantorium Technopark. Hello. And also, Vladislav Kharlamov, director of the Center for Technical Creativity, Chelyabinsk region. Hello.

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Margarita Khizhnyak: And before we start our conversation, we'll probably touch upon the topic of educating the youngest engineers who practically absorb the basics of physics and design from the cradle. And today, we have a representative from the School of Young Inventors, Andrey Mironov, as our guest.

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Margarita Khizhnyak: Before we start our conversation, I still want to show a short story about how classes are conducted in this school, and what children are taught there. Let's take a look.

00:02:12 – Beginning of the recorded story

Andrey Mironov: Our educational kits allow children to practically explore everything they learn in school. For example, they study sunlight and assemble a real telescope, learn about radio waves, and assemble a real walkie-talkie for communication.

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Andrey Mironov: Our program is very comprehensive, consisting of 50 kits, which I will show you now. Here are all the inventions of humanity that have been made, all arranged in this program in sequential order. This is our kit. The second in the program is clay.

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Andrey Mironov: It includes a really powerful pottery wheel that can be used for work. Additionally, in this kit, there is a real kiln for firing the creations. In this kiln, the temperature reaches 2000 degrees. (Alexey Inkin's note – 1200 degrees).

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Andrey Mironov: Well, let's start refueling our car with a heat engine. Take out the magnets, and open the little lid. Don't insert the wick, along the wall, or on the glass, insert it under the cap.

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Child: I light the wick.

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Child: It may seem like it's spinning on its own without any interaction, but in reality, there are many factors at play here.

Andrey Mironov: By heating the air in this cap, it expands and pushes the piston.

00:03:44 – End of the recorded story.

Vladislav Chukhrov: So, what's for 50 kits, I would probably have become an engineer if I had had 50 kits in my childhood. Andrey, what are these kits? And are the children very young there? From what age do they come to you?

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Andrey Mironov: Well, we have children of different ages coming. The main thing is that they should already be able to read more or less. This is from 6.5 years old to 14 years old, absolutely.

Vladislav Chukhrov: What are these kits? What does 50 kits mean in general?

Andrey Mironov: 50 kits – all these kits cover all the issues of the material world. That is, it's physics, you can study, mathematics, or chemistry – the child learns all of this from these areas.

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Margarita Khizhnyak: So, from the firsthand, so to speak. If, for example, he doesn't know how to light matches. We saw that some of them carefully draw on them, and it's also very important – to learn basic things under supervision, so to speak, to try out all these elements and embody them in action.

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Vladislav Chukhrov: And at the same time, find out how the air heats up and what happens when the air is heated.

Margarita Khizhnyak: By the way, what happened? I know that you have prepared for us the contents of one of the kits, and it is directly related to this steam engine.

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Andrey Mironov: Yes, that's correct. This device is from the "Heat Engine" kit. The child gets acquainted with this device. Takes it out and conducts experiments.

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Andrey Mironov: So, here the child... Can we start already?

Vladislav Chukhrov: Yes, show it so that our viewers understand.

Andrey Mironov: The child takes all this, and connects the tube.

Margarita Khizhnyak: Is there an instruction too?

Andrey Mironov: Yes, for sure. In each educational kit, there is a textbook through which the child goes through the lesson.

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Andrey Mironov: The child connects all of this.

Margarita Khizhnyak: Is this an empty flask with air in it?

Andrey Mironov: Yes, an empty flask, here we have air. The child gets acquainted with this device. What is this called, what is that called?

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Andrey Mironov: Here we have a manometer; a syringe with a piston; a valve that opens and closes the air. And then we ask the child to lower this bottle into hot water and see what will happen.

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Margarita Khizhnyak: Okay, we've lowered it. This is hot, right?

Andrey Mironov: Yes, it's definitely hot. I've already checked. And the child observes what is happening here. He looks at this device, the manometer, and here the pressure starts to rise.

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Andrey Mironov: And the air starts to push this piston when heated. Initially, we don't tell the child what is happening here. He just experiments. After that, we ask the child to lower our bottle into cold water and observe what will happen.

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Andrey Mironov: The child sees that something is happening on the manometer here, the arrow is moving in the opposite direction. The piston goes down.

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Margarita Khizhnyak: And what does this teach a child, a future constructor?

Andrey Mironov: Gradually, the child begins to understand that when the air in this bottle is heated, it begins to expand. And when he lowers it into cold water, the air begins to contract. And the piston goes down, and the pressure goes down.

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Andrey Mironov: So, thanks to this, the child learns that during cooling and heating, the air either expands or contracts.

Margarita Khizhnyak: And then can this be used in a practical field somewhere?

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Andrey Mironov: Exactly, yes. We draw an analogy with a real car, a gasoline engine. We have only this heat engine, where, due to the heating of the air, the movement of this car occurs. And the child learns how the engine works.

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