SCHOOLS 2030

HOLISTIC
LEARNING
INNOVATIONS

# ENRICHING SCIENCE LABS WITH LOW-COST RESOURCES

Country: Tajikistan

Target Age: 15 Years

Learning Areas: Biology | Chemistry | Collaboration | Communication | Creativity

## THE CONTEXT

School #9 in Bokhtar City  is located in Bokhtar, Tajikistan, the regional capital and largest city in the Khatlon region. The school is situated amidst residential buildings, a local theatre, markets, and mini shops. It serves 1,830 students.

One of the biggest challenges for the school, and a key priority, is addressing the lack of practical resources needed to conduct science and chemistry experiments in the school's laboratory.


School #9, Bokhtar, Khatlon region, Tajikistan
Photo by Safarbek Qalandarov, DED of Khatlon

The 'Human Torso' model designed by Huseyn Yuldoshev
Photo by: Najiba Temurshoeva, AKF Tjk

Teacher and studnets during the design process
Photo by: Safarbek Qalandarov, DED of Khatlon

THE CHALLENGE

# How might we Improve students' competencies in science with limited resources?

**Assessment:** Through classroom assessment, the teacher identified that most of the students show a lack of interest in the subject, they struggled to understand tasks and reactions related to biology and chemistry subjects.

**Interviews/consultation:** Through conversations with students and other teachers in the school, it became clear that most of the students in the school lacked hands-on, practical learning tools that would enhance their understanding of scientific concepts.

*"Through experiential learning the lessons in the classroom become a lab for life skills."*
*Sarvinoz Tavurova, biology teacher at school #9, Bokhtar, Khatlon, Tajikistan*

THE SOLUTION

# ENRICHING SCIENCE LABS WITH LOW-COST RESOURCES

The idea to tackle this challenge was to develop biology and chemistry practical resources from low-cost materials and use them in lessons.

Students and teachers have jointly created various models and tools that allow them to understand the topics not only theoretically but practically as well.

One example is the **'Human torso'** made by students and the teacher from low-cost materials (bottles, medical drip and syringe, cardboard etc). It shows the movement of organs and real processes producing artificial blood and oxygen using a chemical reaction.

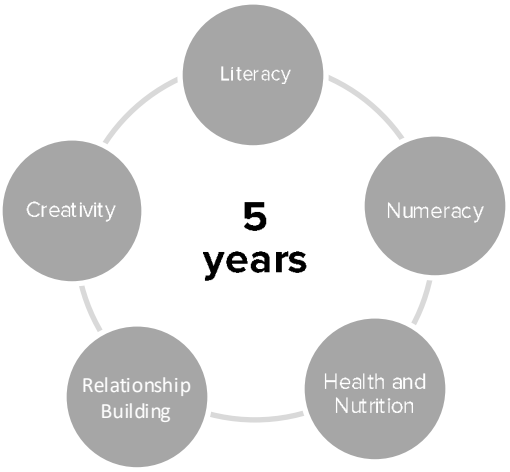
Similarly, students produced chemical reactions using fruit and vegetable ingredients and explored how different types of fruits and vegetables influence bodily health and wellbeing.


Huseyn Yuldoshev at the National Forum "Innovative Teacher" held in Khujand, Tajikistan
Photo by: Najiba Temurshoeva, AKF Tjk


Huseyn Yuldoshev presenting his design solution to the evaluation committee at the National Forum "Innovative Teacher" held in Khujand, Tajikistan
Photo by: Najiba Temurshoeva, AKF Tjk

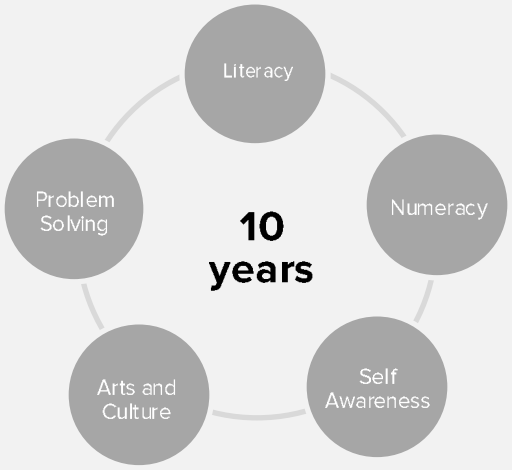
# Competencies Targeted

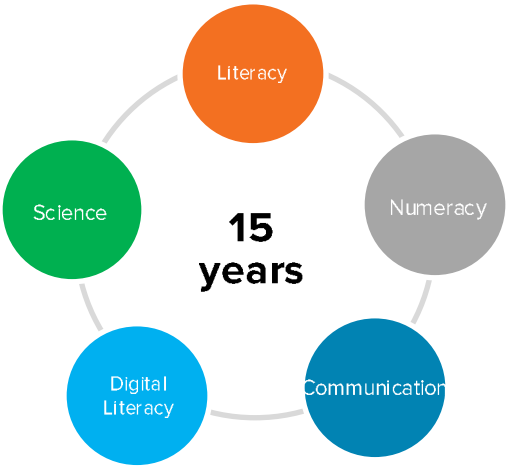
The graphics below show the selected domains that Schools2030 Tajikistan have prioritised for each age group, in line with national curricula. Highlighted are the domains that this specific solution addresses.




## 5-year-old Domains

## 10-year-old Domains




## 15-year-old Domains

*The solution also targets:*

- *Collaboration*
- *Creativity*
- *Problem-solving skills*

Students implementing various models during biology classes.
Photo by: Safarbek Qalandarov, DED of Khatlon

Students applying their theoretical knowledge practically during chemistry classes.
Photo by: Safarbek Qalandarov, DED of Khatlon

# THE IMPACT

## Improved creativity, enriched lessons, better collaboration

The solution has been implemented for the duration of 1 year in the school in 4 classrooms with more than 120 students.

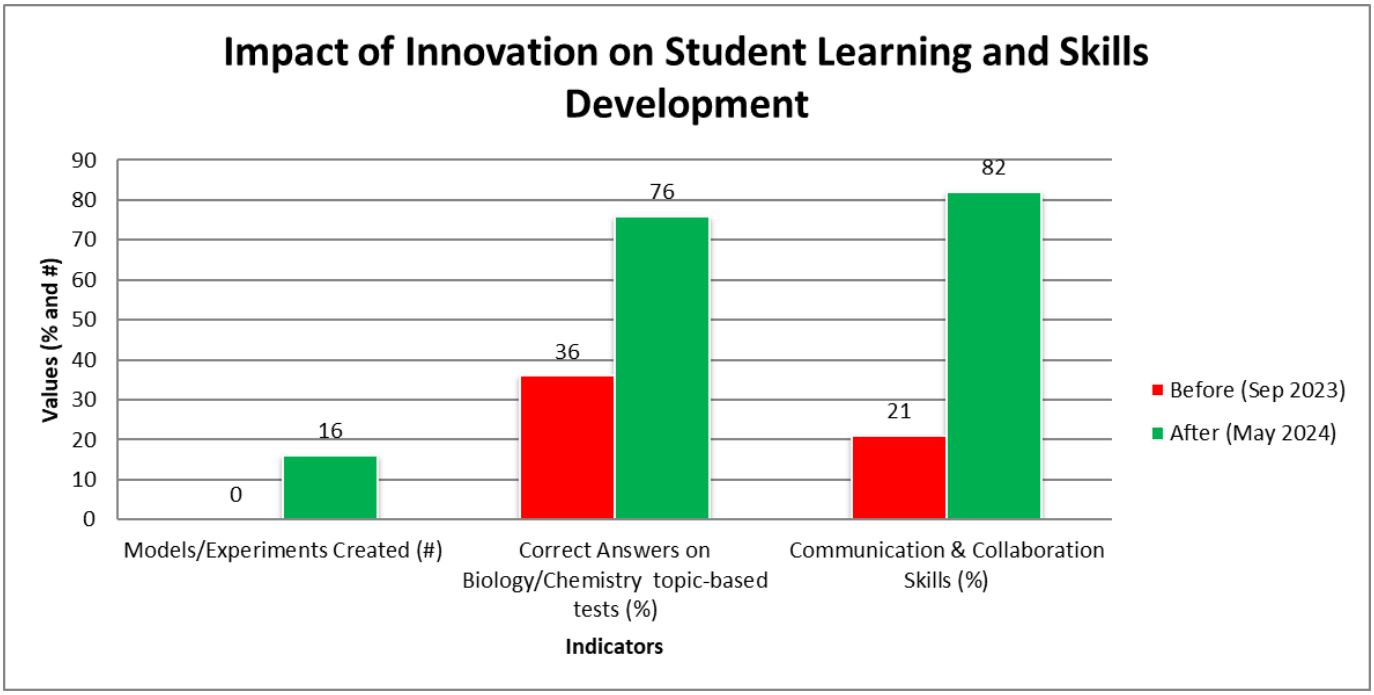
As a result of these practical lessons and model-making, students can understand, discuss and present each topic of biology and chemistry in detail.

Conducting regular practical experiments increases students' interest and applying their theoretical knowledge practically helps with comprehension of difficult concepts.

Students also developed interest and confidence in experimental and research activities and progressed through team-work and collaboration competencies.

*"I used to struggle and not enjoy science classes as much as I expected. However, using the 'Human Torso' and other models we made with our teacher helped me realize that science can actually make concepts clearer and connect to real life through hands-on experiments."*
*Madina Samadova, 9 grade student, Bokhtar, Khatlon, Tajikistan*

## THE IMPACT (CONTINUED)




Data source: Photos with 'Human Torso' and fruit-based reactions; pre and post test of students conducted by teacher, teacher observation and interviews.

# Meet the Teacher

**Huseyn Yuldoshev**

*Biology and chemistry teacher at school #9, Bokhtar city, Khatlon region, Tajikistan*

- I have been in my current role for the past 13 years
- As a teacher, I usually get motivation from great educators' sayings about the importance of teachers such as: "Teaching is not a profession, it is love. If you regard it as a source of income, then leave it. But if teaching is your love, then congratulations!" I also regard my profession as LOVE!
- I believe that education has the power to change lives, and I want to be part of that transformation in my school, community and country. My ambition as a teacher is to make a positive impact on students' lives by improving competencies, inspiring, empowering young minds and contribute to building a better future.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