Learn STEM

Innovative Model of learning STEM in secondary schools

School Education
ERASMUS+

KA220-SCH -
Cooperation partnerships in school education

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Learn STEM

STEM education IN Greece: Innovative approaches

Presentation
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"Innovative Model of learning STEM in secondary schools – Learn STEM"

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ERASMUS+ PARTNERSHIPS

IEK KAVALAS

STEM education IN Greece: Innovative approaches

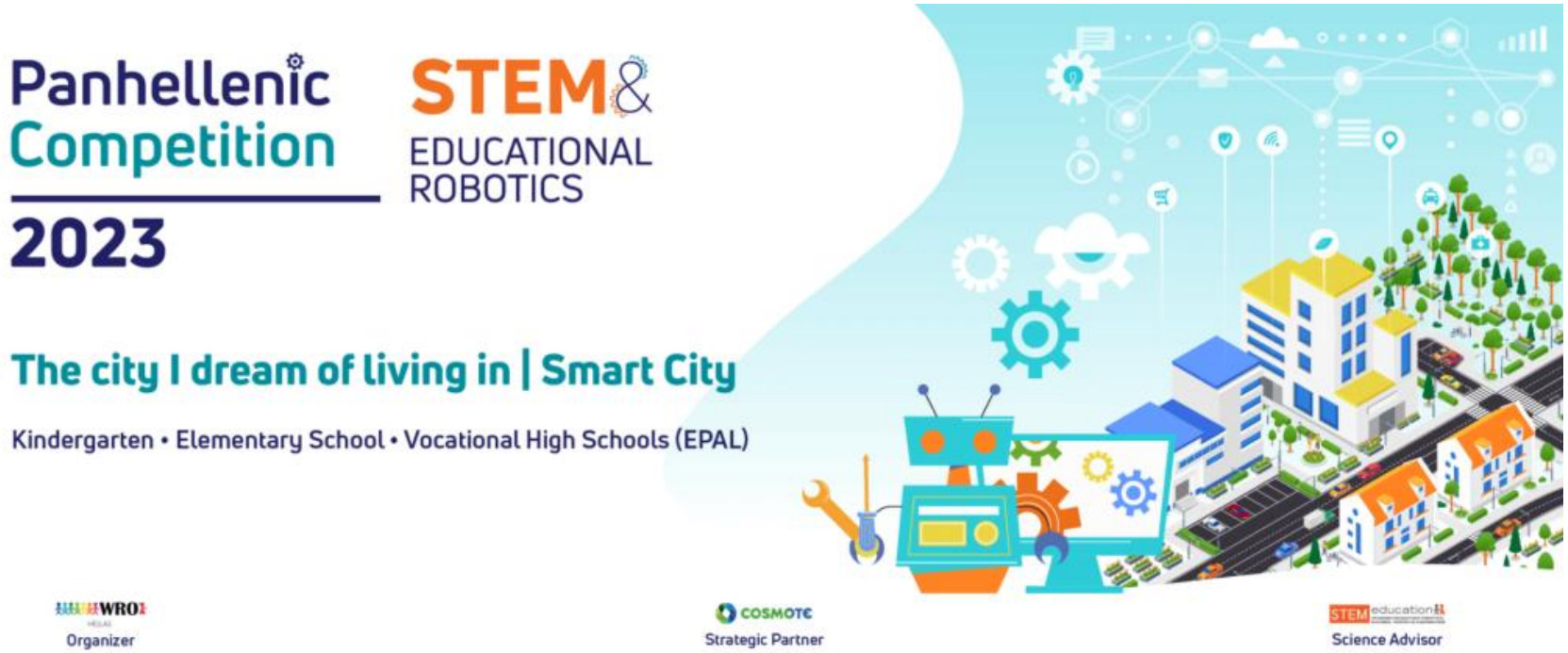
The importance of STEM education IN GREECE

Despite the absence of a comprehensive STEM strategy, important initiatives have been developed in recent years to promote STEM education at all levels, but mainly in secondary general education, and more systematically, in private secondary education.

Although these are, as a rule, isolated and piecemeal actions, their value and impact on the educational and student community, but also on Greek society as a whole, are extremely important, as on the one hand they increase students' interest in these scientific areas, on the other hand gradually introduce STEM teaching in schools.

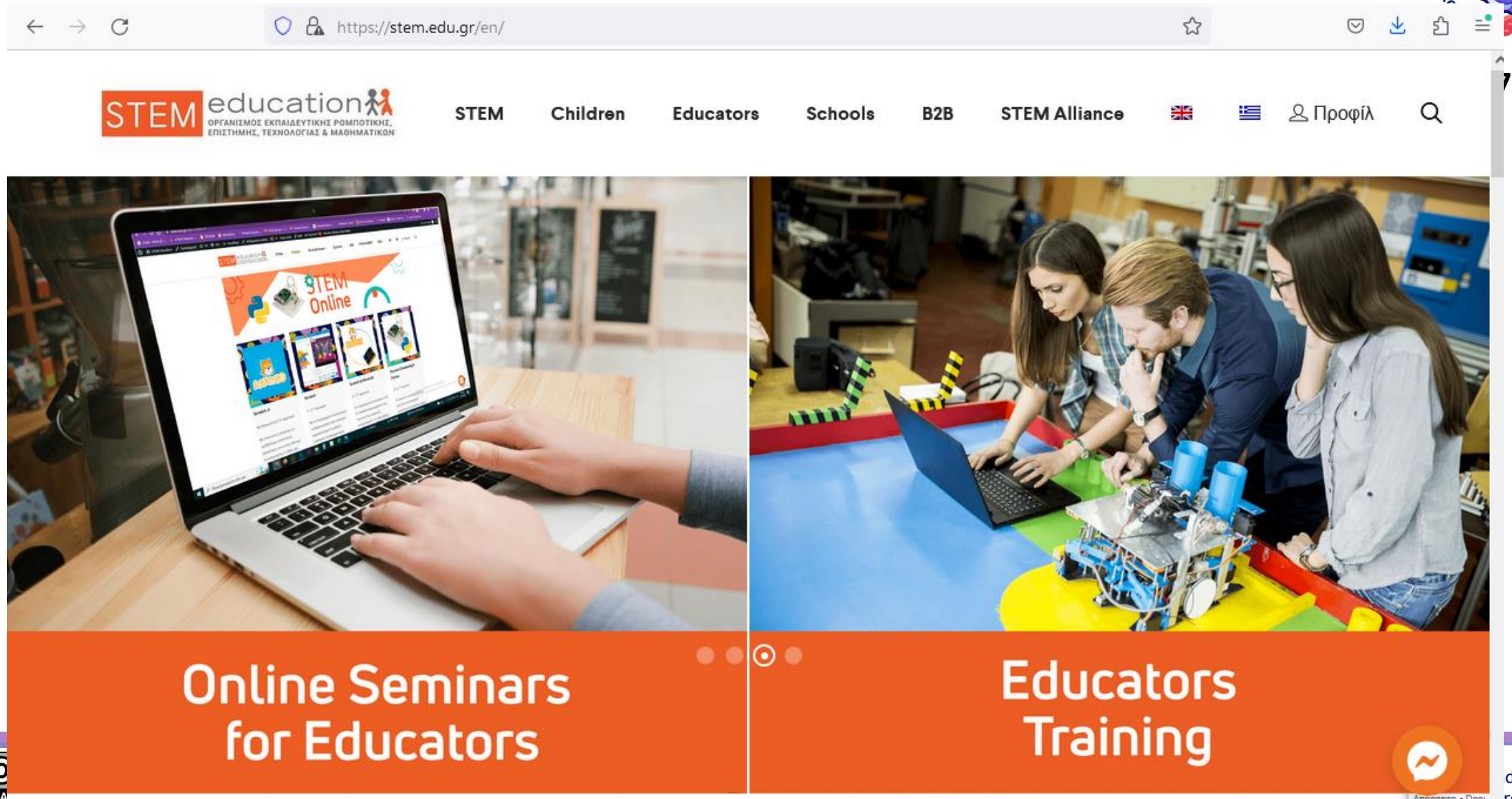
In the majority of cases, these actions are implemented with the assistance, or even with the initiative, of a private company or organization, such as, for example, Cosmote's strategic collaboration with the Greek branch of the Educational Robotics and Science Organization (WRO Hellas).

4 EXAMPLES ARE FOLLOWING:



Educational Robotics and Science Organization (WRO Hellas)

https://stem.edu.gr/en/



Brief description

The world of electronics is significantly influencing the environment in which we live. It is critical for children to understand basic electronic principles so that they have control over the technological environment around them and can make smart decisions. Basic electronics principles are not taught in the school curriculum.

STEM Education's proposed program fills this void in an interesting and entertaining way. How do a processor and its memory work, and how do they differ? How do device power supplies work, and what are the key elements by which we choose them? How do LED, neon, and fluorescent lights work, and how do we select a bulb? What antennas are used for wired and wireless data transmission? How are color and sound converted into data, and how are images and video displayed on screens?

The above were some of the questions that are answered during the program's fun activities.

Objectives

On completion of the program, students have:

become familiar with the basic principles of electronics,

created their own circuits to investigate the concepts of the project,

developed critical thinking and expertise about electronic devices they use in their everyday lives, answer real-world questions according to the STEM methodology.

- **Number of courses: 30**
- **Duration: 90**
- **Age range: Secondary School**
- **Subject/discipline or cross disciplinary:Engineering**

https://stem.edu.gr/en/

STEM education
ΟΡΓΑΝΙΣΜΟΣ ΕΚΠΑΙΔΕΥΤΙΚΗΣ ΡΟΜΠΟΤΙΚΗΣ, ΕΠΙΣΤΗΜΗΣ, ΤΕΧΝΟΛΟΓΙΑΣ & ΜΑΘΗΜΑΤΙΚΩΝ

STEM | Children | Educators | Schools | B2B | STEM Alliance | Προφίλ

Why STEM training

Teamwork

Children learn to work in teams at a very young age. Communicate, argue, disagree and cooperate.

Engineering

Children understand the simple and complex machines and their function. Thus, they perceive the usefulness of everyday machines.

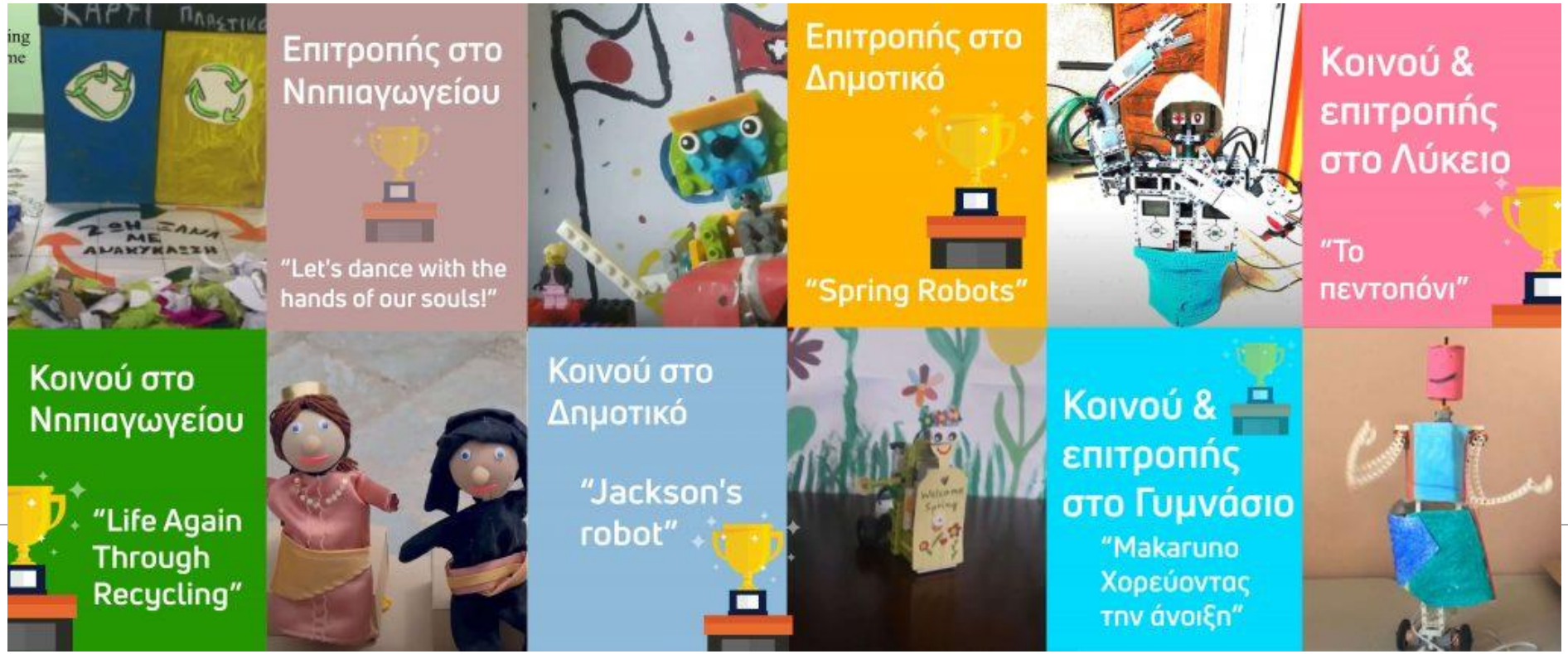
Problem solving

Main component of the STEM methodology is problem solving. Children seek the most suitable solutions to everyday problems.

Mathematics

Children learn, through activities, to think algorithmically. Mathematics becomes attractive because it is part of experiential

2nd EXAMPLE



FUTURE INNOVATORS

Educational Robotics and Science Organization (WRO Hellas), Greece, https://stem.edu.gr/en/

Brief description

The Future Innovators program consists of a series of projects that students will implement, thus understanding genuine problems and providing innovative solutions using cutting-edge technologies. These include technologies such as 3D design and printing, cloud computing, machine vision and artificial intelligence.

Through this program, students learn to design structures and parts of robotic systems in 3D applications, select and assemble the appropriate electronic parts (sensors, actuators, microcontrollers) and code using advanced practices and algorithms. They are also introduced to types and characteristics of data networks, as well as to concepts and methods from the field of artificial intelligence. At the same time, they develop communication skills by preparing presentations on their creations.

Objectives

On completion of the program, students have:

deepened their knowledge of cutting-edge technologies (robotics, artificial intelligence, etc.),

programmed complex applications by creating algorithms with a high degree of complexity,

designed and fabricated artifacts with 3D design and 3D printing,

develop presentation, problem-solving and innovative thinking skills through the project process.

- **Number of courses: 30**
- **Duration: 90’**
- **Age range: 15-18 years old**
- **Subject/discipline or cross disciplinar: Engineering, Technology**

3RD EXAMPLE

EDUCATIONAL ROBOTICS

SPARMATSETO, GREECE,

HTTPS://SPARMATSETO.GR/EVENTS/KAVALA-EKPAIDEFTIKI-ROBOTIKI/

EDUCATİONAL ROBOTİCS HAS BUİLT A SOLİD BASE OF THEORETİCAL, EPİSTEMOLOGİCAL AND PRACTİCAL PRİNCİPLES THAT ALLOW İT TO ACT AUTONOMOUSLY AS A MEANS OF EDUCATİON ADAPTED TO THE PARTİCULAR PRİNCİPLES OF EXPLORATORY LEARNİNG CHARACTERİSTİC THAT MAKES İT HİGHLY EFFECTİVE.

STUDENTS GET İN TOUCH WİTH EDUCATİONAL ROBOTİCS, İTS THEORY AND İTS MATERİALS. THEY EXPLORE A WONDERFUL WORLD, BUİLD AND PROGRAM ROBOTİC STRUCTURES THAT CREATE ART. ALL THİS WİTH THE ULTİMATE GOAL OF KNOWLEDGE AND ARTİSTİC AWARENESS OF THE PARTİCİPANTS.

Purpose and Objectives

The purpose of the program is to provide knowledge, skills and experiences regarding educational robotics, its methods, the applications it can have and its effectiveness. At the same time it is sought to provide the appropriate background which is necessary to engage the participants in a highly effective through training.

The goal of the program is to equip children with all the cognitive, methodological and practical skills that will allow them to delve into educational robotics, understand it and apply it by gaining useful experiences and mastering knowledge through robotics.

- **Age range: 14-15 years old**
- **Subject/discipline or cross disciplinar:**
  - **Physics (motion, friction, energy, pressure, forces, etc.)**
  - **Mathematics-Geometry (proportions, sizes, perimeter, angles, etc.)**
  - **Engineering (construction, assembly, stability, etc.)**
  - **Programming (sensors, algorithmic perception, digital intelligence, etc.)**

4TH EXAMPLE

R-Lab. · Εργαστήρι Physical Computing

ROBOMATHEIA, GREECE, HTTPS://ROBOMATHEIA.GR/

LEARNING THE SECRETS OF THE INTERNET OF THINGS (IOT)

BRIEF DESCRIPTION

THIS EDUCATIONAL PROGRAM INTRODUCES STUDENTS TO NEW TRENDS IN COMPUTER SCIENCE AND COMMUNICATION, EQUIPPING THEM WITH HIGH-LEVEL SKILLS.

STUDENTS LEARN TO PROGRAM COMPUTING DEVICES AND BECOME FAMILIAR WITH SENSORS AND ELECTROMECHANICAL STRUCTURES (IOT), SOLVING EVERYDAY PROBLEMS USING ROBOTIC AUTOMATION, THUS CONNECTING COMPUTERS WITH THE PHYSICAL WORLD (PHYSICAL COMPUTING).

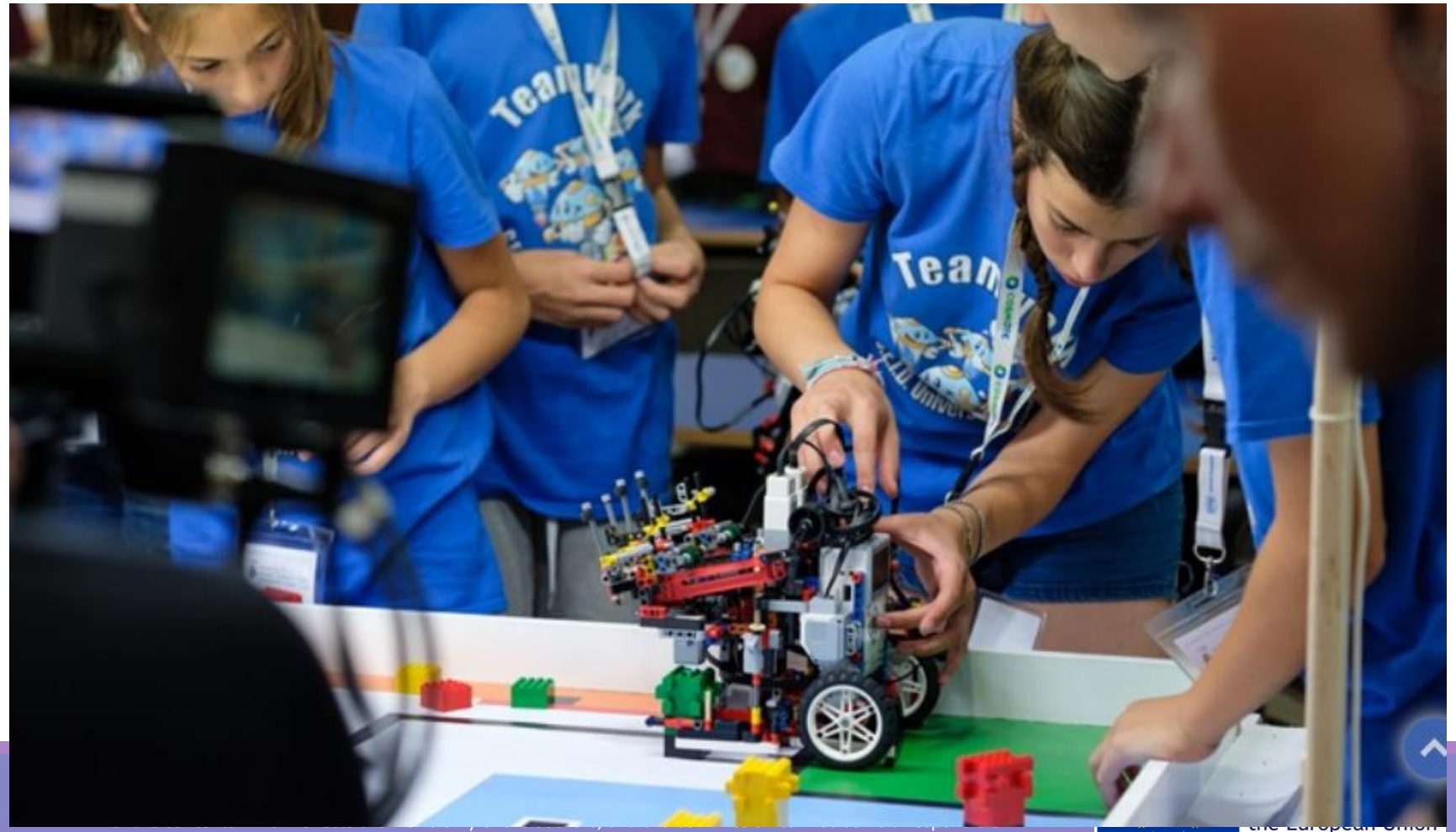
Objectives

On completion of the program, students have:

- Cultivating algorithmic thinking.
- Development of imagination and creativity.
- Improving self-esteem and confidence.
- Analytical and Synthetic Thinking - Formation of Critical Thinking.
- Cultivating a collaborative spirit and communicative clarity.
- Searching for information and acquiring new knowledge.
- Search and find solutions to real, everyday problems.
- Innovation - Familiarity with the possibilities and applications of new technologies.
- Incorporating school material in an experiential way.

- **Duration: 60’**
- **Age range: 12-19 years old**
- **Subject/discipline or cross disciplinar:**

  Science,
  Computer science,
  Arduino,
  Raspberry Pi,
  micro:bit



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