STEM education
ORGANIZATION OF EDUCATIONAL ROBOTICS, SCIENCE, TECHNOLOGY & MATHEMATICS

STEMATHLON SAUDI ARABIA 2026

"*From Human to Artificial Intelligence*"

Open STEM Category (Grades 1–4 of Primary School)

Rules

1st Edition (September 2025)

The image was created using AI tools

Authors: Michalis Mpakaloglou, Anna Koumara

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A. Description

Since the dawn of civilization, humans have been forced to use their minds in order to… survive, and later, to improve their standard of living. But even in modern times, think about what is necessary for us to live!

At first, humans became farmers, herders, and fishermen — that is, they developed primary production — so that they could create a permanent home with a steady source of food. Soon, they needed sources of energy to cook and, later, to preserve their food. Devices, increasingly advanced both mechanically and electrically, helped make the whole process easier and more reliable.

But for humans, with their restless and exploratory spirit, the safety of a permanent home was not enough. They wanted to discover the world and exchange products with distant regions. Thus, they developed a system of exports and imports, transporting goods and people. Here too, energy plays a key role in making travel safer, more ecological, and faster.

All of this shaped the culture of each region and era, becoming part of a person's identity within a larger whole. With pride, it was carried either by those who migrated in search of a better life or from one era to the next, passed down from generation to generation. Art, in all its forms (painting, sculpture, music, dance, photography, video, etc.), helps transmit the message and preserve identity across distant places and future times.

For this category, create a scenario proposing an original solution to a problem that humans faced. Depict it by building mechanisms, and we look forward to hearing your story!

Note: Although this category does not include the use of artificial intelligence in automations, you may use AI tools in your presentation. For example, children can create avatars of themselves using applications such as avatarmaker.com (Important: since this involves children, use a program that does not require a photo or personal data), or they can make a video using AI (e.g. animaker.com), or edit a poster with it (canva.com).

A.1 Themes

This year's thematic units can be drawn from Maslow's pyramid of human needs. In this pyramid, we see five levels defined by the theory of hierarchy of human needs, starting from the basic/primitive to the mature/"civilized." For a person to move from the 1st to the 2nd level, all the needs of the 1st level must first be fully met. For example, if we do not have a place where we can sleep, eat, and stay warm — such as a home — we cannot begin to think about making the surrounding area safer, engaging in entertainment, developing friendships, art, culture, and many other things.

Maslow's hierarchy of needs

Which level would you like to focus on?

Examples:

- **Food cultivation**
  - Agricultural tools
  - Irrigation and water supply
  - Processing
  - Recycling
- **Infrastructure**
  - Building construction
  - Energy, water, air, fuel supply networks, etc.
  - Telecommunications
- **Transportation**
  - Road, bridge, tunnel construction
  - Port and airport runway construction
- **Well-being**
  - Engagement with art and exercise
  - Tourism
  - Play
- **Safety**
  - Alarm systems
  - Security doors, safes

B. The Challenge

Encourage your students to study the themes of the competition, focusing on everyday problems that require mechanical solutions from the past, present, and/or future.

Your team needs to work on a project that includes at least three mechanisms using simple machines, at least one electric motor connected to a battery holder.

What matters is not the destination, but the journey—especially when the tools used along the way include all the simple machines! Organize a port — ancient, medieval, or modern — with cranes and the other machines required for its operation; build a functional sail for a sailing boat; or construct a car with a differential and Ackermann steering.

Think about road networks, from antiquity to the present, railway or tram tracks, as well as traditional bridges. Discover traditional cultivation or cooking techniques from your region and either recreate them or show us their evolution with the help of technology.

What is the difference between a windmill and a wind turbine? Are there traditional musical instruments you could build?

Evaluation Criteria

Projects will be evaluated based on the following:

- Functional representations that are original and, as far as possible, realistically applicable solutions.
- Demonstration of a fully functional project according to the specifications described in sections B.1, B.2, B.3, and B.4.
- The recommended equipment can be found in Appendix B at the end of this document.
- **Attention**: Projects will *not* be evaluated if they:
    1. Are not relevant to the competition's theme.
    2. Include only automations.
- Proper presentation of the project, which should include:
    1. Oral presentation supported by all team members in a spirit of cooperation.
    2. Correct answers to the judges' technical questions.
    3. Complete documentation of the project with printed or digital supporting material.
- **More detailed information regarding the evaluation and competition day can be found in section D.**

B.1 Description and Rules of the Three Mechanisms

- A mechanism is a construction with moving parts that achieves a clear result for the purpose for which it was designed, using simple machines.
- These three mechanisms must:
    1. Contain at least two simple machines (in addition to the axle).
    2. Be able to move either manually or with a motor.
    3. One of them must include a motor with a switch for its operation.
- During the competition presentation, the mechanisms may be pre-built and pre-assembled.
- For each mechanism, the corresponding table from Appendix A must be filled.

B.2 Participants & Teams

- Your team consists of:

    1. **The coach** (over 20 years old).

    2. **3–6 students** who, in the current school year, are in Grades 1–4 of primary school.

- The coach must be over 20 years old, always accompany the children, ensure their safety and needs, and cooperate with the organizers. The coach has the responsibility to set an example of good behavior and to promote fair play among the students, parents, and other participants. They are responsible for the conduct and attitude of their team.
- Each team must include **3–6 students** from Grades 1–4 of primary school during the current school year.

B.4 Technical Specifications of Presentation Space / Booth

At the competition, each team will be provided with:

- A space of approximately **1.5 m x 1.5 m**, where all project materials must fit.
- In this space, there will be a table of about **100 cm x 60 cm**, and electrical power will be available. The project model must not exceed the dimensions of the table.
- Posters may be placed on the **back wall of the booth** (about 2 m high) or may be held by the team during the presentation.

B.5 Types and Examples of Simple Machines

Simple machines are parts of the mechanisms you aim to build. The most fundamental of these are the following six:

Wheel and axle / Gear	Pulley	Lever
Wedge	Screw	Inclined plane

We can find them in many objects that children use — at home as STEM educational toys, and at school as educational material.

Gear

Pulley

Lever

Wheel and axle

Screw

Inclined plane

Wedge

Scissor lift
(Lever, screw, rack gear)

Hand-operated winch with wire rope
(Gears, ratchet, axles, screws, and lever)

C. Deliverables

C.1 Team Portfolio

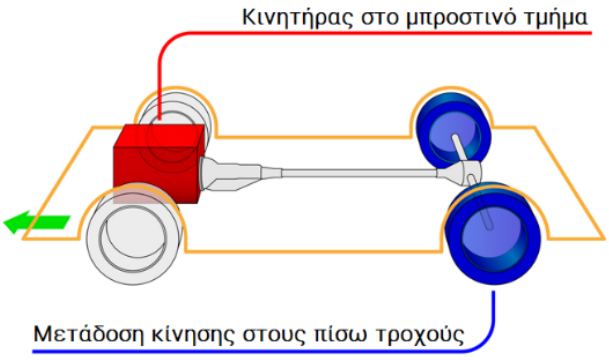
At least 7 days before participating in the Regional Competition of their area or the National Final, teams must complete the upload of their portfolio. This is necessary for the judging committees on competition day and for the free sharing of best practices within the educational community of Greece.

Steps for uploading the portfolio:
Detailed instructions will be provided later.

Required contents of the portfolio:
On the day of the competition and during the presentation, each team must also submit to the judges a folder or spiral-bound file (A4 size) containing materials from categories 2, 4 and optionally material from 3 and 6.

1. **Consent Forms:** Documents with parental consent for the use of photos or videos in which students' faces may appear (special printable forms will be available on the competition website).
2. **Team Report**: The Team Report form and one table for each mechanism presented (provided at the end of the regulations).
3. Photographs: Clear photos showing the stages of construction, especially the construction of the mechanisms.
4. **Sketches:** Sketches of the simple machines used in the mechanisms, either in digital form (PDF, JPG, PNG) or as digital photos of drawings on tracing paper (details provided in the webinars, available live or recorded)..

   Example: a digital sketch of a construction with the simple machines used clearly marked.



5. **Video:** At least one video in which the students demonstrate and describe the functioning of the mechanisms, with emphasis on the simple machines used. The video should include zoom-ins to clearly show construction details both when paused and in motion.
6. **Additional Material:** Posters, presentations, and any other project-related material.

D. Evaluation and Competition Day

D.1 Competition Procedure

Each team will have a limited amount of time for the evaluation of their project — approximately **seven minutes**. Of this, part (e.g., five minutes) will be for the team's presentation, and the remaining time for questions from the judges.

- Students will present the project they have created and explain how it relates to the competition's theme.
- The Team Report and the mechanism tables contain important information for the judges, which the team must present.
- A demonstration of the project's operation will take place, with emphasis on the presentation of the simple machines..
- The sketch will be presented through the digital or printed poster, with reference to the function and the problem it solves.
- Students will answer any questions from the judges about the project.

During evaluation, **no help or involvement of any kind from the coaches** is allowed.

D.2 Competition Day Procedure

During the (Regional or Final) competition, teams must:

- Set up their project in the space provided (including placing posters, sketches, etc.).
- Undergo inspection to ensure compliance with the rules.
- Demonstrate and present their project to the judges, answering their questions.
- Visit the booths of other teams, being mindful in case they are called back to their own booth.
- Demonstrate and present their project to students from other teams visiting their booth.

During the judges' presentation, the folder described in the deliverables must be submitted in **4 to 5 copies**.

D.3 Evaluation Process

There will be only **one round of evaluation** of the students' projects. After deliberation, the judging committee will award **special prizes to all teams** based on the aspects in which their project stood out.

Only teams whose projects **followed the specifications (section B)** and **submitted all required portfolio deliverables** will compete for the top distinctions and qualification to the international STEM Education competition.

The criteria for these awards are shown in the **evaluation table (section D.4)** and are linked to the achievement of one or more of UNESCO's **17 Sustainable Development Goals**.

To ensure the process is handled as effectively and efficiently as possible, it is important that the **team portfolios are finalized one week before the final**. The contents of the deliverables will be taken into account in the committee's deliberation.

D.4 Scoring Criteria

Categories	#	Criteria	Points
Idea Conception & Innovation	**A**	**Total points: 60**	
	1	Idea and creativity	15
	2	Research and development of the idea	15
	3	Applicable and high-quality solution to the challenge	15
	4	Originality of the idea	15
Educational Engineering	**B**	**Total points: 60**	
	1	Structural stability, aesthetics	15
	2	Mechanical performance	15
	3	Correct identification and terminology of simple machines	15
	4	Functionality of the mechanism	15
Construction Sketches	**C**	**Total points: 20**	
	1	Accurate representation of the framework of the constructions	20
	2	Accurate representation of the simple machines and the moving parts of the constructions	20
Presentation & Team Spirit	**E**	**Total points: 40**	
	1	Quality of the presentation	15
	2	Communication skills, collaboration	15
	3	Booth decoration, video, posters	10
		MAXIMUM SCORE:	**200**

APPENDIX A

Team Report Table

Table of Mechanism No. 1

Table of Mechanism No. 2

Table of Mechanism No. 3

Team Report

Team Name		
Coach's Full Name::		
Coach's Full Name:	**1.**	**2.**
	3.	**4.**
	5.	**6.**
Theme or Themes we are focusing on		
What are we trying to invent or improve?		
Where did we look for information?	Internet Libraries Museum Industry/Professionals Other:	
What solutions did you agree to attempt to build?		
How many mechanisms will you present?		
What difficulties and challenges did you encounter?		

Table of Mechanism No. 1

Mechanism's name:	
Problem	Solution
Photograph of the mechanism	Sketch of the mechanism
Simple machines used (circle or underline)	
Wheel & Axle / Gear ☐	**Screw** ☐
Pulley ☐	**Wedge** ☐
Lever ☐	**Inclined Plane** □☐
The mechanism is: Manual ☐	Electric-powered ☐

Table of Mechanism No. 2

Mechanism's name:	
Problem	Solution
Photograph of the mechanism	Sketch of the mechanism
Simple machines used (circle or underline)	
Wheel & Axle / Gear ☐	**Screw** ☐
Pulley ☐	**Wedge** ☐
Lever ☐	**Inclined Plane** □☐
The mechanism is: Manual ☐	Electric-powered ☐

Table of Mechanism No. 3

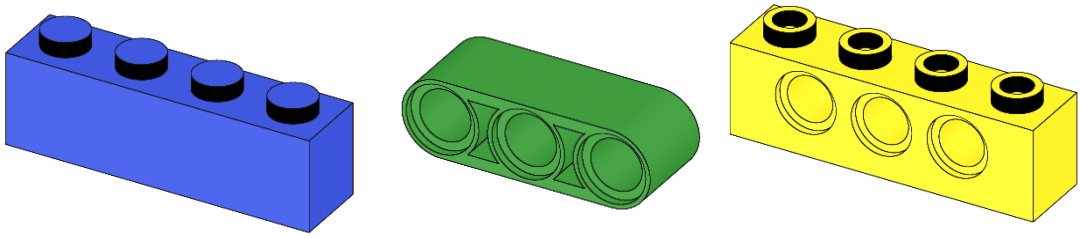
Mechanism's name:	
Problem	Solution
Photograph of the mechanism	Sketch of the mechanism
Simple machines used (circle or underline)	
Wheel & Axle / Gear ☐	Screw ☐
Pulley ☐	Wedge ☐
Lever ☐	Inclined Plane □☐
The mechanism is: Manual ☐	Electric-powered ☐

Appendix B

Build Parts

The structural parts of the mechanisms and the motors must be **Lego Classic, Technic, or hybrids**. Lego pieces from the students' own sets are allowed.

The following three pieces belong respectively to the Lego Classic, Technic, and hybrid systems.



Depending on what you are missing, see the suggestions in the site of the competition

Appendix C

Previous Webinars

Webinar STEM2025:
https://youtu.be/M_w1vqbskkk?si=iETHkn927I8zpSRI