Eco Engineers:
Coding for a Sustainable Future with Micro:bit

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Erasmus+

Sustainability in school and real life

- **Green Mobility & Carbon Reduction**: Promoting sustainable transportation and eco-friendly daily commuting (Choose to Walk).
- **Energy Efficiency & Conservation:** Optimizing power consumption and classroom climate control (Energy Saver & Light Map).
- **Waste Management & Circular Economy**: Auditing, tracking, and promoting classroom recycling habits (Recycling Audit).
- **Water Stewardship**: Monitoring and conserving water resources through smart technology (Plant Project).
- **Environmental Quality & Well-being**: Combating noise pollution to ensure a healthy learning environment (Noise Alarm).
- **Eco-Citizen Awareness**: Gamifying sustainable habits and driving behavioral change through student-led media campaigns (Green Challenge & Awareness Media).

Step 1: Team Formation & Clear Guidelines
Purpose of the activity- how to work- instructions

Step 1: The Intro

We are Team [Name] and we created the [Project Name. Our project focuss on Sustainability and specically on [Energy / Water / Waste / Mobllity.

Step 2: The Why?

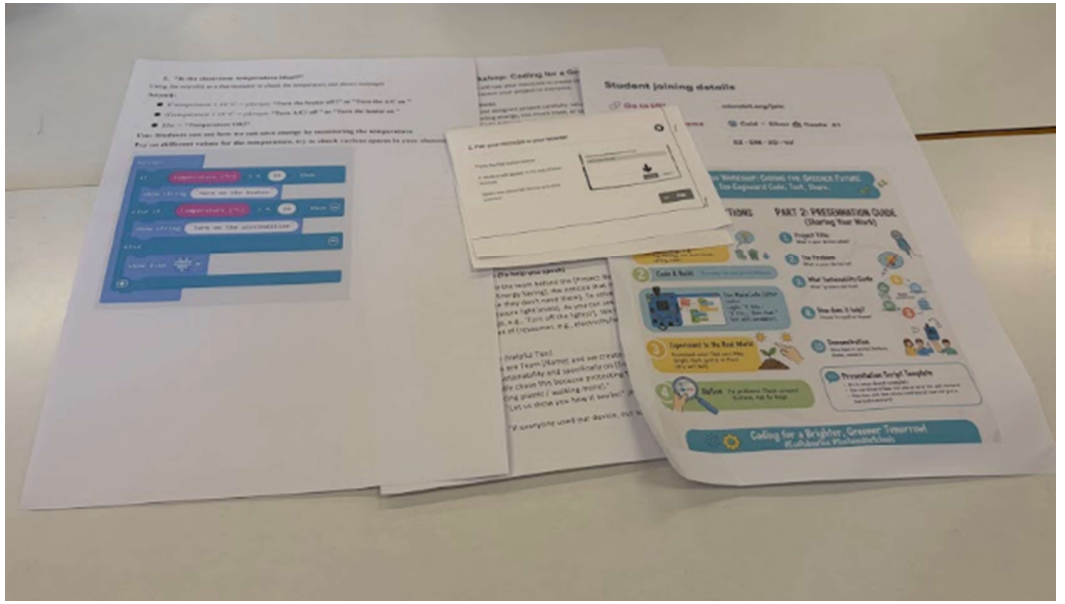
We chose this because protecting the environment means [e.gl., saving power / reducing plastic / walking more]

Let The Action!

Let us show you how you works!
(Press buttons, shake it, or show the sensors)

Step 4: The Impact

If everyone used our device, our school would much greener because...



Hardware and Software

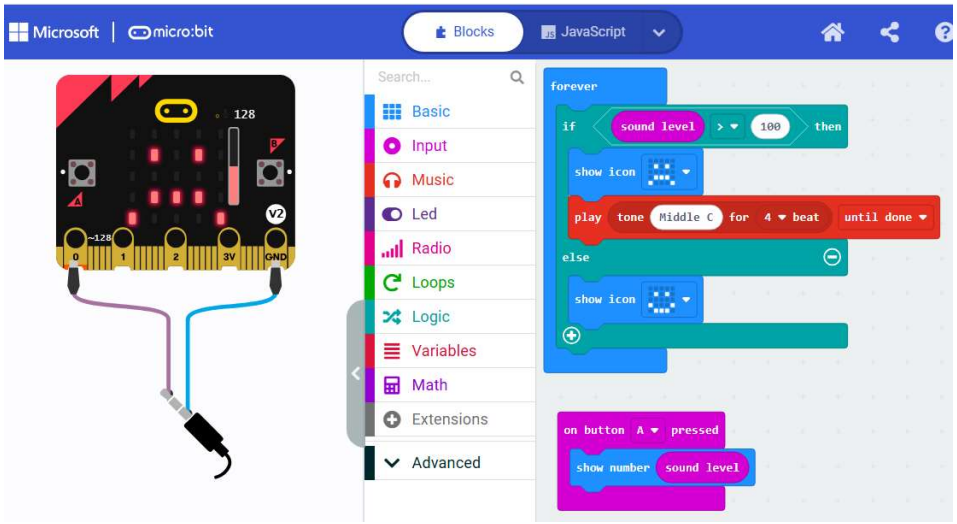
Hardware & Core Equipment

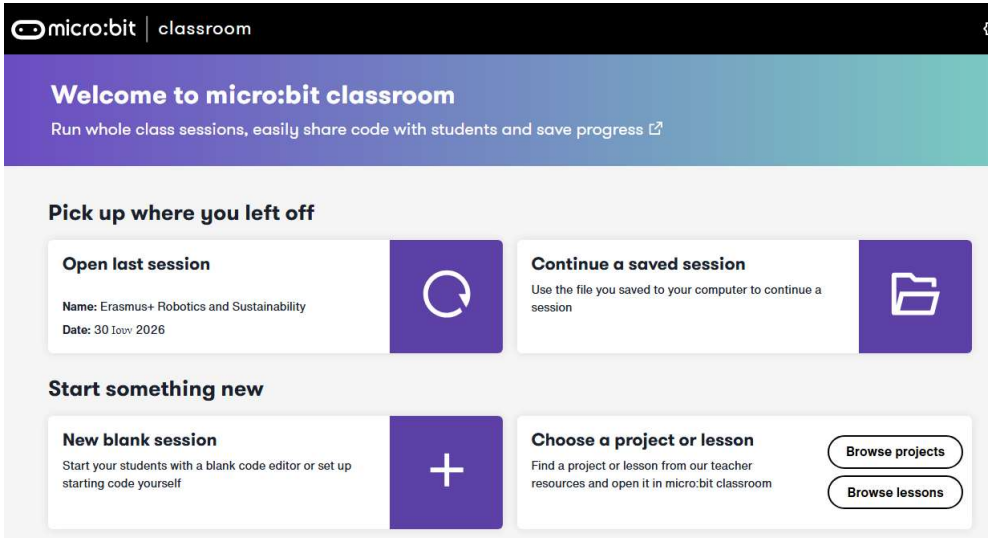
- micro:bit (V2) Boards
- Computers / Laptops / Tablets: Used by student teams to access the coding environment.
- Micro-USB Cables: For flashing/downloading the code from the computer to the micro:bit.
- AAA Battery Packs (with JST connectors)
- Interactive board

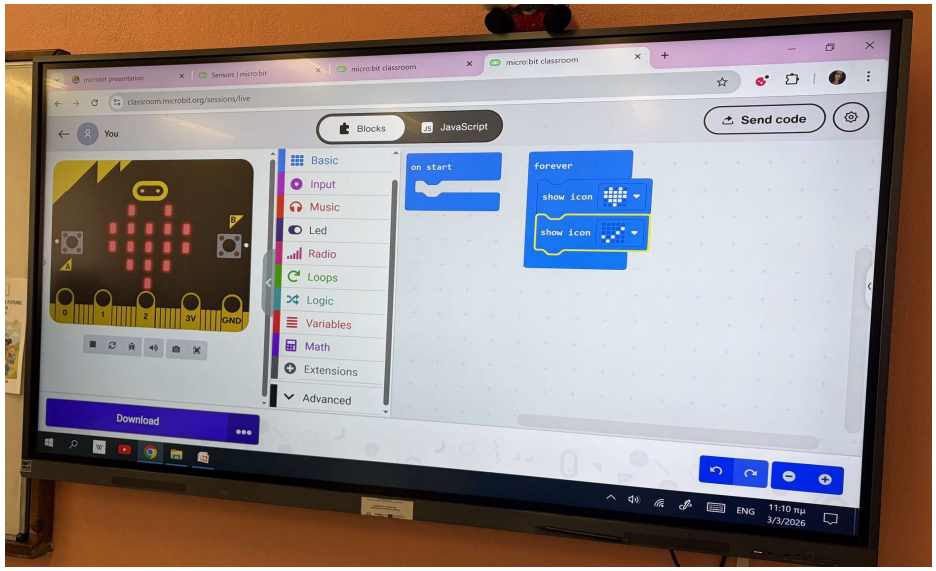
A micro:bit v2 starter: kit costs around 20 to 30 euros or you can buy sets of 10 for a better price.

Software & Digital Tools

- MakeCode Editor (Block-based): The free online block editor used by students to write and test their code on the digital simulator. https://makecode.microbit.org/
- MakeCode Classroom: The teacher management platform used to share starter code, monitor all student screens live, and provide remote assistance. https://classroom.microbit.org/







Step 2: Introduction to micro:bit & MakeCode Classroom (Live Monitoring)

https://classroom.microbit.org/

Hands-on Engineering & Roles

- Coding & Physical Testing (Simulators vs. Real World)
- Assigned Roles: the *Coders*, the *Hardware Testers*, and the *Presenters*

#	Activity Title	🌍 Environmental / Sustainability Focus	😈 micro:bit Feature & Coding Logic
1	**Choose to Walk** PDF	**Green Mobility:** Promoting walking over driving to reduce school traffic and CO_2 emissions. PDF	**Accelerometer:** Step counting ($+1$ on shake/step). PDF
2	**Energy Saver (Temp)**	**Climate Control:** Monitoring classroom temperature to optimize heating/cooling energy.	**Temperature Sensor:** Conditional logic (`If Temp > X then...`).
3	**Recycling Audit**	**Waste Management:** Tracking and auditing recycled materials in the classroom.	**Variables & Buttons:** Counter system (`On Button A pressed` , change variable).
4	**Energy Saver (Timer)**	**Power Conservation:** Reminding students to turn off lights after a specific period.	**Loops & System Time:** Countdown timer and visual alerts on LED screen.
5	**Noise Alarm**	**Well-being & Noise Pollution:** Maintaining a healthy, quiet learning environment.	**Built-in Microphone:** Sound level threshold meter (`If Sound > X dB`).
6	**Light Map**	**Smart Lighting:** Mapping school brightness to utilize natural light and save electricity.	**Light Sensor:** Light level intensity detection ($0 - 255$ scale).
7	**Plant Project**	**Water Conservation:** Preventing water waste by watering plants only when necessary.	**Pins (0 & GND):** Measuring soil electrical conductivity (moisture level).
8	**Green Challenge**	**Sustainable Habits:** Gamifying daily life with random eco-friendly missions.	**Radio/Shake Functions:** Digital dice yielding randomized prompt displays.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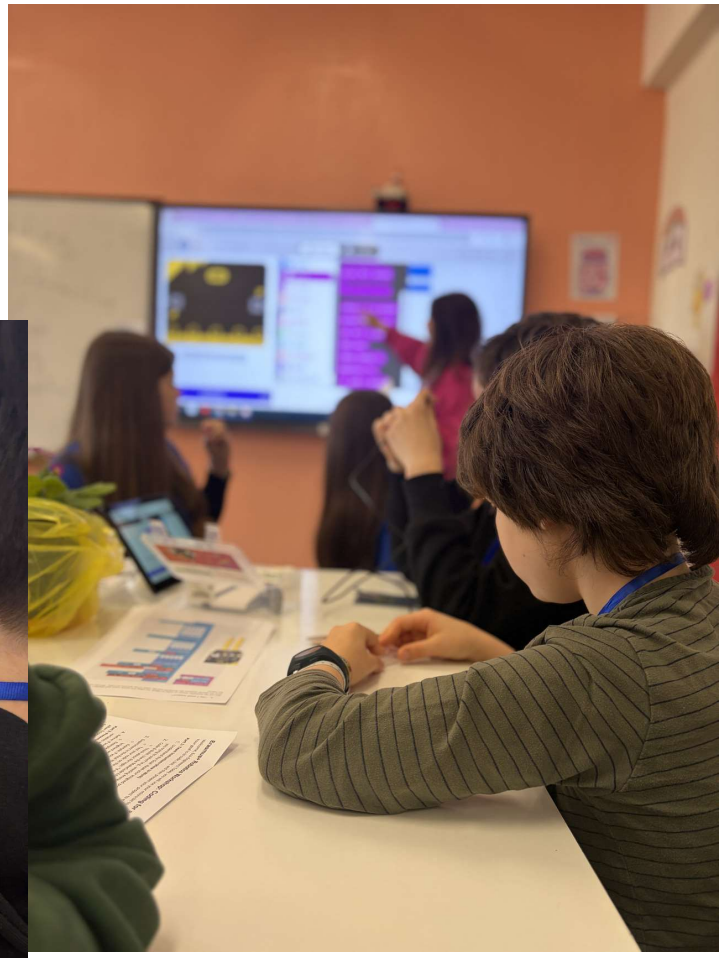
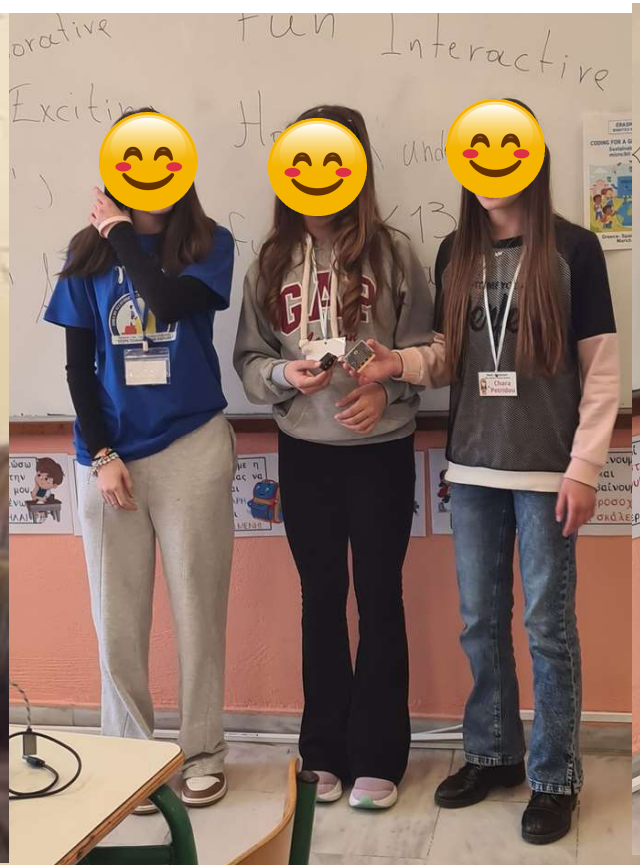
Our rules



Coding and testing

Some team Presentations



Peer Assessment

Eco-Robotics: Peer Review Form

Team Name: _____

Project Reviewed: _____

Criteria	Score (1-5 ☆)	Notes
Eco-Goal: Did they explain which sustainability problem they are solving?	☆☆☆☆☆	
The Code: Did the micro:bit work correctly during the demo?	☆☆☆☆☆	
Presentation: Were they clear and enthusiastic?	☆☆☆☆☆	
Creativity: Did they have a clever idea or a cool message?	☆☆☆☆☆	

One thing I really liked about this project:

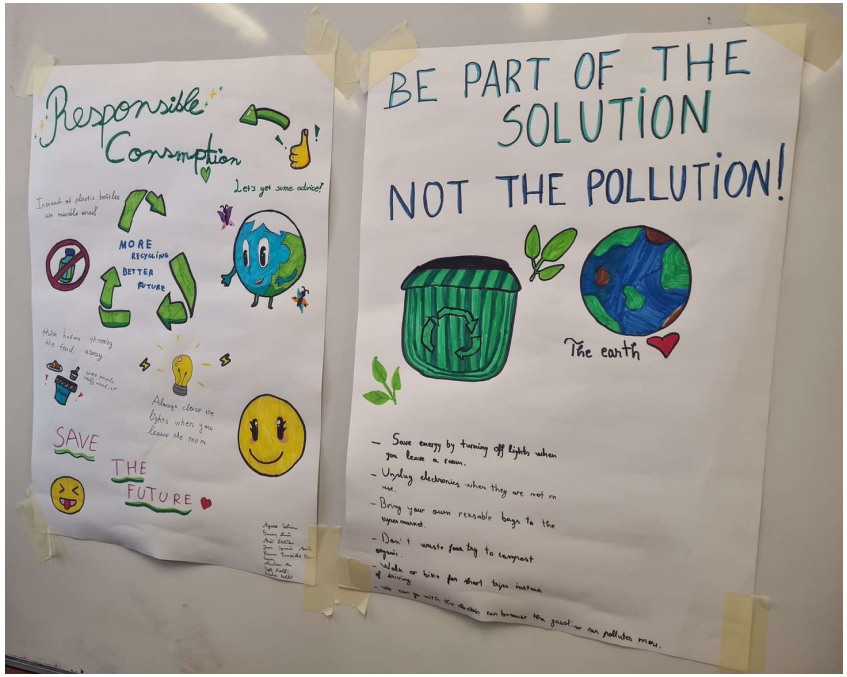
_____

_____

Awareness Campaigns- Real-World Impact

Student-Led Awareness: Classrooms transformed into creative hubs.

Design of digital posters, eco-podcasts, and awareness videos to inspire the whole school.



Why This Matters – Transforming Our Classrooms

🧑 Benefits for Students

- **Active Agency:** Shifts students from tech consumers to eco-problem solvers.
- **Soft Skills:** Fosters collaboration, accountability, and role-sharing. PDF
- **Empathy & Action:** Bridges abstract climate goals with daily school habits.

👩‍🏫 Empowering Educators

- **Ready-to-Use:** Plug-and-play frameworks that lower preparation time.
- **Classroom Management:** MakeCode Classroom simplifies live mentoring.
- **Interdisciplinary:** Merges STEM with Sustainability effortlessly.

Why it works

❌ No expensive sensors needed (uses built-in micro:bit features)

🛠️ Low-floor, high-ceiling (accessible yet challenging)

How to scale it

📤 Shareable code repositories via MakeCode

🤝 Builds an active, green-conscious community

Get the instructions here

nataliageorgitziki.blogspot.com
https://www.facebook.com/natalia.georgitziki/