A Holistic Approach to Digital World

Erasmus+ KA210-SCH Small-Scale Partnership

Lesson Plan

Day 4 of 5 — From Screen to Robot: LEGO Mindstorms EV3

Parent Activity	Scratch 3.0 and Lego Mindstorms EV3
Host School	ARISTOTELIO EKPEDEFTIRIO SERRON (Greece)
Participating Schools	Lycée des Métiers Jean PERRIN (France), Colegiul National "Spiru Haret" (Romania), KARAMAN ANADOLU LISESI (Türkiye)
Session Date (indicative)	16/04/2026
Duration	6 hours (incl. breaks)
Target Group	Secondary students (approx. 14–19) from all four partner schools, mixed nationality groups
Delivery Team	IT teacher (Greece) with support from IT teacher, Colegiul National "Spiru Haret" (Romania)
Lesson Focus	Robot assembly, EV3–Scratch connectivity, motor control, colour and touch sensors

Learning Objectives

By the end of this session, students will be able to:

- Assemble a LEGO Mindstorms EV3 robot base (chassis, motors) from a guide sheet
- Connect the EV3 brick to a Scratch-based control interface
- Program directional movement and motor speed control
- Read and respond to data from the EV3 colour sensor
- Use the EV3 touch sensor to trigger a start/stop or minimise/enlarge action

Materials and Resources

- LEGO Mindstorms EV3 kits (one per team of 3–4 mixed-nationality students)
- Scratch-EV3 bridge software/interface
- Laptops
- Printed robot-assembly guide sheets
- Team role cards (builder, coder, tester, presenter)

Lesson Procedure

Time	Stage / Activity	What Happens	Materials
09:00–09:30	**Forming Mixed Robot Teams**	• Form teams blending Turkish, French, Greek and Romanian students • Assign roles within each team: builder, coder, tester, presenter	Team cards
09:30–10:45	**Robot Design with LEGOs**	• Assemble the base EV3 chassis and motors following the guide sheet • Check mechanical stability before moving to software	EV3 kits
11:00–11:45	**Connecting EV3 to Scratch**	• Pair the EV3 brick with the Scratch-EV3 bridge software • Test basic connectivity with a simple 'move forward' command	EV3 kits, laptops, bridge software
11:45–12:30	**Direction Keys & Motor Movement**	• Program forward/backward/turn movement using keyboard-triggered blocks	EV3 kits, laptops
13:30–14:15	**Direction Keys & Motor Speed**	• Extend scripts to control motor speed • Test robot behaviour at slow, medium and fast settings	EV3 kits, laptops
14:15–15:00	**Colour Sensors**	• Introduce the colour sensor and how it reports data • Program a simple colour-triggered or line-following behaviour	EV3 kits, laptops
15:00–15:30	**Touch Sensor**	• Introduce the touch sensor • Program a start/stop or minimise/ enlarge action triggered by touch	EV3 kits, laptops

Differentiation and Inclusion

- Rotate team roles partway through the day so every student gets hands-on building and coding time
- Provide picture-based (not only text) assembly instructions for students with limited English
- Ensure worktables and floor space for robot testing are wheelchair-accessible

Assessment / Evidence of Learning

- Robot successfully assembled and connected to Scratch by the end of the morning session
- Teacher observation of team collaboration and role rotation
- Working demonstration of movement, speed control, and at least one sensor-based behaviour by end of day

Teacher Notes and Follow-Up

- Keep spare EV3 parts and a spare brick on hand in case of assembly errors or hardware issues
- Photograph/video each team's robot at the end of the day for dissemination and for the Day 5 show
- Teams should save their code so it can be quickly reloaded for Day 5 rehearsal