DIGIEDUHACK SOLUTION CANVAS

Title of the solution: Smart Green Campus & Flying Future: Sustainable Life and Energy

Team name: Smart Green Campus Lab (Team 17)

Challenge addressed: Learning Spaces and Pedagogies

Challenge category: FFuture Innovative Classrooms Learning Scenarios

Background of the team:

(multiple selections possible in case of mixed teams)

- Higher Education Students
- Researchers
- Professionals
- ● Teachers
- Primary School Students
- Secondary School Students
- Others (please specify)

Solution description

What is the final product/service/tool/activity you're proposing? What are its main elements, technologies and objectives? Could you please include a brief implementation plan with some key overall milestones, resources required and eventual barriers foreseen?
How could your solution be used to enhance digital education nowadays? How could its success be measured?

Smart Green Campus & Flying Future is a modular, multi-school learning scenario. Each participating school selects one or more modules – Green Classroom & Campus, Green Kitchen & Menu, Green Hangar & Flying Future – and students measure real or estimated energy, water, waste, food and aviation-related impacts in their own context. Using open digital tools (EBA resources, simulations, spreadsheets, 3D modelling, interactive dashboards, online boards), they co-design practical improvements such as greener menus, energy-efficient procedures or smarter aviation support systems. The scenario provides clear steps, roles, tools, rubrics and a common DigiEduHack showcase where results from different schools are merged into one Smart Green Campus story that any school can adopt or adapt.

Context

What is the current or future problem you're trying to solve? How does your solution align with DigiEduHack 2025 annual theme?
How does your solution confront the challenge posed by the hackathon organiser and how does it address the challenge category?

Schools consume large amounts of energy, water and food every day, yet students rarely see these flows or understand their environmental impact. Teachers are also expected to teach sustainability, digital skills and transversal competences, but often lack concrete interdisciplinary scenarios that fit different school types. Our context is a network of diverse secondary and VET schools in İzmir that want a common, student-centred way to make "sustainable life and energy" visible in everyday school spaces – classrooms, kitchens and hangars – while aligning with national curricula and DigiEduHack's annual theme.

Target group

Who is/are the target group/s of your solution and how will they benefit from it? Why is your solution relevant to them? how do you plan to engage these groups so you fully meet their specific needs?

The main target group is students aged 14–18 in general secondary schools, vocational schools and BILSEMs, together with their STEM and VET teachers. Students benefit by working with data from their own school, developing scientific reasoning, mathematical thinking, digital literacy, collaboration and green skills. Teachers gain a ready-to-use but flexible learning scenario with detailed activities, digital tools and assessment strategies that can be integrated into physics, chemistry, biology, ICT, food services and aircraft electronics curricula. School leaders and local communities indirectly benefit from increased awareness and concrete proposals for reducing the school's environmental footprint.

Impact

How will your solution catalyse changes in education and what impacts will it have at social and environmental level? Could you provide examples or scenarios illustrating how such changes and impacts might unfold?

Educationally, the solution helps students move from abstract talk about climate and energy to concrete, data-based understanding of what happens in their own school. They practise scientific inquiry, mathematical reasoning, digital creation, collaboration and communication while working on an authentic challenge. Socially, the project gives students a voice in school development: their proposals for greener classrooms, kitchens and hangars can influence decisions on behaviour, equipment use and small investments. Environmentally, even simple changes – turning off unused devices, optimising lighting, adjusting menus, reviewing workshop procedures – can reduce energy use, food waste and emissions. In the longer term, the scenario can support school development plans, eco-school initiatives and local SDG actions by providing a repeatable way to monitor and improve the school's footprint.

Describe it in a tweet

How would you describe your solution in a short catchy way with maximum 280 characters?

From classrooms to kitchens and hangars, students turn their schools into a Smart Green Campus, tracking real energy and resource use and redesigning it with digital tools, greener menus and cleaner aviation systems – a flying future for sustainable learning.

Innovativeness

What makes your solution different and original? Are there similar solutions or approaches currently available or implemented by education sector practitioners? If so, why and to what extent is your solution better?

Many projects talk about green campuses but stay at the level of campaigns or one-off lessons. Our solution links three worlds in one scenario: academic subjects, VET practice and aviation systems. It is modular and multi-school: each school adapts a module, and together they build a shared Smart Green Campus.

Transferability

Can your solution partly or fully be used in other education/learning contexts or disciplines? Could you provide any example?

The scenario is easy to transfer. Schools may run only one module, such as Green Classroom, Green Kitchen or Green Hangar, or combine several modules. Activities rely on free or widely available tools, EBA resources and simple measurements, so even low-resource schools can join and reuse the structure for other themes.

Sustainability

Once you have a prototype, what are your plans for a further development, implementation upscale and replication of the solution? How do you see it working in the mid- and long term?

The solution lowers the school's environmental footprint by helping students design concrete changes in energy, food and aviation-related practices. It is also pedagogically sustainable, because schools can repeat it every year with new classes, update the data and track how their Smart Green Campus improves over time.

Team work

Present the members of your team.
Why are you the perfect team to develop this work and what are the competencies you all bring in so the solution is developed successfully? What is your expertise within the thematic field concerned? Are you planning to continue working as a team in the future? If so, why?

Our team gathers teachers of physics, chemistry, biology, mathematics, ICT, food services and aircraft electronics from different school types in İzmir. This diversity mirrors the scenario, which connects academic and vocational learning. Each member brings expertise in STEM teaching, VET practice, EBA use, digital tools and collaborative projects.

European Commission

Technology-Oriented Learning Scenarios Template

Scenario Template: Ünsal SAPER

Scenario Title:	Scenario title	Sustainable Life and Energy: Smart Green Campus and Flying Future

Group Name:	Group name	Team 17

Scenario Team Members:	Scenario team members	• Mert Doğan / İzmir / Bayındır / Bayındır Vocational and Technical Anatolian High School • Faize Elif Çelik / İzmir / Kemalpaşa / Şehit Halil Kantarcı Anatolian Imam Hatip High School • Kevser İşliel / İzmir / Karşıyaka / 15 Temmuz Şehitler Anatolian High School • Özlem Çelik / İzmir / Güzelbahçe / 60. Yıl Anatolian High School • Bülent Durtaş / İzmir / Gaziemir / Gaziemir Borsa İstanbul Vocational and Technical Anatolian High School • Gülsüm Söyler Öğretim / İzmir / Menemen / Özel Can Okulları – International Canadian Schools • Feriştah Sibel Konca / İzmir / Bornova / Şehit Fatih Satır Science and Art Centre

		• Nuri Arsaklı / İzmir / Narlıdere / Arkas Science and Art Centre • Zeynep Topaloğlu / İzmir / Kemalpaşa / Bağyurdu Anatolian High School

Planning		
Overview	Section in which the problem situation is explained (real-life problems, case studies, etc.). Summarise in a few sentences.	This scenario is designed in a modular, multi-school structure: • It can be implemented in different types of schools such as Anatolian / Science / Imam Hatip / Science and Art Centres (BILSEM) / Vocational High Schools. • Each school chooses from the modules below according to its own facilities and fields: ○ **Module A – Green Classroom & Campus**: Energy efficiency, water use, waste management. ○ **Module B – Green Kitchen & Sustainable Menu**: For the Food and Beverage Services field. ○ **Module C – Green Hangar & Flying Future**: For Aircraft Electronics / Aircraft Maintenance.

		• The common theme is **Sustainable Life and Energy**. • Each school implements its own module locally; on DigiEduHack day these outputs are combined to form a multidisciplinary, multi-stakeholder "**Smart Green Campus**" model. *This structure:* • Makes the solution simple, understandable and easy to evaluate, • Fits directly with the themes of digital education, sustainability and future classrooms, • Provides originality through its multi-school, multi-module design.
Learning Aims / Objectives	Section in which the aims/objectives of the learning scenario are explained. Write in bullet points.	Students will: **1.** Understand the concepts of energy and sustainability: • Be able to explain basic concepts such as energy types, energy transformations, power, efficiency, carbon footprint and sustainable development goals using real or sample data. **2.** Carry out analysis at system level: • By analysing, for their own schools,

		○ the classroom/building energy–water–waste profile (Module A), ○ canteen/kitchen processes (Module B), ○ a simplified aviation/electrical scenario (Module C), be able to estimate approximate greenhouse gas emissions. **3.** Develop digital prototypes and products: • In at least one module, design one of the following products: ○ a draft digital dashboard, ○ an IoT/circuit simulation, ○ a 3D model or physical model with a QR-coded digital explanation, ○ a short video or animated presentation. **4.** Apply the scientific method and design thinking: • Experience the steps of evidence-based problem definition, data collection and analysis, solution development, testing and improvement. **5.** Develop 21st-century skills: • Develop collaboration, communication, presentation, critical thinking, digital literacy

		and entrepreneurship skills, and recognise that they are part of a shared and scalable model together with projects from different schools.
Subject(s)	Section indicating for which subject(s) the scenario has been prepared	• Physics • Chemistry • Biology • Food and Beverage Services • Aircraft Electronics / Aircraft Maintenance • *Supporting*: Information Technologies, Mathematics
Related Outcomes	Section indicating which learning outcomes in the relevant subject(s) the scenario is linked with	Each school specifies the detailed outcomes/attainment codes according to its own MoNE curriculum. Within the common framework, the main types of outcomes linked are: • **Physics**: Energy, power, efficiency, electrical energy consumption, renewable resources, simple circuits, sensors. • **Chemistry**: Energy in chemical reactions, fuel types, products of combustion, solubility and mixtures, cells and electrochemistry. • **Biology**: Ecosystems, carbon cycle, environmental problems, biodiversity, sustainable life. • **Mathematics**: Ratio and proportion, percentage calculations, data analysis,

		interpreting tables and graphs, functional relationships. • **Information Technologies**: Algorithmic thinking, data collection and visualisation, digital reporting, basic programming with simple simulations. • **Food and Beverage Services**: Food safety and hygiene, energy- and water-efficient use of equipment, sustainable menu planning, reduction of food waste. • **Aircraft Electronics / Aircraft Maintenance**: Basic principles of aircraft electrical/avionic systems, sensors and data monitoring, energy efficiency, safety culture in aviation.
Level	Educational stage / year group of the target group	Years 9–12 (Each school adapts and deepens the scenario according to its own student level.)
Duration	Lesson duration (Number of lessons) Example: 3 lesson hours (3 × 40')	• **In-school implementation**: 4–6 lesson hours • **DigiEduHack / final day**: 1 full day (presentation, evaluation and refinement)
Skills	In this section, make sure that the key competences you list for each subject are consistent with the "Learning Activities" section. For example: creativity, collaboration, critical thinking, etc.	**1. Common Competences (All Subjects)** • **Science Field Competences (FBAB) – Physics, Chemistry, Biology**: o Scientific observation, classification, scientific prediction (based on observation/data), operational definition, forming hypotheses,

		conducting experiments, scientific inference, constructing scientific models, inductive and deductive reasoning, using evidence and scientific inquiry. • **Mathematics Field Competences (MAB) – Mathematics**: o Mathematical reasoning, mathematical problem solving, mathematical representation, working with data and making data-based decisions, working with mathematical tools and technology. • **Information Technologies and Software Field Competences (BTYAB) – related competences**: o Algorithmic thinking, data collection and processing, creating models/simulations through programming, digital production and sharing, awareness of cyber security and digital citizenship. • **Literacy Competences**:

		○ Information literacy (finding, evaluating and using data sources), ○ Digital literacy (using online tools meaningfully and safely), ○ Science literacy with a focus on environment and sustainability. • **Social and Emotional Learning Competences**: ○ Self-regulation, collaboration, empathy, responsible decision-making, goal setting and perseverance. **2. Subject-Specific Key Competences** • **Physics, Chemistry, Biology**: ○ Scientific process skills within FBAB, systems thinking, modelling, data literacy, planning and interpreting experiments. • **Mathematics**: ○ Problem solving within MAB, quantitative reasoning, establishing functional

		relationships, data analysis and graph literacy. • **Information Technologies**: o Algorithmic thinking, block/text-based programming, data visualisation, using digital tools for simple IoT or circuit simulations. • **Food and Beverage Services**: o Occupational hygiene and food safety, time and resource management, efficiency-focused planning of production processes, teamwork, communication that takes guest/student satisfaction into account. • **Aircraft Electronics / Aircraft Maintenance**: o Aviation safety and quality culture, reading technical drawings and schematics, fault analysis, systematic problem solving, safe and effective use of hand tools and measuring instruments, teamwork.

Preparation		
Learning Approach	Collaborative learning, active learning, problem-based learning, project-based learning, game-based learning, gamification, storytelling, etc. (Ensure that the learning approaches you write here are consistent with the "Learning Activities" section.) Write in bullet points.	• Project-based learning • Problem-based learning • Design thinking • Collaborative learning • Interdisciplinary / STEM-based approach • Gamification and storytelling
Tasks	Section in which the expected roles of teachers and students are defined. Write in bullet points.	**Teacher roles**: • Guide students in choosing a module (A/B/C) and clarify the scenario together in line with the school and subject area. • Prepare and share the necessary data points (bills, equipment lists, menus, aircraft system scenarios, etc.). • Coordinate students' processes of data collection, data analysis and digital product design, and provide feedback. • Prepare and apply assessment rubrics based on DigiEduHack criteria and innovative assessment tools. **Student roles**: • Collect data in their own classroom/school environment and analyse the data using digital tools.

		• Share roles within the team (data lead, design lead, presentation lead, etc.). • Produce a digital prototype and design the part of the "Smart Green Campus" that fits their chosen module. • Prepare for in-school and DigiEduHack presentations and present their solutions to peers and the jury.
Tools / Technologies	Section where hardware tools such as interactive whiteboards, tablets and online tools such as EBA are specified (Write according to the classification in http://meb.ai/UFAYJp3.)	**Hardware**: • Interactive whiteboard • Tablets / student computers • Projector • Basic measuring instruments (thermometer, simple wattmeter, etc., where available) **According to web tool categories**: • **Simulation tools**: ○ PhET, Tinkercad Circuits, simple flight/energy simulations ○ 3D modelling tools: ○ Tinkercad, SketchUp • **Graphing and spreadsheet tools**: ○ Google Sheets, Excel • **Digital board / digital post-it tools**: ○ Padlet, Jamboard-equivalent tools

		• **Interactive presentation tools**:
		  ○ Genially, Mentimeter
		• Poster and banner creation tools:
		  ○ Canva
		• **Coding / programming tools (supportive)**:
		  ○ Scratch, mBlock, simple Python environments
		• **Data management and storage tools**:
		  ○ Google Drive / OneDrive
		• **Survey tools**:
		  ○ Google Forms / Microsoft Forms
		• AI-supported tools (supportive):
		  ○ Basic artificial intelligence tools for text editing, drafting and reflection

Concrete Materials	List the concrete materials used, if any.	• The school's latest electricity, water and natural gas bills (where available) • Classroom/corridor/workshop layouts, canteen layout, hangar or workshop floor plans • Simple model-making materials (cardboard, corrugated card, straws, coloured paper, waste materials) • For Food and Beverage Services: sample menus, portion sizes, standard recipes • For Aircraft Electronics: basic circuit diagrams and, where available, old/faulty components and catalogues

EBA Links	Section where the relevant EBA links are shared together with the content titles (use the MoNE short URL service for the links). Example: War of Independence and Atatürk Theme: http://meb.ai/U7rbXbM	**Grade 9 Physics – Energy Unit (Workbook):** https://meb.ai/72HRsT **Grade 11 Chemistry – Energy in Chemical Reactions (Workbook / Interactive Book):** https://meb.ai/4XSdgX **Grade 10 Biology – Ecosystem Ecology and Current Environmental Problems (Workbook):** https://meb.ai/U8OPaJ1 **Grade 10 Biology – Ecosystem Ecology and Current Environmental Problems (Lesson Presentations):** https://meb.ai/6Cihvf **Grade 11 Chemistry – Energy in Chemical Reactions (Unit E-Book Preview):** https://meb.ai/Usna7Vi **Principles of Nutrition and Hygiene – Grade 9 Textbook (for Food and Beverage Services):** https://meb.ai/r7u7wy **Aircraft Maintenance Field / Aircraft Electronics – Core Field Textbook:** https://meb.ai/nOuOke **Electrical and Electronic Fundamentals (supporting content for Aircraft Electronics and related vocational fields):** https://meb.ai/Uk0fAHV **Materials on Sustainability, Energy and Environment – OGM / EBA Resources:** https://meb.ai/U7kQZWQ

Application		
Learning Activities	Section in which the activities and applications to be carried out by students are explained	**Stage 1 – Interaction** *(FCL: Interact & Exchange – 1 lesson hour)* • Short videos/images about the climate crisis, energy consumption, food waste and aviation emissions are watched. • A common question is posed to the class: "Which part of our school most needs to be improved?" (Energy consumption, water use, waste management, canteen processes, workshop/hangar, etc.) • With teacher guidance, students discuss the options for Module A/B/C. • Each school chooses the module(s) that fit its own conditions and clarifies its target. • The module choice is recorded in a digital board tool such as Padlet (each class opens its own column). At this stage, in particular: • Scientific observation and classification from the Science Field Competences (FBAB), • Collaboration and communication from social and emotional competences are supported. **Stage 2 – Research**

		(FCL: Investigate – 1–2 lesson hours) Each school collects and analyses data according to the module it has chosen: • **Module A – Green Classroom & Campus**: o The numbers of lighting units, sockets and devices in classrooms/corridors/laboratories are identified. o Based on simple assumed or real bills, quantities such as kWh, water consumption (L) and waste (kg) are estimated. • **Module B – Green Kitchen & Sustainable Menu**: o Using a single meal or weekly menu, the quantities of ingredients, cooking times, energy and water use and the amount of food waste produced are estimated. o Critical points are identified in terms of hygiene and food safety. • **Module C – Green Hangar & Flying Future**: o A simplified scenario is chosen, such as aircraft cabin lighting or a ground support equipment system. o Energy consumption and approximate emissions are

		calculated using device power and operating time. For all modules: • Mathematical calculations (ratio and proportion, percentage calculations, unit conversions) and the creation of tables/graphs are carried out. • Results are visualised using graphing and spreadsheet tools (Google Sheets, Excel). • Students define the problem numerically, for example: "This habit/piece of equipment creates this much extra consumption/emission." At this stage: • The aspects of FBAB related to scientific observation, data-based prediction, experiment/measurement and the use of evidence, • The aspects of MAB related to working with data and mathematical reasoning are used directly. **Stage 3 – Production** *(FCL: Create – 1–2 lesson hours)* Each school develops at least one feasible solution and turns it into a digital prototype: • **Module A**: o A proposal for sensor-based lighting, a behaviour-focused saving campaign, or suggestions

		to reduce heat loss/insulation problems. o The solution is visualised using a simulation tool, simple circuit design or a draft digital dashboard. • **Module B**: o A sustainable menu (seasonal, local products with a lower carbon footprint), o An energy- and water-efficient workflow, o A plan to reduce food waste (re-purposing leftovers, improving portioning/planning). o The product is designed as a poster, short video or digital brochure using tools such as Canva. • **Module C**: o An energy-efficient cabin lighting system, a smart monitoring panel, or a SAF/electric system scenario. o A simple circuit or dashboard is modelled using Tinkercad Circuits, simulation tools or a 3D design tool. For each solution: • Cost, feasibility and possible barriers are briefly analysed.

		• It is clearly stated which "part" of the school the solution will improve. At this stage: • Modelling and scientific inquiry from FBAB, • Problem solving and mathematical representation from MAB, • Algorithmic thinking and digital production competences from BTYAB are used intensively. **Stage 4 – Presentation** *(FCL: Present & Exchange – 1 lesson hour + Hackathon day)* **In-school presentation**: • Teams prepare 3–5 minute presentations (poster, digital board, short video, simulation screenshots, etc.). • The school jury (teachers, administrators and, if possible, parents/local stakeholders) evaluates the projects using a rubric supported by innovative assessment tools. • Each school selects 1–2 projects for the DigiEduHack final. **DigiEduHack day (joint work and sharing)**: • Selected teams combine their modules to create the overall "Smart Green Campus and Flying Future". • Module components from different school types (green

		classroom, green kitchen, green hangar, etc.) are placed on a shared digital board or a digital campus map. • The jury scores the projects according to the DigiEduHack 2025 evaluation grid (quality, originality, feasibility, sustainability, transferability, social impact, etc.). **Possible Challenges** • **Data access**: o There may be difficulties in accessing bills, real consumption data or kitchen records. o Solution: If necessary, scenario-based sample data or MoNE sample data sets can be used. • **Time management**: o Four to six lesson hours may be tight for both data collection and prototype development. o *Solution*: Part of the data collection can be given as homework; a minimum viable product (MVP) approach can be used for the prototype. • **Coordination between schools**: o It may be difficult to maintain communication between different school types. o *Solution*: A shared online board (e.g. Padlet) and a simple project timeline are

		used to clarify communication between teams. • **Access to digital tools**: o Some schools may have limited access to devices or the internet. o *Solution*: The number of tools is simplified; free and low-hardware web tools are preferred wherever possible; device sharing is organised through group work when needed. • **Differences in skill levels**: o Students' mathematical and digital skills may vary. o *Solution*: Mixed-ability groups are formed, peer support is used, and the teacher leads the critical calculation and interpretation steps together with the class.

Assessment		
Assessment Methods / Tools	Section providing information about the assessment activities Innovative assessment tools (Write according to the	**1. Multi-perspective Digital Rubric (Analytic Rating Scale)** • Category: *Web tools that enable the creation of rating scales (rubrics)*

	classification in http://meb.ai/1J9oik.)	• Example tools: Rubistar, rubric templates built in Google Sheets, ForAllRubrics, etc.
		
		• Criteria are defined in line with the headings in the DigiEduHack evaluation grid:
		
		  ○ Quality and clarity of the solution
		
		  ○ Alignment with digital education trends
		
		  ○ Innovation and originality
		
		  ○ Feasibility and sustainability
		
		  ○ Transferability (adaptability to other schools/fields)
		
		  ○ Social and environmental impact
		
		2. E-Portfolio (Individual and Group)
		
		• Category: *Web tools that enable the creation of e-portfolios*
		
		• Example tools: Google Sites, Wakelet
		
		• Students collect screenshots of data collection, interim reports, prototype drafts and reflective writings in their portfolios.
		
		• Supports process-oriented assessment and helps document BTYAB, FBAB and MAB competences.
		
		3. Self-assessment and Peer Assessment Forms
		
		• Category:

		○ *Web tools that enable self-assessment* ○ *Web tools that enable peer assessment* • Example tools: Google Forms / Microsoft Forms • Students score their own contributions and those of their peers in areas such as collaboration, responsibility, time management and creativity, and write short reflective comments. **4. Game-based Rapid Feedback** • Category: *Game-based web tools for measurement and assessment* • Example tools: Kahoot, Quizizz • Short multiple-choice games are used to assess concepts related to energy, sustainability, carbon footprint, food waste and aviation emissions. **5.** Concept Mapping with Word Clouds • Category: ○ *Web tools that enable the creation of word clouds* ○ *Web tools that enable the creation of concept maps* • Example tools: Mentimeter Word Cloud, Coggle / MindMeister • At the end of the scenario, the concepts that come to students' minds when they hear "sustainable life and energy" are collected using a word cloud; these are then turned into a

		concept map and discussed as a class. **6. Group Assessment (Hackathon Jury)** • Category: *Web tools that enable group assessment* • Example tools: Shared Google Forms-based rubrics • The jury scores each team using the same digital rubric, ensuring transparent and comparable evaluation.

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