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IoT4Schools
"Bringing the Internet of Things in school education as a tool to address 21st century challenges"

- Design exemplary scenarios for IOT projects -

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Scope of the document

This document presents a number of ideas for the development and design of learning scenarios revolving around IoT, while addressing the four challenges of the 21st century identified in the document "*Review on 21st century challenges and IoT solutions for everyday life*". These challenges are as follows: Smart Cities, Home automation, Health monitoring and Environmental protection.

The objective of the designed learning scenarios is to assist educators in secondary education in the smooth introduction of their students (aged 12 to 16) to the concept of IoT and the relevant technologies through the lens of these four challenges, paving the way for the implementation of the IoT projects that will be designed in the context of WP3.

A template was created with the intention of facilitating the recording and capture of a diverse range of information regarding the learning scenarios. The template included 8 fields which are:

1. Scenario Title
2. Underline the challenge or problem that this scenario applies to or reflects
3. Scenario Implementation overview
4. Discussion Points
5. Specific learning objectives
6. Required Tools/Software
7. Additional suggestions
8. Indicative picture

The "Scenario title" requested for a concise and descriptive title for the learning scenario. The second field requested that the challenge or the challenges addressed by the scenario be specified. The "Scenario Implementation overview" requested an outline of the practical implementation of the scenario in the classroom. The "Discussion Points" field pertained to the formulation of a list of key topics or questions that could assist educators in initiating the dialogue with their students, thereby making the scenario more engaging, while prompting critical thinking. The "Specific Learning Objectives" field was intended for capturing the knowledge and the skills that students are expected to gain from each scenario. The "Required Tools/Software" field requested the mention of any necessary tool, device or/and software that would be essential for the execution of each scenario. The "Additional Suggestions" field requested to provide any additional tip or advice that could possibly help teachers in the effective implementation of each scenario with their students. Finally, an optional request was made for an illustrative representation of the scenario, which would serve to enhance its graphical presentation.

The template was distributed to the partners in digital format, with the intention of collecting their input. The partners were encouraged to suggest a variety of learning scenarios, encompassing both theoretical and practical approaches. A total of eleven scenarios were compiled, each addressing a different solution to the identified challenges through the lens of the Internet of Things (IoT). The following section presents the scenarios as recorded in the template.

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Input from partners

Learning Scenarios suggested by EDUMOTIVA	
Scenario 1	
Scenario Title	Using smart electronic devices and applications to monitor health-related data
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to introduce students to the concept of IoT in the context of health monitoring. Divide your students in teams of 2 and encourage them to use a smart electronic device, such as a smartwatch or a smart band, along with the corresponding application to monitor health-related data. Ask them to record specific data such as their heartbeat, daily steps, and body battery, three times a day for a week, and keep a diary of their findings. Encourage each team to share their observations in the plenary. Raise discussion on how such data can be important for people with health problems, as well as on the inherent risks of using such devices as an exclusive method for monitoring health. After this discussion, you can ask you students to consider how such an IoT system could be improved to help people with health problems.
Discussion Points	● How is this data gathered and where is it stored? ● Is it important to store data in a secure webspace? ● Based on the monitored data, what decisions can you make about your physical health or daily exercise? ● Can you think of other applications or/and devices that can be used for health monitoring? ● How important is it to have such devices, and how much should we rely on their results?

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	• Can you think of any disadvantage or limitation of these types of IoT systems?
Specific Learning Objectives	• identify IoT applications that can be used for health monitoring • gain a basic understanding of how IoT devices collect, store and use data • understand the impact of monitoring data on our daily life for making decisions about our health • Understand how to make informed health decisions based on data analysis. • identify the advantages, disadvantages and risks using such devices and application for health monitoring
Required Tools/Software	• Smart Health Devices: Smartwatches or fitness bands for data tracking. • Monitoring App: A compatible application that aggregates and visualizes the collected data. • Notebook: For documenting observations, reflections, and insights during the implementation of the scenario
Additional Suggestions	• **Expert Talks:** If possible, invite a healthcare professional or a technologist to share insights on the convergence of technology and health. • **Privacy Workshop:** Conduct a session on digital privacy, focusing on how personal data can be protected online.
Indicative picture (optional)	 

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Scenario 2	
Scenario Title	Using an air quality monitoring application
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to introduce students to the concept of IoT in the context of both environmental protection and health monitoring. Divide your students into teams of 2 and encourage them to use an application that monitors the air quality. Ask them to record the air quality in different areas, cities or countries three to four times a day for a week, and keep a diary of their findings. Suggest that they also take a print screen to have a visual representation of how the air quality might change during the day. Encourage each team to share their observations in the plenary. Raise discussion on how these data can be important for protecting the environment and peoples' lives. After this discussion, you can ask you students to think about how they could create an IoT system that monitors the air quality in their school building, leading to decisions to optimize some operational systems.
Discussion Points	• What are the criteria for monitoring air quality • How air quality is assessed • How can the monitored data be relevant to the environment or to people's daily lives? • Can you think of other applications or/and devices that can be used for monitoring air quality? • How important is it to have such applications and devices? • Can you think of any disadvantages or limitations of these types of IoT systems?

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Specific Learning Objectives	• identify IoT applications that can be used for air quality monitoring • gain a basic understanding of how IoT devices collect, store and use data • understand the impact of monitoring data for protecting our environment • Understand how to make informed design decisions for our environment based on data analysis. • identify the advantages, disadvantages and risks using such devices and application for protecting the environment
Required Tools/Software	• Air quality applications: applications that are easily accessible from a smart device or a computer (indicative links: https://www.iqair.com/; https://airly.org/) • Notebook: For documenting observations, reflections, and insights during the implementation of the scenario • Microcontroller and sensors for creating an air quality monitoring device (as a next level and a possible project)
Additional Suggestions	• **Expert Talks:** If possible, invite a professional or a technologist to share insights on the convergence of technology and air quality monitoring.
Indicative picture (optional)	

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Scenario 3	
Scenario Title	Traffic and data driven decisions
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to introduce students to the concept of IoT in the context of smart cities, and through the lens of mobility and transport. Divide your students into teams of 2 and encourage them to use Google maps to monitor the traffic on the routes they take every day. Ask them to record these routes at different times of the day for a week, and keep a diary of their findings. Suggest that they also take a print screen to have a visual representation of the data. Encourage each team to think about how this data could lead to different decisions about the route they would take or the mode of transport they would use. Encourage them to make some maps showing the different routes they would choose based on the different traffic patterns and share their observations in the plenary. Raise a discussion about the impact of location-based data on peoples' daily lives in terms of their mobility and transport choices in the city. After this discussion, you could ask your students to think about how an application such as Google maps could be used for a self-driving vehicle.
Discussion Points	• How does Google Maps work? • Is it important to monitor traffic? • How monitoring data affects your daily decisions about mobility and transport • Is it safe to make mobility and transport decisions based on traffic monitoring data • Where is the monitoring data stored? • What are location based services? • Can you name an (IoT) application that uses Google Maps?

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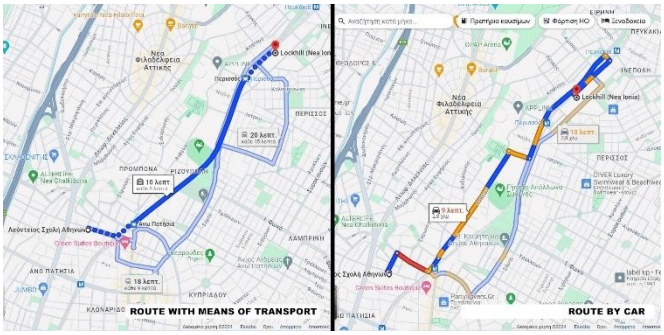
	• Can you think of any disadvantages or limitations of using location based services?
Specific Learning Objectives	• Learn how Google Maps work • Identify IoT applications that use location-based data • Understand the importance of making decisions based on location-based data • Understand how to make informed design decisions for their mobility and transport based on data analysis. • Understand the impact of such informed design decisions on the daily life • identify the advantages, disadvantages and risks using location-based applications
Required Tools/Software	• Google maps: https://www.google.gr/maps • Notebook: For documenting observations, reflections, and insights during the implementation of the scenario
Additional Suggestions	• **Expert Talks:** If possible, invite a professional or a technologist to share insights on the convergence of technology and location based data
Indicative picture (optional)	

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Scenario 4	
Scenario Title	Towards designing a smart home
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to introduce students to the concept of IoT in the context of home automation. Divide your students into teams of 2 and encourage them to think of appliances (such as the boiler) that could be controlled remotely. Encourage them to focus on one example and ask them to think about what kind of data it would be useful to monitor (e.g. temperature, humidity etc.) and the benefits of being able to control this appliance remotely. Encourage a discussion about the advantages of such a system in terms of saving energy, as well as the disadvantages or risks that such monitoring could have, especially in terms of data storage and the security of storing data in the cloud.
Discussion Points	• What appliances in your home could be controlled remotely? • What kind of data should be monitored? • How would you use this data to control the appliance? • Could this data be integrated into an IoT application? • What would this application do? • What would be the benefits of remotely monitoring and controlling an appliance? • Where would this data be stored? • Is there any risk of the monitored data being stored in the cloud?
Specific Learning Objectives	• Identify appliances that could be improved though IoT • Identify data that would be useful to monitor • Identify methods for monitoring data • identify IoT applications that can be used to remote control appliances

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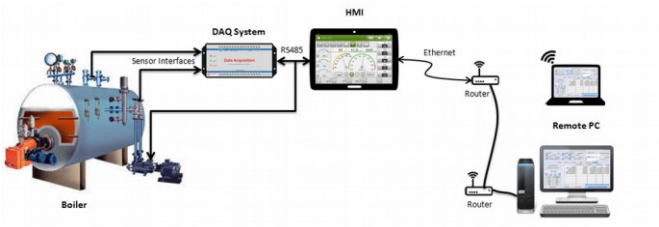
	• Gain a basic understanding of how IoT devices collect, store and use data • Understand the impact of monitoring data on energy saving • Understand how to make informed design decisions for their homes based on data analysis. • Identify the advantages, disadvantages and risks of using IoT for home automation
Required Tools/Software	• Notebook: For documenting reflections and insights during the implementation of the scenario • IoT smart home applications: to explore how such applications work (indicative links: https://www.home-assistant.io/;) • MIT App Inventor (optional): for a next level, to explore how to design and program an application • Microcontroller and sensors (optional): for a next level, to create a device that can be remotely controlled by the application
Additional Suggestions	• **Expert Talks:** If possible, invite a professional or a technologist to share insights on smart home applications and technologies
Indicative picture (optional) (image retrieved from: https://www.embien.com/case-studies/boiler-monitoring-system)	

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Learning Scenarios suggested by WUT	
Scenario 1	
Scenario Title	Smart waste bins: how to improve waste management in smart cities?
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to familiarize students with the problem of waste management in the city. Start the class with a discussion on why recycling and efficient waste collection in the city are so important. Consider what the current waste collection system in your city looks like and list the advantages and disadvantages. Let each team think of how the current waste collection system could be modified to make it smarter, e.g. collecting garbage only when the bins are completely full, optimizing the route to reduce fuel consumption, etc. Then discuss together the proposed changes and their feasibility. Compare your own ideas with ready-made ideas available on the Internet and materials prepared for the IoT4schools project. Then, let each team refine its own idea based on the discussion and inspiration from the available materials. In the last step, try to implement your own idea using available DIY technologies (e.g. Raspberry Pi Pico, Microbit).
Discussion Points	1. What does the waste collection system in your city currently look like? What do you see as its advantages and disadvantages? 2. What is recycling? Do you think that selective waste collection is important? What can recovered raw materials be used for? 3. Is it important to only collect garbage from fully loaded garbage bins to reduce fuel consumption? What do you think? 4. Is optimization of the garbage truck route an important issue? If so, how can it be done? Do you know what the traveling salesman problem is?

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Specific Learning Objectives	1. Getting to know the problem of waste collection in cities (improving ecological awareness). 2. Getting to know the essence of recycling. 3. Learning about the possibilities of IoT technology, which can help improve the functioning of cities to reduce their negative impact on the environment. 4. Learning to find solutions to problems using IoT technology and finding the advantages and disadvantages of the proposed solutions.
Required Tools/Software	1. Any microcontroller to make your own projects. 2. Basic sensors and actuators (selection depends on students' ideas).
Additional Suggestions	
Indicative picture (optional)	https://media.excellentwebworld.com/wp-content/uploads/2021/08/27101104/smart-waste-management-using-internet-of-things.jpg

Scenario 2	
Scenario Title:	Smart gardening
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The purpose of this scenario is to familiarize students with the problems of water use for gardening purposes. Start the class by dividing students into teams. Then ask students what percentage of water is used in horticulture and agriculture. Look up water consumption statistics in Europe and compare them with your guesses. Let each team consider when watering

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	plants in the garden is really necessary and how smart watering should be designed to reduce water consumption to a minimum. Compare your ideas, look for their advantages and disadvantages and consider the feasibility of their implementation. After discussion, let each team refine their idea. After the final discussion of ideas, try to implement them using any technology (e.g. Raspberry Pi Pico, Microbit).
Discussion Points	1. What is the percentage of water used for horticultural purposes and how much for agricultural purposes? 2. What can be done to minimize water consumption in the garden? 3. Why is saving water so important? 4. What are the optimal growing conditions for plants? When is irrigation really necessary?
Specific Learning Objectives	1. Getting to know the problem of water scarcity in Europe and water consumption statistics in various areas of life. 2. Understanding the need to save water, especially in horticulture and agriculture. 3. Learning about the possibilities of using IoT technology to reduce water consumption. 4. Learning to design simple IoT systems.
Required Tools/Software	1. Any microcontroller to make your own projects. 2. Basic sensors and actuators (selection depends on students' ideas).
Additional Suggestions	
Indicative picture (optional)	https://www.twl-irrigation.com/wp-content/uploads/2021/11/Smart-irrigation.jpg

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Scenario 3	
Scenario Title:	Smart car: how to reduce the number of car accidents?
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; Home automation
Scenario Implementation Overview	The aim of this scenario is to familiarize students with the issue of road safety. Start the class by dividing students into teams. Try to think about where the most car accidents occur. What causes these accidents? Excessive speed or maybe driver errors? Look for statistics on the Internet and compare your guesses with them. Then ask each team to think about how they could design a system to prevent two cars from colliding. Discuss the proposed solutions. Look together for their advantages, disadvantages and implementation possibilities. Then, let each team refine its idea for discussion and try to implement it using the selected technology (e.g. Raspberry Pi Pico or Microbit).
Discussion Points	1. Where do car accidents most often occur? 2. What is the most common cause of car accidents? 3. Is it possible to avoid a collision between two cars? 4. Is installing collision avoidance systems in cars a good solution? 5. What are the advantages and disadvantages of using IoT technology in cars?
Specific Learning Objectives:	1. Raising awareness of the reasons for car accidents. 2. Understanding the need to modernize cars with newer systems to prevent car accidents. 3. Understanding the threats resulting from the use of IoT technology in cars.

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Required Tools/Software	1. Any microcontroller to make your own projects. 2. Basic sensors and actuators (selection depends on students' ideas).
Additional Suggestions	
Indicative picture (optional)	https://miro.medium.com/v2/resize:fit:1400/format:webp/1*nRxRkYqTTMbZeoSUknzDlg.jpeg

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Learning scenarios suggested by Atermon	
Scenario 1	
Scenario Title	Building IoT devices to build a SmartHome ecosystem
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; Environmental protection; Smart cities; **Home automation**

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Scenario Implementation Overview	In this project, students will create a Smart Home system using a Raspberry Pi Pico W, various sensors and actuators, programmed with MicroPython, and integrated with the Adafruit IO platform for monitoring and control. This project aims to introduce students to IoT concepts, programming, and cloud-based data management, while also enhancing their understanding of home automation technologies. Implementing a Smart Home IoT project in a secondary education classroom involves a combination of theoretical sessions, hands-on activities, and collaborative learning. This project will help students understand IoT technology, programming, and the integration of sensors and actuators with a microcontroller, culminating in a fully functional smart home system. Session 1: Introduction to IoT concepts and applications in smart homes and presentation and discussion on the basics of IoT and real-world examples of smart homes. Session 2: Overview of the Raspberry Pi Pico W and its capabilities and demonstration of setting up the Raspberry Pi Pico W and a basic LED blinking project using MicroPython. Session 3: Introduction to basic MicroPython programming and simple coding exercises to familiarize students with MicroPython syntax and commands. Session 4: Connecting and programming the DHT11 sensor, the PIR sensor (Motion Detection) and the Light sensor (LDR). Session 5: Connecting and programming the relay module to control home appliances, the LEDs and a servo motor. Write scripts to control these based on sensor inputs. Session 6: Setting up an Adafruit IO account and creating data feeds. Sending sensor data to Adafruit IO and controlling actuators via Adafruit IO. Session 7: Testing and debugging the complete smart home system. Prepare documentation and presentations per workgroup. Session 8: Students present their smart home projects

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Discussion Points	• How does the integration of IoT technology transform traditional home automation systems? What are the advantages of using IoT for home automation? How do IoT systems improve convenience, efficiency, and security in homes? • In what ways can smart home IoT systems contribute to environmental sustainability and economic savings? How can smart home systems reduce energy consumption and lower utility bills? What are some examples of IoT devices that promote eco-friendly practices in homes? • What are the potential risks associated with data privacy and security in IoT-based smart home systems? How can data transmitted from IoT devices be protected from unauthorized access? What are some best practices for ensuring the security of IoT devices in a smart home?
Specific Learning Objectives	• Get familiar with programming in MicroPython • Learn how to connect electronics and sensors on a breadboard • Create an online application that controls inputs/outputs • Understand the concept of SmartHome and IoT devices.
Required Tools/Software	• Raspberry Pi Pico W • DHT11 • PIR sensor • LDR sensor • Relay module • LEDs • Servo motor • Power supply • Thonny software • Adafruit IO
Additional Suggestions	
Indicative picture (optional)	

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Scenario 2	
Scenario Title	IoT-based weather reporting system
Underline the challenge or problem that this scenario applies to or reflect	Health monitoring; **Environmental protection**; Smart cities; **Home automation**
Scenario Implementation Overview	This scenario involves creating a simple smart weather reporting system using a Raspberry Pi 4B+ and various weather sensors. The system tracks and reports weather parameters such as temperature, humidity, and barometric pressure, and provides alerts when it detects rain. It utilizes the ThingSpeak Cloud platform for data collection and can conduct advanced data analysis with MATLAB. Additionally, it employs the IFTTT service to send alerts and notifications. Students will learn about basic IoT concepts and applications, and will be able to experiment with hardware and software to create a smart weather reporting system that tracks real-time data. For this scenario however we will focus on Session 1: How IoT devices can help in environmental protection, as well as ease our lives by offering automated services? In this first session of the IoT-based weather reporting system project, students will explore how IoT technology can contribute to environmental protection and enhance daily life through automated services. This introductory session will involve a presentation and an ice-breaking activity where students share their thoughts on the potential applications of IoT in environmental and home automation contexts. The aim is to familiarize students with IoT concepts and stimulate

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	interest and engagement through discussion.
Discussion Points	The teacher should be able to explain the following key points: ● How does the integration of IoT devices improve the accuracy and efficiency of weather monitoring compared to traditional methods? ● What are some examples of IoT applications in weather monitoring outside of the classroom? How do real-time data collection and analysis impact weather prediction and disaster management? ● How does monitoring local weather conditions help students understand climate change and environmental science? Can this project inspire students to pursue careers in environmental science or meteorology? ● What are the potential privacy and security concerns associated with IoT weather systems, and how can they be mitigated? The teacher should also ask their students to enable interaction: 1. Do you know any IoT devices focused on environmental protection? 2. How can you use weather-reporting devices to your benefit at your home? 3. Any idea on how such devices can be part of a smart home ecosystem and would you use them for?
Specific Learning Objectives	● Learn the fundamentals of IoT technology and how it can be applied to weather monitoring. ● Students will learn about the role of IoT in monitoring and protecting the environment. ● Students will understand how IoT can automate and improve weather and disaster reporting. ● Students will engage in brainstorming and discussions to generate innovative ideas for IoT applications in disaster management.

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Required Tools/Software	Examples of weather sensors for demonstration purposes. • DHT11 Temperature Sensor • BMP180 Barometric Pressure Sensor • YL-83 Rain Sensor • Rain gauge • Hygrometer • Soil moisture sensor
Additional Suggestions	• Start with a fun activity where students list possible IoT applications they are familiar with or can imagine. • Invite an environmental scientist or IoT expert to discuss the impact of IoT on environmental monitoring. • If possible, show a live demo of a simple IoT setup using weather sensors and a Raspberry Pi.
Indicative picture (optional)	

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Learning Scenarios suggested by Heron	
Scenario 1	
Scenario Title:	*Using IoT devices for water conservation and preservation of school gardens.*
Underline the challenge or problem that this scenario applies to or reflect	Environmental protection
Scenario Implementation Overview	The aim of the scenario is to develop an IoT-based system that monitors the moisture of the soil, the temperature and moisture of the air, and to provide water to plants in school gardens, based on the perceived needs. Students will research the needs and requirements of plants in school gardens, as well as the problems associated with their maintenance, especially during school holidays. Interviews with expert gardeners, and with IoT specialists will take place, to enhance and enlarge the knowledge and experience of the students. Students will be required not only to set up an automated IoT-based system for garden monitoring, but also to make proper selection of plants that might be better adjusted to the conditions of school soil and school working schedule. Students will then create a small-scale pilot implementation in at least one school garden, and use IoT devices to control the collection and watering of the plants.
Discussion Points	Some questions that will enable the students to further research the needs of a (school) garden, and propose solutions are: ● what are the benefits of school gardens? ● what are the limitations of soil found in schools? ● what type of plants can we use in a school garden? ● what are the needs of such plants? ● what are the limitations of having a thriving garden throughout the year, including school holidays? ● how can technology enable us to maintain a school garden, while at the same time conserving resources?

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Specific Learning Objectives	**Students are expected to learn:** ● the needs and varieties of plants suitable for school gardens ● the requirements of plants to sustain them throughout a full school year, including summer holidays ● the equipment required to monitor the moisture in the air and soil, and how to program them ● the equipment required to provide water to plants, and how to automate the procedure ● identify the impact of the proposed solution, when implemented at a national level
Required Tools/Software	● BBC Micro:bit or Raspberry Pi Pico ● Moisture sensor for soil ● Moisture sensor for air ● Motor for the water pump ● Associated accessories and cabling ● Software for programming the device ● Software or Notebook to be used as a log for the measurements of the IoT device.
Additional Suggestions	**Interviews with experts:** It is required that students not only research articles and similar solutions on the internet, but broaden their knowledge by interviewing experts in both the fields of (school) gardens and plants, and also from the field of IoT. **Presentation of project to Policy Makers:** Such a project offers a viable solution for the school gardens of schools across the country. As such, it might be important for students, at the end of the project or during its implementation, to officially present it to Policy Makers.

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Indicative picture (optional) *School garden monitored by BBC Micro:bit (created using Bing Creator)*	

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Scenario 2	
Scenario Title	School automation: designing a “smart”, energy efficient school
Underline the challenge or problem that this scenario applies to or reflect	Environmental protection; home/work automation
Scenario Implementation Overview	Classroom settings require the regulation of the temperature at all times, however in countries such as Cyprus or Greece, there is rarely if at all air conditioning systems installed at schools. As such, at best the temperature, especially during the warm months of the year, that consist of almost 50% of school time, is regulated by manually opening and closing windows and/or fans located on the ceiling or walls. Additionally, in winter months with less light during the day, it is essential to switch on the lights during the classroom and switch them off for energy conservation during the (daily) breaks. We propose a smart system that will monitor the temperature in the classroom, and switch on and off the fans whenever it is required, automatically, and to switch them off automatically at the end of the school day. The same system will be responsible for switching on and off the lighting, to preserve energy and avoid the possibility of leaving them on during weekends or afternoons. The devices used, with the exception of the fans and the classroom lights, can be solar-powered to conserve energy.
Discussion Points	Some questions that will engage students into creative thinking and problem solving can be: ● What are the needs of your classroom during the months of September - November and April - June? ● What are the problems of manually switching on and off the fans and the lights during the school day? ● How can we automate the use of fans and lighting? ● How can we preserve energy with a proposed automated system?

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Specific Learning Objectives	Through the implementation of this scenario, students are expected to: ● Identify the necessities of classroom environments during the warm months of the year ● Identify the barriers (financial, technical) of using air conditioning systems in all classrooms ● Propose solutions to alleviate the problem with a low cost of installation and operation ● Propose a system that will control and monitor the classroom environment, focusing on lighting and temperature control ● Identify the requirements of such a system
Required Tools/Software	For the implementation of the proposed scenario, it is necessary to use the following equipment: ● BBC Micro:bit or Raspberry Pi Pico ● Temperature sensor ● Moisture sensor ● Light sensor ● Software for monitoring and controlling the system ● Solar panels for providing power to the proposed system ● Necessary cables, equipment, tools and consumables
Additional Suggestions	**Interviews with experts:** It is required that students not only research articles and similar solutions on the internet, but broaden their knowledge by interviewing experts in both the fields of home/office/school automation, but also of environmental control. **Presentation of project to Policy Makers:** Such a project offers an important solution, even at a theoretical level, on how to improve the working conditions in the classroom. As such, it might be important for students, at the end of the project or during its implementation, to officially present it to Policy Makers.

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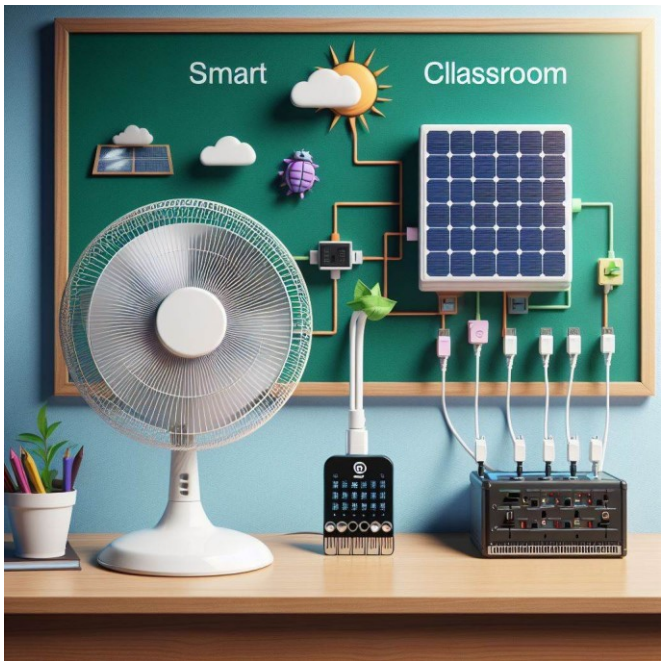
Indicative picture (optional) *BBC Micro:bit controlling the environment of the classroom (image created using Bing Creator)*	

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