AI-GREENER

2024-1-AT01-KA220-SCH-000248327

LESSON PLAN

AI-Driven Smart Cities

Bundeshandelsakademie Wolfsberg
Austria

Darica İlçe Milli Eğitim Müdürlüğü
Turkey

Campus 02 Fachhochschule der Wirtschaft GmbH
Austria

Directorate of Secondary Education of Kefallinia
Greece

Jaunpiebalgas vidusskola
Latvia

Sucessos Criativos, Lda
Portugal

Sredno obshtoobrazovatelno uchilishte Lyuben Karavelov
Bulgaria

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Authors

Gymnasio Mesovounion with Lyseum Classes

Andromachi Ganga

Disclamer

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1. TITLE

AI-Driven Smart Cities: Designing Green Neighborhoods with the Power of Artificial Intelligence.

2. GRADE LEVEL

ISCED Level 2 – Lower Secondary Education (ages 12–15)

3. SUBJECT AREA

Geography

4. TYPE

Lesson Plan

5. DURATION

Double session (2 × 60 minutes) optional project-based homework.

6. LEARNING OBJECTIVES

- O1: Students will recognize and analyze urban environmental problems (e.g., urban heat island effect, traffic congestion) using geographical and climatic concepts.
- O2: Students will investigate the use of Artificial Intelligence (AI) and Open Data as tools to improve the sustainability of cities (Smart Cities), specifically regarding resource management and emission reduction.
- O3: Students will design an initial Green AI solution for a local problem, presenting its potential business value through a Mini Business Canvas outline.

7. Key Competences Developed

- Mathematical competence and competence in STEM
- Digital competence
- Personal, social and learning to learn competence
- Citizenship competence

- Entrepreneurship competence

8. Prior Knowledge / Prerequisites

Basic knowledge of topography, climate, and urbanization in Europe, as covered in the Geography B' Gymnasio curriculum.

9. Lesson/Project Outline

Phase 1 – Introduction (Engage & Contextualize)

Instructions & Activities: The module begins with framing urban environmental challenges. Students use audiovisual material illustrating the effects of climate change in urban centers. In groups, they list the environmental challenges in their own city, linking local problems to broader geographical concepts.
Expected Output: Recognition of the need for smart, sustainable interventions (Smart Environments).

Resource (name)	Link (to the folder on Teams)
Video: "Urban Climate Challenges"	https://teams.microsoft.com/l/folder/Lesson1/Video_Urban_Challenges.mp4

Phase 2 – Exploration (Investigate & Compare)

Instructions & Activities: Students study specific examples of AI application in European smart cities. They examine, for instance, how AI is used for automated intersection management (e.g., in Issy-les-Moulineaux, France) or space monitoring with smart cameras (e.g., in Las Rozas, Spain), using Open Data.3 Investigation extends to how AI improves resource management (energy, waste).4 Students critically compare the cost-benefit of traditional vs. AI-driven solutions, recognizing challenges related to privacy and ethical use of technology in cities.7
Expected Output: Understanding of AI's functional role in resource management and critical comparison of solutions.

Resource (name)	Link (to the folder on Teams)
Worksheet: Comparing AI Solutions (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Worksheet_AI_Solutions.docx

Phase 3 – Application (Hands-On Practice)

Instructions & Activities: Mini Business Canvas: Each team selects a local challenge and designs an initial Green AI solution. They use a simplified Mini Business Canvas template to identify the Value Proposition, customers/users, and the function of the AI solution (e.g., a traffic prediction system or optimized lighting).
Expected Output: A completed Mini Business Canvas draft, bridging Geographical knowledge with Entrepreneurship competence.

Resource (name)	Link (to the folder on Teams)
Template: Mini Business Canvas (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Template_Mini_Business_Canvas.docx
Guide: Pitch Presentation (PPTX)	https://teams.microsoft.com/l/doc/Lesson1/Guide_Pitch_Presentation.pptx

Phase 4 – Reflection & Consolidation (Present & Connect)

Instructions & Activities: The module concludes with a short presentation (pitch) of each team's solution. Peer Review Protocols are used to provide feedback.1 Reflection focuses on AI's role as a digital governance tool and the citizen's responsibilities regarding the use and control of data in smart cities.7
Expected Output: Presentation of the AI-solution and documented peer feedback.

Resource (name)	Link (to the folder on Teams)
Peer Review Protocol (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Protocol_Peer_Review.docx

10. Assessment Criteria

Assessment verifies alignment with learning objectives (O2, O3).
-Peer Review Protocol: Assessment of the business idea and presentation (Phase 4).
-Portfolio: Grading of the final completed Mini Business Canvas (Phase 3) for clarity of the value proposition and AI usage.

Resource (name)	Link (to the folder on Teams)
Assessment Form: Mini Business Canvas (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Assessment_Mini_Business_Canvas.docx

11. Teaching Materials

Name	Type (Developed/Existing)	Link	Role in the lesson
Worksheet: Comparing AI Solutions	Developed (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Worksheet_AI_Solutions.docx	Guiding research in Phase 2.
Template: Mini Business Canvas	Developed (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Template_Mini_Business_Canvas.docx	Tool for developing the business idea (Phase 3).
Peer Review Protocol	Developed (DOCX)	https://teams.microsoft.com/l/doc/Lesson1/Protocol_Peer_Review.docx	Assessment of the presentation (Phase 4).

12. External Resources and References

Resource (name)	Link (external or to the folder on Teams)
data.europa academy webinars: Smart Cities	https://data.europa.eu/en/news-events/news/smart-cities-integrating-ai-and-open-data
AI-GREENER eGuide to Digital Green Entrepreneurship	https://ai-greener.eu/e-guide-download

Picture 1. Athens, Acropolis