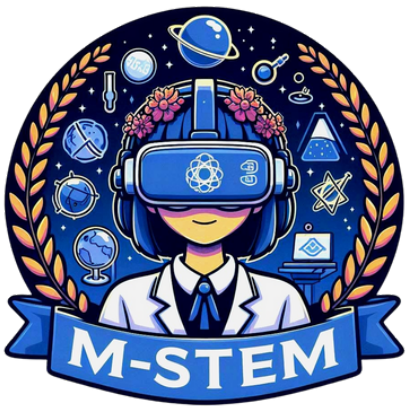

MSTEM

LESSON PLAN: SUSTAINABLE TECHNOLOGIES

METAVERSE-BASED STEM EDUCATION FOR A SUSTAINABLE AND RESILIENT FUTURE

2023-1-FR01-KA220-SCH-000151516

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Purpose of Lesson

ThThe lesson introduces sustainable technologies that minimize environmental impact while supporting economic growth and social well-being.

Description of Lesson

SStudents will explore key sustainable technologies, including energy-efficient systems, green building techniques, and circular economy practices. A simple Metaverse activity will allow students to navigate a virtual eco-friendly city.

Lesson Teaching Methods

Problem-Solving Approach

- Students will analyze a sustainability challenge (e.g., reducing plastic waste or improving energy efficiency in homes).
- Encourages creative and analytical thinking.

Flipped Classroom

- Students review case studies of sustainable technologies before class.
- Allows more time for hands-on activities and discussions.

Metaverse simulation

- VR-based interaction with a sustainable city model.

Lesson Objectives

- Define sustainable technologies and their role in reducing environmental impact.
- Identify examples of sustainable technologies in different sectors.
- Analyze how sustainability is implemented in urban planning.
- Experience a virtual eco-friendly city model.

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Lesson plan

- **Introduction (10-15 min):**
  - Students discuss the importance of sustainability in daily life.

- **Main Lesson (25-30 min):**
  - Teacher presents case studies on green buildings, energy-efficient appliances, and smart grids.
- **Metaverse Activity (15 min):**
  - Students explore a VR city showcasing sustainable buildings, green spaces, and efficient transportation.

- **Conclusion (10 min):**
  - Students share insights from their Metaverse experience and discuss future applications.

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Lesson table

lesson plan	
Brainstorming Activity: Students discuss the importance of sustainability in daily life.	10-15 min
Exploring Sustainable Technologies: Teacher presents case studies on green buildings, energy-efficient appliances, and smart grids.	30 min
Virtual Eco-Friendly City Tour: Students explore a VR city showcasing sustainable buildings, green spaces, and efficient transportation.	15 min
Reflection & Summary: Students share insights from their Metaverse experience and discuss future applications.	15 min

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Lesson resources

- Lesson slides on sustainable technologies
- Access to a VR platform for the Metaverse activity
- Case studies on green buildings, smart grids, and energy-efficient systems

Resources used to create this lesson:

- United Nations (UN). (2023). The Sustainable Development Goals Report 2023. Retrieved from https://unstats.un.org/sdgs/
- World Green Building Council. (2022). Sustainable Cities and the Built Environment. Retrieved from https://www.worldgbc.org
- Ellen MacArthur Foundation. (2021). Circular Economy and Sustainable Technologies. Retrieved from https://www.ellenmacarthurfoundation.org

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Work and homework

Individual work:

- Work 1: Research an existing sustainable technology and present its impact.
- Work 2: Create a plan for making their school or home more sustainable.

Homework:

- Homework 1: Write a short essay on a country leading in sustainable technologies.
- Homework 2: Develop a simple blueprint for an eco-friendly building.

Evaluation and indicators

Assessment Methods:

- Class Discussions & Participation: Students will be evaluated based on their engagement and ability to articulate key concepts.
- Metaverse Activity: Teachers will assess students' ability to recognize and describe components of renewable energy or sustainable technology in the virtual environment.
- Work & Homework Assignments: Grading will be based on the depth of research, clarity of explanation, and creativity in presenting solutions.

Success Indicators:

- Students can identify and explain different renewable energy sources or sustainable technologies.
- Students actively participate in discussions and contribute meaningful insights.
- Students demonstrate comprehension through their work and homework assignments.
- Successful completion of the Metaverse activity with correct identification of key elements.

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Evaluation Indicators	
Method	Indicator
Class Participation	Contributions to discussions and activities
Metaverse Activity	Ability to identify key sustainable technology features
Homework & Work	Depth of analysis and creativity in solutions

Overview of the lesson

This lesson focuses on sustainable technologies that minimize environmental impact while promoting economic and social well-being. Students will learn about energy-efficient systems, green building techniques, and circular economy practices through case studies and interactive discussions. A key highlight of the lesson is a virtual tour in the Metaverse, where students will explore an eco-friendly city model featuring sustainable buildings, green spaces, and smart grids. By the end of the session, students will have a clear grasp of how sustainable technologies shape modern urban development and their role in addressing global environmental challenges.

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