BURSA İNOVASYON MERKEZİ

STEM ve YAPAY ZEKA TEMA: SÜRDÜRÜLEBİLİR TARIM PROGRAMI

STEM ETKİNLİK PLAN ŞABLONU

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Team Name:	Eco-Friends
Teachers' Names:	Hasan ERSOY Cenap ERGÜN Ebru AVCI Hilal AYDIN
Topic Title:	SUSTAINABLE CITIES AND COMMUNITIES
Learning Objectives / Goals:	FB.4.8.1 Ability to conduct scientific inquiry related to establishing a sustainable living environment.
Related Learning Outcomes:	Science: a) Defines a question or problem related to establishing a sustainable living environment. b) Develops a sustainable living environment model that can be used to answer the question/problem. c) Plans research related to establishing a sustainable living environment and implements the model. d) Analyzes and interprets data related to the sustainability of the living environment. e) Produces solutions by making evidence-based explanations about whether the living environment is sustainable. f) Evaluates and shares knowledge related to establishing a sustainable living environment.
	Information Technologies: BT.6.5.1.5 Develops an algorithm to solve a problem. BT.6.5.1.6 Tests the solution of an algorithm. BT.6.5.2.1 Recognizes the interface and features of block-based programming tools. BT.6.5.2.2 Explains the functions of programs created in block-based programming tools. BT.6.5.2.4 Improves and edits a program in a block-based programming tool according to given criteria.
	Engineering: • Ability to calculate energy production capacity • Ability to maintain the developed system regularly • Experiences problems encountered while producing sustainable solutions for society
	Mathematics: • Learns the basic principles of sustainable agriculture and supports them with mathematical calculations. • Discovers how mathematics can be used to solve real-world problems. • Understands the importance of resource conservation and sustainability awareness as environmentally responsible individuals.
	Other:
Grade Level:	4th Grade
Duration:	12 Class Hours
21st Century Skills:	Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration

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	Technology Literacy Flexibility and Adaptability Productivity and Responsibility
Learning Approach:	Active Learning Collaborative Learning Constructivist Approach Project-Based Learning Problem-Based Learning
Tasks (Teacher and Student Roles):	The teacher acts as a guide and facilitator. Students actively participate in the learning process and work as members of their group. They construct knowledge collaboratively.
Materials / Technologies:	Computer, internet Arduino robotics materials Artificial Intelligence Tools (DALL-E, Teachable Machine, Invideo etc.) Recycling materials
LESSON PLAN ACCORDING TO THE 5E LEARNING MODEL	Engage – Duration: 1 Lesson Hour Objective: To spark students' interest in sustainability and encourage curiosity about making living environments more sustainable. Activity: The teacher shows a short video or images about eco-friendly living spaces and sustainable schools. The teacher can generate this video using an AI tool such as Invideo with a prompt like "Create a video about sustainable living spaces." AI tools can also be used to visualize possible future dangers to our planet if sustainability principles are ignored. Discussion Questions: • How can a school become more environmentally friendly? • What changes can be made in a school to ensure sustainability? • What can we do to transform our school into a sustainable living environment? Result: Students begin thinking about how sustainability can be achieved in schools and prepare for designing a sustainable school.
	Explore – Duration: 5 Lesson Hours Objective: Students explore sustainability and investigate how schools can become more sustainable. Activity: Students work in small groups to research sustainable school designs. They examine example school concepts using

visual AI tools such as DALL-E.

Topics they may examine:
- Energy efficiency and renewable energy (solar panels)
- Water conservation methods (rainwater harvesting)
- Waste management and recycling
- Increasing green spaces and school gardens
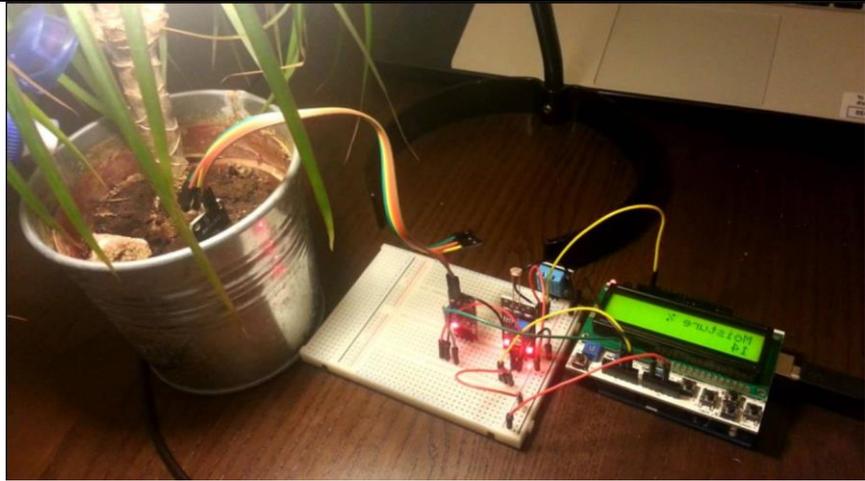
Students design a simple electrical circuit using Arduino robotics kits. Using a soil-moisture sensor, they build a system that automatically starts irrigation when soil moisture drops below a certain level.
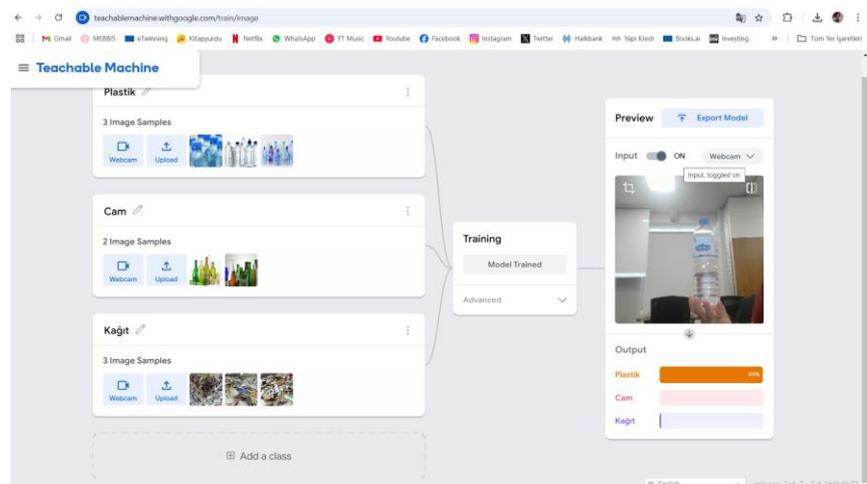
Using Teachable Machine, students develop an AI system that recognizes recyclable materials and sorts them automatically.

Result: Students learn the essential components of a sustainable school design.

Explain – Duration: 2 Lesson Hours

Objective: Students share what they learned and understand the basic principles of sustainable school design.

Activity: Each group presents their research results. The teacher explains sustainability principles and the importance of environmentally responsible design.

Class Discussion: Students discuss materials, energy sources, and environmentally friendly practices that can be used in a sustainable school.

Result: Students clarify their sustainable school designs.

Elaborate – Duration: 2 Lesson Hours

Objective: Students apply their knowledge by designing a sustainable school model.

Activity: Students create a sustainable school model (physical model, AI-generated design, or video).

	Possible features:
	• Solar panels and energy-efficient lighting
	• Rainwater harvesting systems
	• Recycling stations and compost areas
	• Green spaces and student gardens
	Students justify their design decisions scientifically by asking questions such as: "How does this design help create an environmentally friendly school?"
	Result: Students apply what they learned to develop sustainable design solutions.
	Evaluate – Duration: 2 Lesson Hours
	Objective: Students evaluate their learning and their designs.
	Activity: Groups present their sustainable school models and explain the environmental contribution of each component.
	Evaluation criteria:
	• Energy efficiency and resource conservation
	• Scope and functionality of eco-friendly practices
	• Strengths and weaknesses of the school model
	Self-Assessment: Students reflect on what they could improve and give feedback to other groups.
	Result: Students evaluate how effective their designs are in creating sustainable environments.
Related Resources:	
References:	