BURSA İNOVASYON MERKEZİ

STEM ve YAPAY ZEKA TEMA: SÜRDÜRÜLEBİLİR TARIM PROGRAMI

STEM ETKİNLİK PLAN ŞABLONU

Team Name:	NÖZTAN TEAM
Teachers' Names:	Osman Nuri Güngör Öznur Kaya Munise Canbolat Kübra Öztürk
Topic Title:	Sustainable Agriculture
Learning Objectives / Goals:	• To help students understand the importance of sustainable agriculture. • To raise awareness about the protection of natural resources. • To help students understand the relationship between healthy nutrition and local production. • To develop sensitivity about reducing food waste. • To improve students' scientific research and problem-solving skills.
Related Learning Outcomes:	Science Students conduct experiments on topics such as plant growth, soil structure, compost production and the water cycle. For example, they may perform seed germination experiments using different types of soil, measure the water needs of plants, or observe the effects of sunlight on plant growth.
	Information Technologies Students can research the historical development of agricultural tools and learn about modern agricultural technologies such as sensors and irrigation systems. They can also make learning more engaging by using artificial intelligence applications or simulation programs related to agriculture.
	Engineering Students can design and build mini gardens or hydroponic systems. This provides students with the opportunity to develop their own systems by considering which factors are important for plants to grow in the most efficient way.
	Mathematics Students can measure plant growth rates and create graphs, calculate productivity, or calculate field areas. They can also perform mathematical modelling to solve problems related to agriculture.
	Other Hydroponic System Design: Students are given different materials (plastic bottles, sponge, pump, etc.) and asked to design their own hydroponic systems. They can determine the most efficient system by comparing the performance of their systems. Data Analysis: Students measure the growth rates of different plants in a garden and present these data in a table or graph. Students analyze the data and answer questions such as which plant grows faster or which plant needs more water.
Grade Level:	4th Grade
Duration:	2 Class Hours
21st Century Skills:	• Problem Solving: Students find solutions to the problems they encounter in the garden.

	• Collaboration: Students create the garden by working together in groups. • Creativity: Students design the garden according to their personal preferences.
Learning Approach:	Project-Based Learning: A learning approach in which students conduct research on a specific topic and prepare products or presentations. Collaborative Learning: An approach that enables students to learn from each other by working in groups. Inquiry-Based Learning: An approach that stimulates students' curiosity and enables them to generate their own questions and find answers. Visual Learners: Students learn more effectively by using visual materials such as diagrams, graphs and pictures. Process evaluation is carried out through monitoring and evaluation within the framework of the Türkiye Century Education Model.
Tasks (Teacher and Student Roles):	Student Roles Active Participant: Students should not only be receivers of information but also producers and transformers of knowledge. They should ask questions, share ideas and actively participate in discussions. Researcher: Students should use different resources to research topics they are curious about, collect data and analyze them. Problem Solver: Students should develop different perspectives in order to produce creative and innovative solutions to the problems they encounter. Collaborator: Students should communicate effectively with other students and cooperate in group work and projects. Reflective Learner: Students should evaluate their own learning processes and determine areas for improvement. Teacher Roles Guide: The teacher guides students' learning processes, supports and motivates them. The teacher prepares activities and materials that facilitate learning and organizes the learning environment. Role Model: The teacher acts as a role model for students and demonstrates openness to lifelong learning. Evaluator: The teacher uses various assessment methods to monitor students' development and provides feedback. Collaborator: The teacher cooperates with other teachers, parents and the community to support students' development.
Materials / Technologies:	Artificial intelligence applications, garden materials and technologies such as virtual reality can be used to support students' creativity.

LESSON PLAN ACCORDING TO THE 5E LEARNING MODEL	Activity: “A Dream Field” Students are asked to imagine a field and decide what they would like to grow in that field. They are asked to draw how their field would look and what plants and animals would exist there using the AutoDraw artificial intelligence application. Students share their drawings in the classroom and explain why they chose those products.
	Activity: “Following Agriculture” Students watch a video about a farm. They observe what is done on the farm, which tools are used and which products are grown. Students conduct an interview with a farmer using the Synthesia artificial intelligence application and ask questions about agriculture.
	Activity: “What is Sustainable Agriculture?” Students are told what sustainable agriculture is and why it is important. Topics such as the protection of natural resources, healthy nutrition and environmental awareness are emphasized. Information is given about sustainable agriculture methods such as compost, fertilizers and natural pesticides.
	Activity: “Our Little Garden” A small area is determined in the classroom or school garden and a mini garden is created together with the students. Students decide which seeds to plant and carry out the planting process. They water their gardens regularly and record their observations. Students use the compost they produced in their gardens. They present information about the plants they grow.
	Activity: “Sustainable Agriculture Project” Students are given projects in small groups. Project topics: • Sustainable nutrition suggestions for the school cafeteria • Methods to reduce food waste at home • Vegetable growing project in the school garden Students prepare their projects and present them to their classmates. Assessment

	Observation: Students' participation in activities and their responses are observed. Performance evaluation: Students' care of their plants in their mini gardens and their project presentations are evaluated. Product evaluation: Students' drawings, writings and projects are examined to determine their learning levels.
Related Resources:	Science textbook, presentation by Agricultural Engineer Selahattin Yılmaz, Google Research
References:	Gemini, AutoDraw, Copilot, Synthesia artificial intelligence applications, Canva https://www.canva.com/design/DAE47CNzSr8/tJc1D6rVezHqdYxrf4E_Bg/edit