Teacher: Fatma Gündoğan
Subject: Classroom Activity

Title	**I use compost as a method of recycling household waste.**	**Time**	3 hours
Subject:		**Biology, Math, Internet Literacy**	
Aims		**General competence**[1]: Developing solutions for climate change and global warming, which are the biggest problems of our world **Specific competence**[2]: Recycling of household waste, which is a big problem in daily life **Aim of the activity:** Useful recycling of organic waste	
Key CS elements:		Decomposition; Pattern recognition; Abstraction; Algorithm design.	
Age group :		**12-14 year old**	
Learning place:	**Çetin Şen Science and Art Center**	**Activity type:**	**Classroom Activity**
Resources:		1-Books and Guides: Books and guides are available with information about the compost process. These resources can provide detailed information on how to make compost, what materials to use, how to optimize the process, etc. 2-Internet: Many reliable websites offer comprehensive information about compost. Websites of environmental organizations, agricultural organizations, and sustainable living platforms may contain articles, guides, and tips about compost. 3-Local Agricultural or Environmental Organizations: Local agricultural associations, environmental protection groups or municipalities may organize seminars, workshops or informational events about compost. By attending such events, you can get information directly from experts. 4-Video and Visual Content: YouTube and other video platforms offer educational videos and documentaries that demonstrate the compost process. Visual content can help you better understand how compost is made.	

	5-Universities and Research Organizations: Agriculture, environmental sciences or biology departments of universities can conduct research on compost and publish scientific articles on this subject. Such resources can provide in-depth information.

Learning development:

Problem definition:

Using computational thinking, categorizing and collecting organic wastes generated at home and thinking of various methods to turn them into useful recycling.

Introduction

The problems of our world related to global warming in recent years are explained. In order to cope with these problems, we discuss how we can make the organic waste generated in our own homes useful without harming the nature. Videos about recycling are shown. The importance of recycling is emphasized.

We think that organic waste (food residues) in our home's harms nature. What can we do to make these wastes useful without harming nature? For this, we want you to do some tasks.
- We want you to collect and categorize waste in your homes for 1 month.
-In this process, we expect you to collect information about recycling by visiting universities, municipalities and local agricultural and environmental organizations in your region.
- We expect you to research how you can recycle waste with this information you have acquired. We want you to decide what recycling will be most beneficial to nature.
-After you decide on the recycling you will do, we expect you to watch its applications on the internet and in videos.
- As a result of all this, we expect you to make your own recycling plan. In this plan, the amount, type, waiting time and waiting place of the waste you will use will be determined by the students.
- You should design the recycling activities you will do in your classroom together with your teachers.
Let's design useful recycling for farmers interested in agriculture.

Four Principles of Computational Thinking:

1. **Decomposition:** Breaking down complex steps into smaller, manageable parts.
2. **Pattern Recognition:** Identifying identifying similarities or patterns within data.
3. **Abstraction:** - Discuss abstraction: focusing on essential details while ignoring unnecessary information
4. **Algorithm Design:** Determine composting steps and times

I. Decomposition:

- Explaining the compost process by breaking it down step by step.
- Give students a list to determine which steps the compost process consists of and ask them to list these steps.
- Break down the composting process into manageable steps: collecting household waste, separating compostable items, mixing with soil, and maintaining the compost pile (adding water, turning it over, etc.).
- Students discuss what types of waste can and cannot be composted.

II. Pattern Recognition

- Introduce pattern recognition: identifying similarities or patterns within data.
- Recognize patterns in the types of waste that decompose quickly (fruit peels, vegetable scraps) versus those that decompose slowly (egg shells, paper).
- Discuss how patterns in moisture and heat affect decomposition rates.

III. Abstraction

- Discuss abstraction: Focusing on essential details while ignoring unnecessary information.
- Focus on the essential elements needed for composting: carbon-rich material (dry leaves), nitrogen-rich material (food scraps), air, and moisture.
- Abstract the process by creating a simple model of composting that can be applied to any household.

IV. Algorithm design:

Guide students in creating a step-by-step algorithm for composting household waste at home:

Step 1: Collect organic waste (fruits, vegetables, leaves).
Step 2: Separate compostable and non-compostable materials.
Step 3: Mix waste with soil in a compost bin.
Step 4: Add water and turn over the compost regularly.
Step 5: Wait for 2-3 months for decomposition to complete.
Step 6: Use finished compost in the garden or for planting.

Conclusion

Discuss how students can use the waste they encounter at home in daily life.
- Review the basic principles learned: parsing, pattern recognition, abstraction, and algorithm design.
- Consider and analyze the differences students encounter in the compost process and suggest the most beneficial solutions for nature.
- Encourage students to apply these principles to other problem-solving scenarios.

Homework/Extension:

- Ask students to determine how they would solve another type of waste and environmental problem in daily life using computational thinking principles and have them create their scenarios.

Assessment:	-Observation and Evaluation Forms: You can create an observation form to observe and evaluate students as they implement the compost process. This form can be used to determine how accurately students follow the steps in the compost process, how effectively they manage the process, and what challenges they encounter. -Project Reports: You can ask students to prepare a project report that includes the steps they took while implementing the compost process, the challenges they encountered, the materials they used, and the results they achieved. These reports can help you evaluate how well students understand the process and how they express their thoughts and experiences. -Presentations: You can give students the opportunity to present the composting process and their results to the class. Presentations allow you to evaluate how students communicate information, their presentation skills, and their confidence. -Participation and Collaboration: You can evaluate how actively students participate and work collaboratively in the composting process. You can observe how much students contribute to the process, how they communicate within the group, and their ability to work together. -Criterion-Based Assessment: You can evaluate students based on the criteria you set. For example, you can determine criteria such as the correct selection of materials used in the compost process, regular management of the process, the effectiveness of the process and the quality of the results. You can evaluate students objectively by creating a scoring system for each criterion.

Expected results:	• Students will be able to explain the composting process. • Students will demonstrate understanding of how computational thinking can simplify and enhance their understanding of complex processes like composting. • Students will commit to using compost as a method to recycle household waste and promote sustainability.
Notes:	
Students learn to evaluate household waste through different composting methods and are helped to raise environmental awareness.	