

Title	Making Bags from Old T-Shirts Using Computational Thinking	Teacher	Ümmügülsüm Koçak
		Time	2 hours
Subject:		Home Economics/Art/Environmental Science/Computer Science/Interdisciplinary	
Aims		<p>1.Students will learn how to repurpose old T-shirts into reusable bags, applying computational thinking methods such as decomposition, pattern recognition, abstraction, and algorithm design to plan and execute their project.</p> <p>2. Reducing waste production among students, encouraging recycling, being environmentally friendly,It is aimed to raise awareness for sustainable development and to encourage the development of creative and innovative solutions.</p>	
Key CS elements:		Decomposition; Pattern recognition; Abstraction; Algorithm design.	
Age group :		12-14 years old (Middle School)	
Learning situations:	Çetin Şen Science and Art Center	Activity type:	extracurricular
Resources: - Old T-shirts (one per student) - Scissors - Rulers - Fabric markers or chalk - Sewing kits (needles, thread) or fabric glue (for no-sew option) - Whiteboard and markers - Paper and pencils for planning - Optional: Decorative materials like fabric paint, patches, or buttons -1.Design Images			
Learning development:			
<p>Introduction (10 minutes):*</p> <ol style="list-style-type: none"> Hook: Start with a discussion on recycling and upcycling, showing examples of repurposed items. Highlight the environmental impact of reducing waste by repurposing old clothing. Objective Sharing: Explain that students will learn how to transform old T-shirts into reusable bags by using computational thinking to organize and execute their project. 			

I. Decomposition (10 minutes):*

1. Activity: Break down the process of making a bag from an old T-shirt into smaller tasks.

- Example tasks: Choosing a T-shirt, cutting the fabric, deciding on a design, sewing or gluing the edges, and adding handles.

2. Discussion: Discuss how decomposing the project into steps makes it easier to manage and understand, just like breaking down a problem in computer science.

- Discuss the end goal: turning a T-shirt into a bag.
- Decompose the process into smaller steps:
 - Selecting the right T-shirt.
 - Cutting off unnecessary parts.
 - Creating handles.
 - Securing the base for holding weight.

Goal: Students identify each step involved in the process of turning a T-shirt into a bag, making it easier to execute.

II. Pattern Recognition (10 minutes):*

1. Activity: Identify common patterns in reusable bag designs.

- Example: Recognize patterns in how different cuts can create different bag shapes, or how various T-shirt sizes affect the final product.

2. Hands-On: Have students look at examples of T-shirt bags or diagrams, identifying common steps and variations in design.

3. Discussion: Relate these patterns to recognizing patterns in computational problems, which can help in simplifying and solving them more effectively.

- Show students various examples of reusable bags (different materials, styles).
- Discuss common features of reusable bags:
 - Handles for carrying.
 - Sturdy base for holding items.
 - Enough space to carry groceries or personal items.

Goal: Students recognize the essential patterns in bag design that can be replicated when making their own T-shirt bag.

III. Abstraction (10 minutes):*

1. Activity: Focus on the essential elements needed to create a functional bag while ignoring unnecessary details.

- Example: Abstract the process by focusing on the key cuts, stitching or gluing areas, and the overall structure of the bag.

2. Discussion: Discuss how abstraction helps in concentrating on the most critical aspects of the design and construction, like how it simplifies complex problems in computational thinking.

- Focus on what is important for the project:
 - What features make the bag functional?
 - How can a simple T-shirt fulfill the criteria of a reusable bag?
- Ignore unnecessary details like color or T-shirt design unless it's critical to the function.

Goal: Students understand the key attributes of a functional bag (durability, size, handles) while simplifying the process to its core.

IV. Algorithm Design (15-20 minutes):*

1. Activity: Guide students to create a step-by-step algorithm for making their T-shirt bag.

- Example: The algorithm might include steps like measuring and marking the cutting lines, cutting the fabric, assembling the pieces, and adding handles.

2. Group Work: Students work individually or in pairs to draft their algorithms, ensuring that each step is clear, logical, and efficient.

3. Discussion: Compare this process to writing a computer program, where each instruction must be precise and in the correct sequence to achieve the desired outcome.

Step 1: Lay the T-shirt flat.

Step 2: Cut off the sleeves and neckline to form handles.

Step 3: Decide on how deep the bag should be, then cut fringes at the bottom of the shirt.

Step 4: Tie the fringes together to close the base of the bag securely.

Step 5: Test the bag by putting in a few lightweight items.

Bag-Making Activity (20-25 minutes):*

- Students follow their algorithms to transform their T-shirts into bags. Encourage them to document any changes they make to their original plan.
- Optionally, students can decorate their bags using fabric paint, patches, or other materials, further personalizing their creations.





***Homework/Extension:**

- Students can try making another bag at home from a different type of material, documenting their process and reflecting on how computational thinking helped.
- Research the environmental impact of fast fashion and write a short essay on how upcycling old clothes can contribute to sustainability.

<p>Assessment:</p>	<ul style="list-style-type: none"> - Participation in discussions and group activities. - Evaluate how well students decomposed the problem into steps. - Check if they recognized essential patterns in reusable bag designs. - Observe how they abstracted key elements to simplify the process. - Ensure they can follow or create a correct algorithm to transform their T-shirt into a functional bag. - Evaluation of the final bag based on functionality, creativity, and adherence to the algorithm.
<p>Expected results:</p>	<p>1. Discussion: Reflect on how computational thinking helped in planning and executing the bag-making project. How did breaking down the steps and recognizing patterns assist in the process?</p>

	2. Real-World Connection: Discuss how these skills can be applied to other DIY projects, problem-solving, or even in everyday life, such as organizing tasks or managing time.
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Notes:
