Unplugged Activity

Title: Recicle in binary.

Educational level: **5th level 3rd cycle Primary Education.**
Curricular areas: **Social Sciencies.**
Timing: **2 sessions of 45´ (3th trimester).**

Summary

Students will learn about the binary number system, the foundation of all digital things, while exploring the importance of recycling. Through practical activities, they will relate the concepts of 0 and 1 to waste classification.

Aims

- Introduce the concept of the binary number system in a simple and fun way.
- Relate the binary system to waste classification.
- Promote environmental awareness and the importance of recycling.
- Develop classification, logic, and problem-solving skills.

Key competences to develop: mathematical, scientific and technological, digital, civic, and learning to learn.

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How do we do it?

Context for students. "Today we are going to learn how computers understand numbers. They only use two digits: 0 and 1. This is called the binary system. We are also going to recycle in a very special way, using binary codes to classify waste."

Introduction to the binary system. Explain in a simple way how the binary system works using everyday examples. Examples: Use simple examples like yes and no (1 and 0), turning a light on and off (1 and 0), or raising and lowering a flag (1 and 0). Theoretical and practical support material is available at this link.

What is Waste classification and how to do it. Show the 5 types of containers commonly used in our daily lives and the different types of waste generated by human activities. This link details what can be thrown in each container.

Practical Activity 1. Waste classification and binary representation. "Now we are going to review our neighbors' trash. Each neighbor has thrown away 8 items, and you must classify them and write a binary code for each neighbor." Next, explain how the binary system can be applied to classify waste. Each student will have a sheet with 5 sections, one for each container (yellow, blue, brown, green, orange). Below each container, there will be 8 boxes with different waste items belonging to a neighbor. Below these, there will be 8 blank boxes where the student must put 1 or 0. A 1 if the waste should go in that container, or a 0 if it should not. The result is an 8-position code made up of ones and zeros. The sheet will have 3 neighbors per container so that they can practice waste classification several times while applying it to the binary system.

Practical Activity 2. What types of waste are in each bag? Now the activity will be done in reverse and in pairs. A sheet with the containers and codes will be given, but without the waste items, and another sheet with waste boxes for them to cut out. Each pair will have to cut out and paste the waste items that correspond to the code that appears below each container.

Suggestions

Without printing materials. For Practical Activity 1, you can project the images on the board and have students write the solution in their notebooks.

Reuse sheets. If the sheets for Practical Activity 1 are laminated and written on with a whiteboard marker, they can be reused, and you won't need to print as many copies.

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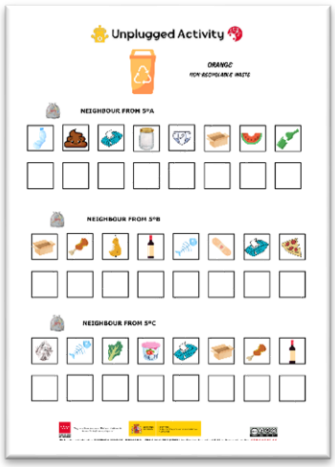
Resources

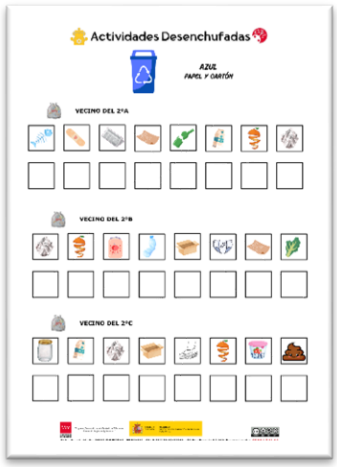
- **Human:** teachers and students.
- **Material:** color-printed sheets, scissors, glue.

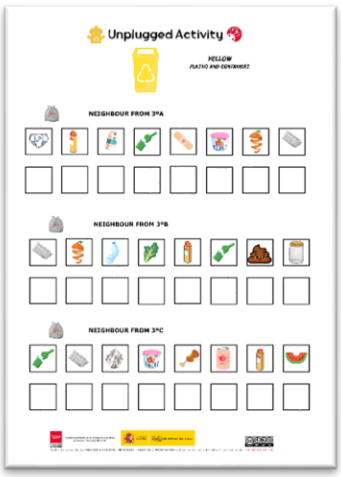
Space: classroom.

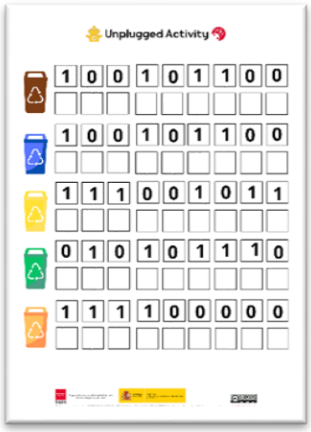
Type of activity: individual, in pairs.

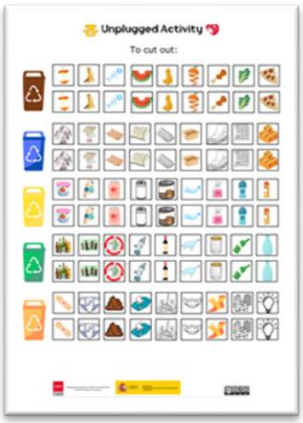
Printable material in PDF











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What have we learned?

Assessment Criteria	4 Excellent	3 Satisfactory	2 Needs improvement	1 Insufficient
Understands the binary system	Demonstrates a deep understanding of the binary system, can perform more complex conversions, and clearly explains how it works.	Understands the binary system and can convert small numbers from decimal to binary and vice versa. Correctly applies the binary system in waste classification.	Shows a basic understanding of the binary system but makes errors when converting numbers or applying them to waste classification.	Does not understand the concept of the binary system or cannot apply it in simple situations.
Classifies different types of waste	Correctly classifies all waste and justifies their choices using the binary system.	Correctly classifies most waste, demonstrating knowledge of recyclable materials.	Identifies some types of waste but makes errors in classification.	Does not correctly identify different types of waste or the appropriate containers.
Applies simple algorithms	Creates their own algorithms to solve problems related to waste classification and the binary system.	Correctly follows instructions and consistently applies the algorithm for converting decimal to binary.	Partially follows instructions, making some errors.	Does not follow instructions for converting numbers or classifying waste.
Works in a team	Actively and collaboratively participates in teamwork, clearly and concisely communicating their ideas.	Actively participates in teamwork and communicates their ideas clearly, though with sometimes with difficulties.	Passively participates in teamwork and has difficulty expressing their ideas.	Does not participate in teamwork or communicate their ideas clearly.

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Computational Thinking

Logic (prediction and analysis): thinking to make predictions, solve problems and make decisions based on available information.

Algorithms (steps and rules): is a step-by-step process that solves a problem or completes a task.

Abstraction (delete unnecessary details): simplifying things in a problem hiding unnecessary details or aspects to focus on those which are relevant and essential.

More information

QR codes to the activity resources

On this platform, you can access more resources and the theoretical considerations explained in a simple way with examples.

On this page, you can find everything related to types of waste and their classification.

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