LEARNING BOX OF UNPLUGGED ACTIVITIES

The waste sorting decision framework

In this unplugged collaborative activity, participants work in teams to design a clear and consistent decision-making framework for sorting different types of waste materials. They are presented with a variety of waste items (e.g., packaging, organic waste, electronics, mixed materials) that may sometimes be ambiguous, partially contaminated, or difficult to classify.

The challenge is not only to correctly classify each item, but also to agree on a shared set of rules that can be used consistently to make sorting decisions. Teams must discuss interpretations, resolve disagreements, and define criteria that reduce ambiguity in future decisions.

Target Group

- ☑ Low-skilled adults with low digital competences
- ☑ Low-skilled adults with limited formal education or qualifications
- ☑ Low-skilled adults with low participation in lifelong learning / training opportunities

Learning Objectives

- Analyze items and their relevant characteristics for classification
- Apply decomposition to break down a classification problem into clear categories and decision criteria
- Identify patterns in types of items, properties, and levels of variation or quality
- Apply abstraction to focus on key properties relevant for decision-making
- Collaboratively design a consistent decision-making framework for classification tasks

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Theme

Environmental responsibility and structured decision-making in waste management

Duration

60 mins

Level

Intermediate

Computational Thinking Steps Used

- ☑ Decomposition
- ☑ Pattern recognition
- ☑ Abstraction
- ☑ Algorithmic thinking

Methodological Approach

- ☐ Gamification
- ☐ Challenge-Based Learning
- ☑ Collaborative learning
- ☑ Experiential learning

Competence Areas

a) Innovation Competences

- ☐ Creativity
- ☑ Critical thinking
- ☑ Problem solving
- ☐ Communication
- ☑ Collaboration

b) Information Literacy Competences

- ☑ Ability to access, understand and critically analyse information
- ☐ Interpretation of digital and visual content
- ☐ Awareness of media influence and biases

c) Life and Career Competences

- ☑ Flexibility and adaptability
- ☑ Initiative and autonomy
- ☐ Sociability and intercultural competence
- ☐ Productivity
- ☑ Leadership and responsibility

Learning Outcomes

- Classify items into appropriate categories based on defined criteria
- Apply consistent rules to resolve ambiguous or mixed cases
- Identify similarities and differences between items to support classification decisions
- Focus on relevant properties when making classification decisions
- Collaboratively define and apply shared classification rules

Notes

- Use realistic and relatable waste examples (plastic bottles, paper cups, food containers, batteries, mixed packaging) to keep the activity grounded in everyday life.
- Include ambiguous or “tricky” items (e.g., pizza boxes with grease, mixed-material packaging, lightly contaminated recyclables) to encourage discussion

and rule definition.

- Emphasize that the goal is not only correct answers, but consistent reasoning rules.
- Expect disagreement—this is valuable. The focus is on negotiation and building shared criteria, not individual correctness.
- Guide participants to move from specific cases to general rules (e.g., “if it is contaminated with food, it goes to…”).

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Step 1: Explore waste items and understand the challenge

Participants are organized into teams and presented with a set of waste items. These may include clear examples (plastic bottles, paper, glass) and ambiguous cases (food-contaminated packaging, mixed materials, electronic waste).

Teams first examine all items and discuss initial ideas about how they might be classified. The goal is to understand the variety of materials and the difficulty of consistent sorting.

Computational thinking focus: Decomposition, breaking the problem into waste items and potential categories.

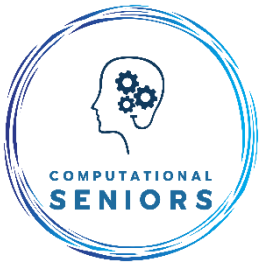
Step 2: Define classification rules collaboratively

The waste sorting decision framework

Teams examine similarities and differences between waste items to identify patterns (e.g., materials that behave similarly, items that are recyclable under the same conditions, common contamination issues).

Based on these patterns, they collaboratively define a set of clear classification rules for sorting waste into categories.

Computational thinking focus: Pattern recognition, identifying recurring material characteristics and similarities across waste items. Abstraction, focusing on essential properties such as material type, contamination level, and recyclability.



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Step 3: Apply and refine the framework

Teams apply their rules to all waste items and check for consistency. If inconsistencies or disagreements appear, they refine their classification system to improve clarity and reliability.

Finally, they present their decision framework and explain how it ensures consistent sorting.

Computational thinking focus: Algorithmic thinking, creating a structured, step-by-step system for classifying waste reliably.

The waste sorting decision framework

ACTIVITY CARDS

The waste sorting decision framework

Card Categories

Team role

Waste items

Events

Priority Levels

Essential
Extremely necessary to take into consideration

High
Importance

Medium
Helpful to take into consideration

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Print and cut the cards on the following slides to use in the activity.

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COORDINATOR

Leads the discussion.

Ensures everyone contributes.

Makes sure decisions are reached.

MATERIALS ANALYST

Examines the properties of each waste item.

RULE BUILDER

Writes the team's classification rules

DECISION CHECKER

Makes sure every item follows the agreed rules.

PLASTIC WATER BOTTLE

Material: Plastic

Condition: Empty and clean

NEWSPAPER

Material: Paper

Condition: Clean

BANANA PEEL

Material: Organic

Condition: Fresh

GLASS BOTTLE

Material: Glass

Condition: Empty

ALUMINIUM DRINK CAN

Material: Metal

Condition: Empty

USED BATTERY

Material: Hazardous Waste

Condition: Used

BROKEN MOBILE PHONE

Material: Electronic Waste

Condition: Broken

PIZZA BOX

Material: Cardboard

Condition: Greasy

NEW LOCAL RULE

Plastic containers must be rinsed before recycling.

Does your framework need to change?

Priority: Essential

MIXED MATERIALS

One item contains two different materials.

How will your team classify it?

Priority: High

FOOD CONTAMINATION

An item has food residue.

Does this affect its category?

Priority: High

RECYCLING BIN FULL

One recycling bin is temporarily unavailable.

How will you adapt?

Priority: Essential