

SDG12 Future of Innovation and Enterprise

MM5: Introduction to Engineering for Good



Micro-Module 5: Introduction to Engineering for Good

Exploration and Experimentation

Lesson 7: Waste Not, Want Not 4

**Subjects: Applied
Technology, Climate
Action and Sustainable
Development, Digital
Literacy, Technology**

Lesson Title and Summary: Waste Not Want Not 4

In Waste Not, Want Not 4, learners will apply the Engineering Design Process to designing and testing a system for waste separation and management.

Vocabulary: Reduce, Reuse, Recycling, Materials Recovery Facility

In this lesson, the learner will...

- develop their understanding of the issues around human-produced waste, recycling and the complexities of the recycling process
- learn how to effectively support recycling in their communities
- learn about how creative technology can be applied to clean up global waste
- work collaboratively with peers on a recycling-related problem
- plan, design, sketch and build a recycling system

Materials:

- Worksheet: Waste Design Challenge (covers lesson 5 - 7)
- Notebooks
- Pen/Pencil
- Paper
- A variety of clean, dry recyclables in a single, large recycling bin
- Four smaller bins (one for plastic, one for metal, one for glass, and one for paper)
- A long table
- A selection of craft materials including, but not limited to: bin bags, hand fans, small magnets, plastic tubs, netting, paper, plastic cups, straws, tape etc.



MM4 Introduction to Engineering for Good

L7: Waste Not, Want Not 4



Activity Instructions

Activity 1: Waste Design Challenge- Prototyping (30min)

1. Using Worksheet: Waste Design Challenge, the paper designs from the previous lesson and the materials provided, build a working prototype.
2. Encourage teams to test as they build and amend where needed.

Activity 2: Testing & Reflection (20 min)

1. Present each prototype by asking the teams to test under observation.
The objectives of the challenge are:

- sort a mixed-up bin of recyclables
- separate recyclables into four categories (plastic, glass, metal & paper)
- teams can help run the system by taking the place of some machinery, but cannot handle the recyclables directly.
- paper material must be kept dry

Between each test, discuss the following:

- How did it work?
- Did it meet the challenge? Was it successful?
- What worked well? What didn't work well? Why?
- How could the prototype be improve

Reflective Exercise: 3-2-1 (10 mins)

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more
- One opinion they have about the tasks

Use Post-its or a mentimeter survey - www.mentimeter.com - to gather reflections

SDG12 Introduction to Engineering for Good

L7: Waste Not, Want Not 4



Extension / Reduction Activities

Reduction: For a shorter class, reduce timing of Activity 2 and move reflection into the next lesson.

Extension: For a longer class, have learners circulate around the room testing each other's ideas to give peer feedback before the main testing phase.

Additional reflection prompts:

- What are the characteristics (magnetism, weight, etc.) of each type of recyclable that allowed it to be sorted?
- How important do you think human eyes and hands would be in a single stream sorting process?
- Given the advantages and disadvantages of single stream recycling, do you think it's worthwhile? Why or why not?
- What do you think could be done to improve recycling where you live?

Media (materials, online video links, extra resources, case studies etc)

Repak: Ireland's leading environmental not for profit organisation: repak.ie

Modernising design for minimal waste [19:31min] https://youtu.be/TJNl3vWj2_I

Sources of Marine Litter [3:50 mins] <https://www.youtube.com/watch?v=017bBeXhYz4&t=1s>

Recycling – how to [3:00 mins] <https://www.youtube.com/watch?v=sZZsBedy0CU&t=81s>

Zero waste challenge: [5:36 mins] <https://www.youtube.com/watch?v=KtTTnEePeAQ>

Local Tips / Expertise / Additional Work and Assessments

Contact or take a trip to your local Materials Recovery Facility or recycling bins to see the process of recycling.

Contact local waste disposal, e.g., KWD, Panda, etc., to see how waste is handled.

Find local organisation or individuals who use recycled or reused materials in their business.

Invite local authority environmental officer to speak to the class. Have students devise questions in advance.