

SDG12 Future of Innovation and Enterprise

MM5: Introduction to Engineering for Good



Micro-Module 5: Introduction to Engineering for Good

Exploration and Experimentation

Lesson 4: Waste Not, Want Not 1

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

Lesson Title and Summary: Waste Not, Want Not 1

In Waste Not, Want Not 1, learners will develop an awareness of consumption and waste and begin to consider sustainability and the circular economy in the products they use.

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

Materials:

- Video: The Global Waste Problem
- Teachers' Guide
- Notebooks
- Pen/Pencil
- Paper
- Bag of 'waste' items- examples:
 - Toothbrush (bamboo/plastic/electric)
 - Takeaway dish (polystyrene/plastic/cardboard)
 - Cups (single-use/reusable/mug)
 - Water bottles (plastic/reusable)



MM4 Introduction to Engineering for Good

L4: Waste Not, Want Not 1



Activity Instructions

Activity 1: Context of waste in Ireland (30min)

1. Ask learners (in pairs) to brainstorm answers to the following questions, and then share answers as a whole class. See Teachers' Guide for support.
 - What is recycling?
 - Why is it important?
2. Watch Video: The Global Waste Problem
 - What are the key areas that will lead to the volume of waste increasing?
 - Where does waste generally end up?
 - How can you explain the gap between developed and developing nations?
3. In small groups, discuss the following questions in the previous exercise. Use poster paper or a digital tool like [Mentimeter](#) to record responses to the following prompt.
 - Summarise the global waste crisis.

Activity 2: Pairs Game (20min)

1. Give each learner an item from a bag of 'waste'. See Materials for examples.
2. Learners now have to find their matches – i.e. the two different types of toothbrush. This will create groups of 2, 3 or 4 depending on the materials you have used.
3. In their groups, discuss the items they possess in terms of waste, sustainability and the circular economy.
 - Which of these items do you use/have in your home?
 - What are they made from?
 - How would you dispose of these items?
 - Which is the most sustainable?
 - Can they be reused? Can they be repurposed into other items?

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

L4: Waste Not, Want Not 1



Extension / Reduction Activities

Reduction: For a shorter class, reduce timing of Activity 1.

Extension: For a longer class, have learners exchange their ideas from the Pairs Game with another group.

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

The Global Waste Problem [2:08min] <https://youtu.be/nbUaB12VuHs>

The Big Sort: An Insider's Tour of a Recycling Plant [4:43min] https://www.youtube.com/watch?v=nUrBBBs7yzQ&ab_channel=SciFri

Engineering Design Process [1:46min] https://www.youtube.com/watch?v=b0ISWaNoz-c&ab_channel=TeachEngineering

The Global Waste Problem [2:08min] <https://youtu.be/nbUaB12VuHs>

A day in the life of one of Ireland's busiest recycling centres [2:32min]
<https://youtu.be/ZzX7y17X3o0>

Irish Waste Management Association is a trade association for waste management companies in Ireland <https://iwma.ie/>

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.

Contact your county council to invite the waste officer or the environmental health officer to speak to the class about waste management, illegal dumping and other aspects of the council's policies and procedures

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 learners devise questions in advance.



Context of waste in Ireland

What is recycling?

- To treat or process used materials or waste so they can be used again.
- Can be used for the same purpose or a different purpose (Paper can be recycled into new paper products, plastic bottles can be recycled and modified into fibres for producing clothing).

Why is it important?

- Reduces the use of raw materials (cotton, crude oil, coal, rubber blanks, mineral ores, wood)
- Reduces the amount of energy used
- Reduces water consumption
- Reduces air pollution
- Lowers Greenhouse Gas (GHG) emissions

Greenhouse Gases are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. The main greenhouse gases are:

Water vapor

Carbon dioxide

Methane

Ozone

Nitrous oxide

Chlorofluorocarbons

In Ireland...

- How much rubbish is produced by each person on average, every year? 167kg / 267kg / 367kg? (answer = 367kg)
- If you recycle one aluminium can today, how long will it take to be back on the shelf in a shop? (answer = 6 weeks)
- How long does it take plastic to decompose? (answer = can take up to 500 years)