

SDG12 Future of Innovation and Enterprise

MM5: Introduction to Engineering for Good



Micro-Module 5: Introduction to Engineering for Good

Exploration and Experimentation

Lesson 9: 3D Printing 2

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

Lesson Title and Summary: 3D Printing 2

Learners will discover the scope that 3D Printing can offer to the achievement of the SDG targets.

Vocabulary: 3D Printing, Manufacturing, Application

In this lesson, the learner will...

- develop their understanding of 3D printing
- develop their understanding of how 3D printing relates to traditional manufacturing processes
- learn the concept behind the practical aspects of 3D printing
- examine potential applications for 3D printing to tackle SDG-related problems
- ideate on potential problems and solutions arising from the use of 3D printing

Materials:

- SDG Image: See Media Box
- Teachers' Guide
- Notebooks
- Pen/Pencil
- Post it Guide/ Paper
- Materials for prototyping (e.g., pipe cleaners, polymer clay, pins, paperclips, cardboard, tin foil, sticks, straws, etc.)



MM5: Introduction to Engineering for Good

L9: 3D Printing 2



Activity Instructions

Activity 1: 3D Printing to tackle SDGs (20min)

1. Ask learners to form pairs. Using the SDG Image (see Materials), learners need to select two SDGs.
2. In their pairs, they will use the two SDGs to think about areas that 3D printing technology can be applied to, to improve global issues. Make a list of 5-10 ideas. See Teachers' Guide.
3. Ask each pair to join another pair to make a group of 4. Swap lists and highlight the best three ideas from the list. Give feedback on why you think these ideas are the best.

Activity 2: Design (20min)

1. Reform back into pairs. Each pair needs to select one of the ideas from the top three identified on their list.
2. Taking this idea, pairs develop a paper design/brief on how this idea tackles the two SDGs. They can use the internet for research.

Activity 3: Feedback (10min)

1. Share designs/brief in small groups or as a whole class. Each pair needs to listen to each presentation and provide 2 pieces of feedback. They should make a Guide on the feedback they receive.

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

MM5: Introduction to Engineering for Good

L9: 3D Printing 2



Extension / Reduction Activities

Reduction: For a shorter class, reduce timing of Activity 1 and ask them to only select one SDG to work with.

Extension: For a longer class, give learners more time in Activity 2 & 3.

For an extra class, have learners do SDG4 Problem to Pitch Lesson 6: Prototype Your Idea.

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

SDG Image <https://www.un.org/development/desa/en/news/sustainable/sustainable-development-goals.html>

What is Prototyping [1:16min] https://www.youtube.com/watch?v=_1bOaNSy5XY&ab_channel=Nesta-TheUK%27sInnovationAgency

Rapid Prototyping [7:32min] <https://www.youtube.com/watch?v=JMjozqJS44M>

Ready Set Design [3:26min] https://www.youtube.com/watch?v=jlXSuZg2awA&ab_channel=CooperHewitt

Design Thinking Prototyping [4:53min] <https://youtu.be/Q4MzT2MEDHA>

Local Tips / Expertise / Additional Work and Assessments

Invite businesses who use 3D printing to listen to the paper design/briefs of each pair and provide feedback.

If possible, access an organisation in the community that has 3D printers to run a demo session with learners.